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So many modellers, including myself, have fallen under the spell of W. J. Hughes' Allchin. Surely it must be the most modelled traction engine design, I wonder if modellers have now made more Allchin models than Allchins themselves turned out from their famous Globe Works in Northampton? W. J. Hughes was a true traction engine enthusiast and model engineer. He was also a past President of the Road Locomotive Society, Member of the Newcomen Society, of the Society of Model and Experimental Engineers and of the National Traction Engine Club. His first meeting with number 3251, the chosen prototype, was as one of three Allchins and a Marshall in yard in Sheffield, although he seemed at the time more preoccupied with the other two Allchins numbers 1275 and 1407. If Mr. Hughes was looking for a prototype to model I wonder if he was actually considering the Marshall 69256, as he says, 'I hope that before long there will be some special news about this particular engine'. However No. 3251 'won' and on 20 September 1951 the Allchin series began in M. E., the Allchin proved to be so popular that Mr. Hughes was asked by the editor to rewrite the articles, the first of which was published on 3 Nov. 1972. I have seen 3251 in 1½, 3, 4, 4½ and 6in. scales. Cherry Hill's Allchin was ¾in. scale, Mr. Ware later in this issue mentions one he made to 2¼in. scale. In respect of scale Mr. Hughes wrote 'For my part, I think 3in. scale is too big for a model'. Mr Stubbs' engine went on to win a silver medal at the 1970 Model Engineer Exhibition.

Differences in the Engines

Photo No. 1 shows a general view of engine No. 1275, with part of Royal Chester's chimney showing beyond. All the other photos are of No. 1407, and one or two of the slight points of difference may be noted by comparing them. For example, the former has a "spudpan" on the front axle, while on the latter, the steering chains are attached to clips fastened round the front axle near the wheels. (See photo No. 2.)

On photo No. 4, three different features are apparent—first, the comparatively large lubricator mounted on the valvechest; secondly, the pipe and stopvalve leading backwards from the top of the valvechest. This is not a standard fitting, but was added by a former owner to obtain really dry steam for the injector in the cab. Thirdly, a steam pipe and stop valve lead from the bottom of the valvechest forward to the blower.

Again, No. 1275 has no flywheel brake, while on photo No. 3 may be seen that fitted to No. 1407. It consists of a hardwood block sliding in a square section tubular guide behind the flywheel. On turning the small hand wheel, which can just be seen, a screw forces the endgrain of the block on to the flywheel rim.

Other Useful Information

Further particulars of No 1275 and No. 1407 are given below, with particulars of No. 3251 in parentheses (where obtained).

Rear Wheels: 6ft. diameter, 16in. wide on tread, 16 spokes, one driving pin. (No. 3251 6ft. 18½in. wide, two driving pins).

Front Wheels: 3 ft. 10 in. diameter, 9in. wide on tread, 12 spokes. (No. 3251, 3ft. 9in., 9in. wide, 10 spokes).

A FINE SIGHT!

by W. J. Hughes

Photos by Peter E. Hind, Press Photo Agency

It is told that when the raw recruit was asked at musketry practice to define "a fine sight" he answered "six dinners on one plate." Had he been a model engineer, he might have replied "Four traction engines, all in a line—which was the "fine sight," very unusual in 1948, which met my eyes recently in a yard at Gleadless, Sheffield.

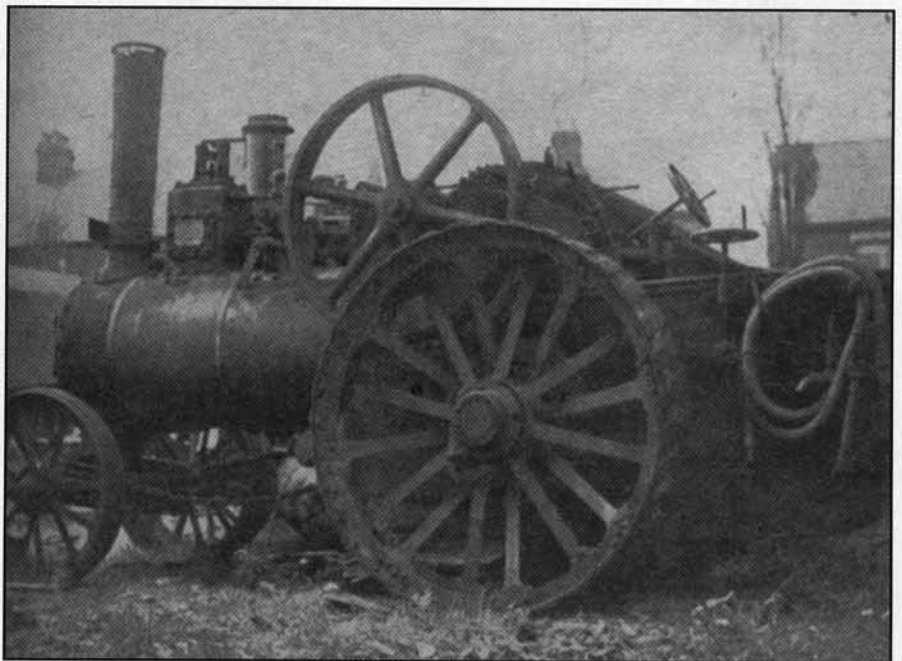
These engines belong to two brothers who are agricultural contractors, and whose lament it is that owing to the fuel problem, it is easier to run a Fordson, than a steamer today. Thus they have several Fordsons in constant use, while the four traction engines stand idle, though in good running order.

Three of the latter were built by William Allchin, Ltd., Globe Works, Northampton, and numbered, 1275, 1407 and 3251, respectively. No. 1275 was built just before the turn of the century, No. 1407 in 1912, and No. 3251 in 1925.

The first two are identical in most respects, but No. 3251, called Royal Chester, differs in several particulars—notably in that both axles are sprung (the other engines being unsprung), while the boiler is 2½ in. less in diameter, and the smokebox is 4 in. longer.

In addition, the driving position is on the near side on Royal Chester instead of the offside.

Unfortunately, owing to lack of time, it was not possible to measure up this engine completely, but the drawing gives the principal dimensions of the other two engines. I feel sure that these, with the photographs, will be of great help to anyone wishing to build a model.



Traction engine No. 1275 built by Messrs. William Allchin, Globe Works, Northampton. This is the last photograph which will ever be taken of this old-timer.

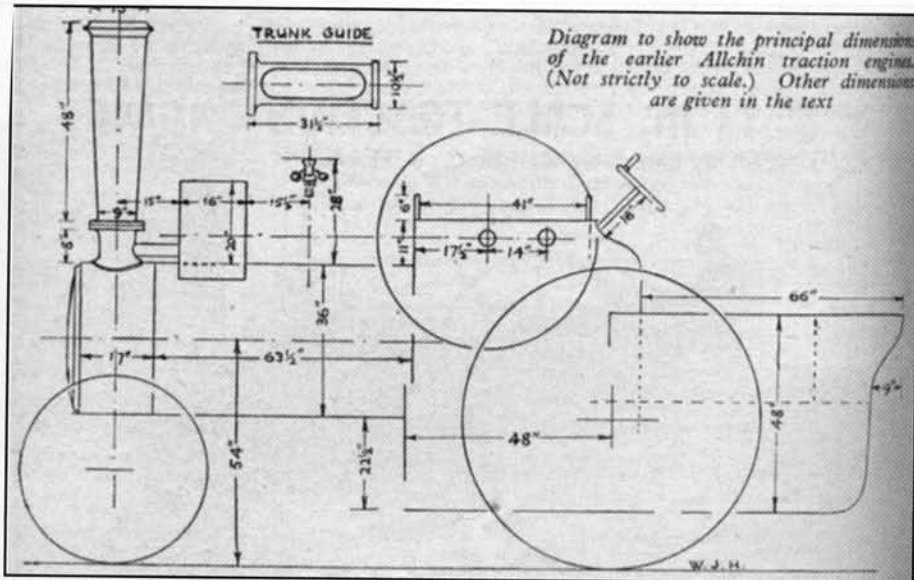


Diagram to show the principle dimensions of the earlier Allchin traction engine. (Not strictly to scale.) Other dimensions are given in the text.

Steering at offside. (No. 3251 : at nearside).
Pump in cab, at offside, driven by eccentric between crank and crankshaft bearing, visible on photograph No. 3.

The Fourth Engine

After all these details of the Allchin, will be wondering what about the fourth in the row ?

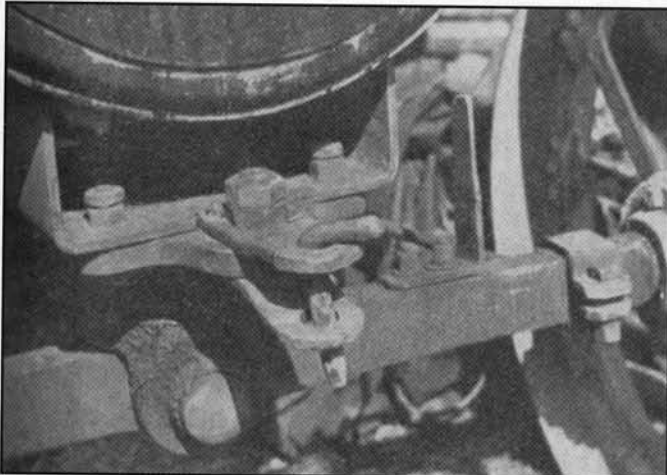
Well, this one is a Marshall, but that is all I am going to say about it at present, because there wasn't time to take any measurements, secondly, because it was so placed that we couldn't take any photographs and thirdly, because I hope that before long there will be some special news about this particular engine.

So if the Editor approves, I shall give details of the Marshall later on.

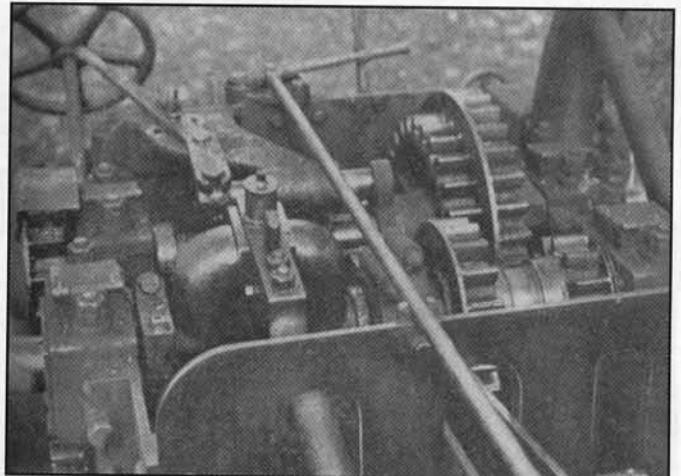
Epilogue

Since the above article was written, I have to report the sad news that Allchin No. 1275 is now no more. Like so many of her kind, she has been broken up for scrap.

Farewell, old timer! You served your masters well for half-a-century and surely you could have no better epitaph than that. Let us hope that your metals, remelted and re-born through Vulcan's alchemy, may serve mankind equally well in their future existence. Certainly they could not serve him better! ●



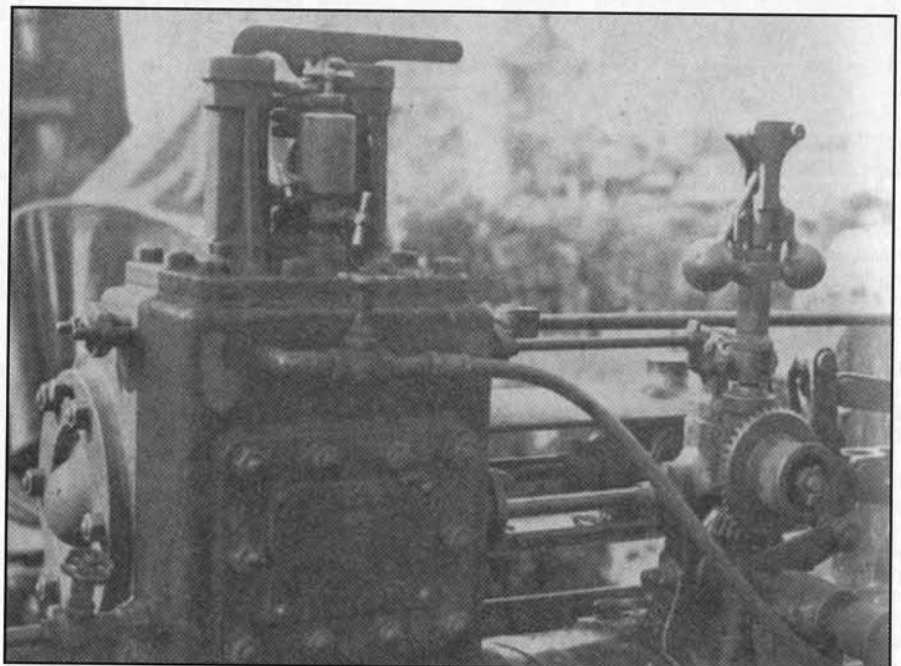
Front axle mounting of No. 1407. Note difference between this and No. 1275.



Part of "the works."

Flywheel: 4ft. 6in. diameter, rim 6in. wide by 1 1/4 in. thick, 6 spokes. (No. 3251? ditto.)
Single Cylinder: 10 in. bore by 12 in. stroke.
Connecting rod centres: 3ft. 3in.
Eccentric rod centres: 2ft. 8 1/2 in.
Eccentrics heave diameter: 7in.
Crankshaft as forged: 4in. diameter. (All journals turned to 3 1/2 in. diameter.)
Steering wheel: 17 in. diameter, 5 spokes.
Brake operating wheel: 13 in. diameter, 6 spokes. (Why the difference, one wonders?)
Hornplates are 3/4 in. thick, and distance between them is 32 1/2 in.; thus firebox is also 32 1/2 in. wide and boiler ditto diameter, with lagging 1 1/4 in. thick.
Bolting flange at chimney foot: 13in. diameter.
Width of engine over hind wheels : 7ft. 7in.
Width over tender: 2 ft. 10 1/2 in.
Thickness of plating of tender: 3/8 in.
Distance between tender side and nearside hind wheel: 13 in.
Distance between tender side and offside hind wheel: 10 1/2 in.

Cylinder-block and governor of No. 1407, showing lubricator and safety-valve. Linkage between governor and steam-chest may be seen. Note that valve-rod is guided by a bearing in the governor support.



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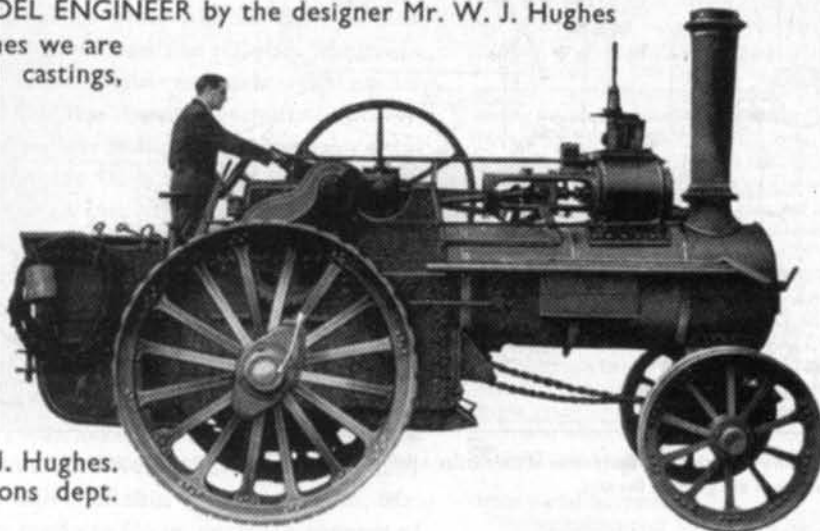
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An Allchin weather vane at Bicester.

PROGRESS REPORT ON THE ALLCHINS

W.J. HUGHES describes some of the successful trials which have taken place with this popular model

The ME Allchin 1½ in. scale traction engine is proving to be a highly successful model, both in appearance and performance. This is confirmed by reports and photographs from builders as Allchins are completed. Those who have not yet finished their own model, and other readers who may be contemplating building it, can be assured that with reasonable care and workmanship, they will have an engine which will give them as much pleasure when finished as in the making.

There were two Allchins at the Model Engineer Exhibition, one was built by Bob Page, of Cardiff, who is secretary of the South Wales Federation. Soon after the Exhibition, the engine was back in Cardiff being tested for performance.

This began with a steam-up for Mr. L. I. Heath, who himself is a keen model engineer with a penchant for portable engines and contractors' plant. A spring balance was attached to the drawbar, and Royal Chester registered a pull of 45 to 50 lb. before the hind wheels began to plough up the grass. The Allchin was then taken out to the road, and hitched by wire rope to Mr. Heath's car, with the spring balance interposed. Here the road is on a gradient of 1 in 60, and it was found that although the Allchin

could not start the load without wheel slip, if a slight push was given, to start the car moving, the Allchin could keep it going on the 1 in 60 slope.

The car weighs 19½ cwt empty, and with extra equipment, petrol, and so on it must have exceeded a ton at the time of the test.

The car and engine were then taken to where the road levelled off and with 80 lb. on the clock—she is designed for 100 lb—Royal Chester this time started the car moving (Fig. 1), and kept it going for 80 ft.

At that point a crossroads was reached and she had to stop. On the concrete road, the drawbar pull was 35 to 40 lb. before the wheels slipped. The test was witnessed by other Cardiff model engineers, and I have a statement of performance signed by them including Jack Constable, whose Sentinel Industrial locomotive won the Championship Cup in London last year.

On a later occasion, the engine was in steam at a fete, and with an industrial four wheeled trolley attached, working on rough tarmac, she had no trouble in hauling three 12 stone (average) adults and three children!

Two more Allchins

There were two Allchins at this year's Northern Models Exhibition, one by F. V. Harrison, of West Kirby, and the other by H. Smith, of Rawtenstall. Mr

Harrison's engine (Fig. 2) was awarded first prize, and Mr Smith's came second, the painting being not quite up to Mr Harrison's standard, though it was very good.

Mr Harrison told me that on "single-wheel" drive, before the differential was completed, his engine had hauled 18 stone. Later on, after completion, he borrowed a child's trolley equipped with narrow hard rubber tyres, and on hard tarmac Royal Chester moved 23 stone (all the trolley could hold) in high gear with a mere whiff of throttle and the greatest of ease.

She also hauled the same load on extremely wet grass, with the wheels sinking at least ½ in. into the earth.

Judging by these two tests it seems that Mr. Harrison's engine, in decent conditions, will have a similar performance to Bob Page's. Incidentally although he has some previous engineering experience, this is Mr Harrison's first attempt at model engineering.

At Hethe, in Oxfordshire, another "first attempt" has also proved successful. Mr T. H. Allen's family used to be in the threshing business, and at the age of 60 he decided he would like to demonstrate his love of steam by making a model traction engine. Six years (and 2,000 hours of spare time) later, he has the fine Allchin seen in Fig. 3. ●



Fig. 3 T.H. Allen with his first attempt at model engineering. Note accessories in the foreground
(Picture reproduced by courtesy the Oxford Mail.)

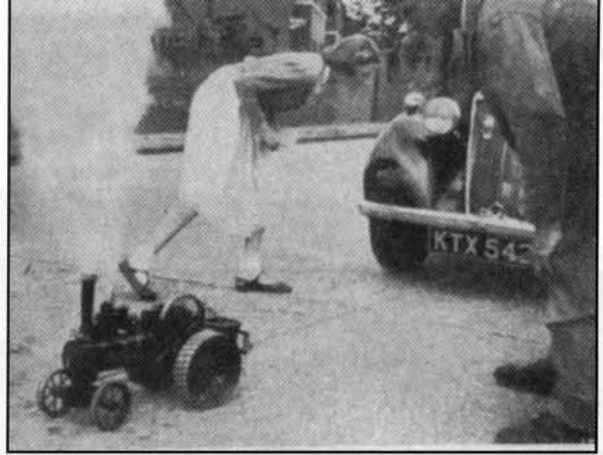


Fig. 1: Bob Page keeps an eye on ROYAL CHESTER as his daughter makes a careful check of the spring-balance reading.

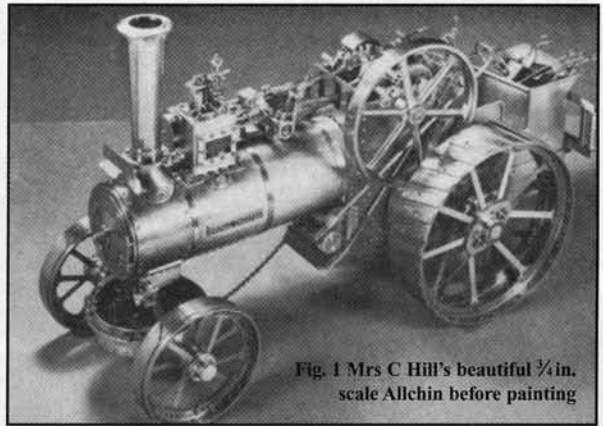
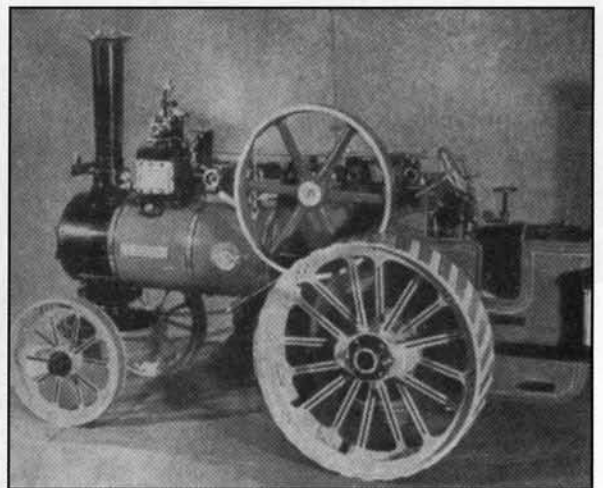


Fig. 1 Mrs C Hill's beautiful 3/4 in. scale Allchin before painting

Below: Fig. 2: The paint and mechanical work on E. V. Harrison's Allchin are beautifully finished. This photograph was taken by J. S. Christopher.



Fig. 4: Sidney Christopher applies oil on an easy haul.
(Picture by L. I. Heath)

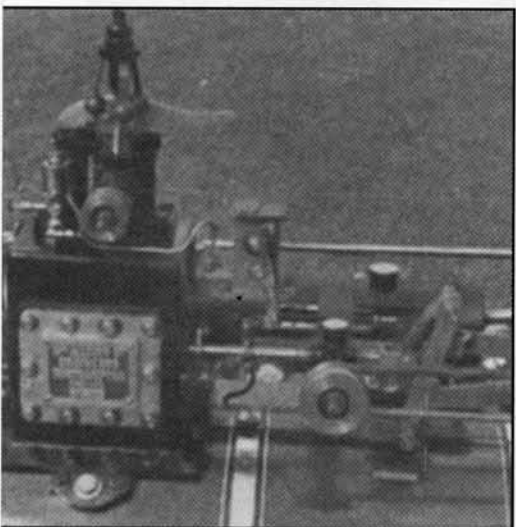
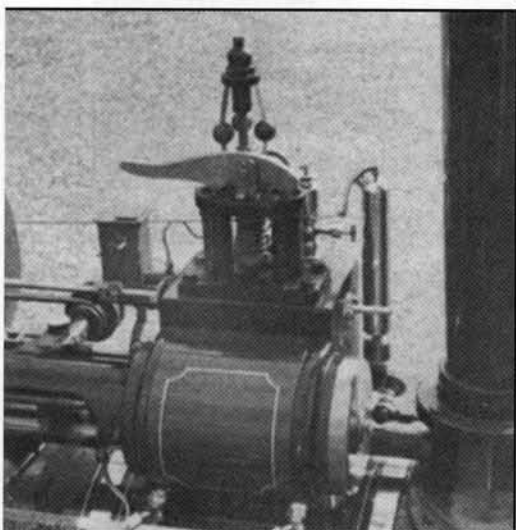


This model traction engine, built by Mr F. S. Christopher of Southport, took the first prize in the model engineering section at the Burtonwood Rally.



AN ALLCHIN WITH A BIG DIFFERENCE

TALKING ABOUT STEAM WITH W. J. HUGHES



Above: Two views of the cylinder

DURING THE 1969 RALLY SEASON, the crowds at several traction engine rallies in the North and Midlands have been intrigued to see a very fine Allchin to 4in. scale. It was built by Mr G. E. Stubbs of Bunny, near Nottingham, with some assistance in the latter stages from Mr Derek Scothern. Mr Stubbs is managing director of an engineering firm at Beeston, Notts., and his collaborator is an employee who, like himself, is at home with my kind of machine tool.

The model really started ten years ago, with the presentation to Mr Stubbs of a piece of $\frac{3}{16}$ in. thick seamless steel tube, which when measured up was found to be right for the boiler barrel of a 4 in. scale Allchin. Mr Stubbs was already working on a $1\frac{1}{2}$ in. scale version, and thus had a full set of drawings. From these it was not difficult to scale up the various components for the larger engine.

In the main, the boiler is of $\frac{3}{16}$ in. steel, including the firebox, but the boiler front (backhead) and the tubeplates are $\frac{1}{8}$ in. thick. The boiler is of welded

Right: Only the flower bed gives away her true size - 4 in. scale! Visitors to the M.E. Exhibition will be able to see this fine engine.

construction throughout, except that the eighteen 1 in. by 18 gauge copper flue tubes are simply secured by being expanded in at both ends. An advantage of the thicker backhead is that the fittings can be screwed straight in without bushing.

The side stays are of $\frac{1}{8}$ in. dia. high tensile steel, screwed in and welded all round. They are hollow, as in the $1\frac{1}{2}$ in. scale design, to allow for the hornplates being riveted on. There are three longitudinal stays, also of $\frac{1}{8}$ in. high tensile steel. No conventional crown stays are fitted, but a 'Maltese cross' arrangement of bars is welded to the firebox crown. This has stood a hydraulic boiler test of over 250 p.s.i., and the safety valves are set for 125 lb. There are two fusible plugs, $\frac{1}{8}$ in. B.S.P.

Mr Stubbs made his own pattern for the cylinder, which was cast in iron. It was fitted with a steel liner to form the steam jacket, but the working surface is a shrunk in cast iron liner from a twin cylinder motorcycle. The piston is made from dural, and fitted with motorcycle piston rings to fit the liner.

Slight trouble with seizing was experienced on the first trial run due to the dural expanding rather more than had been calculated, but it was rectified easily by taking a slight skim off the piston, without even letting the steam pressure down.

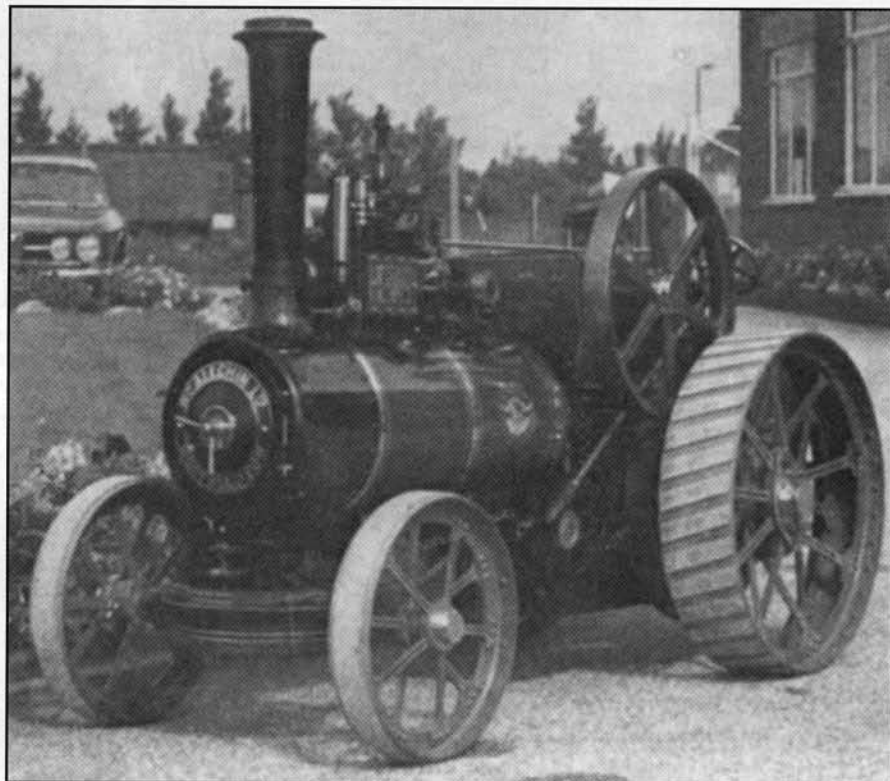
To fix the cylinder to the boiler, headed studs were screwed into the shell from inside. They are tapped with blind holes facing outwards, and hexagon headed set screws pass through the cylinder saddle into these.

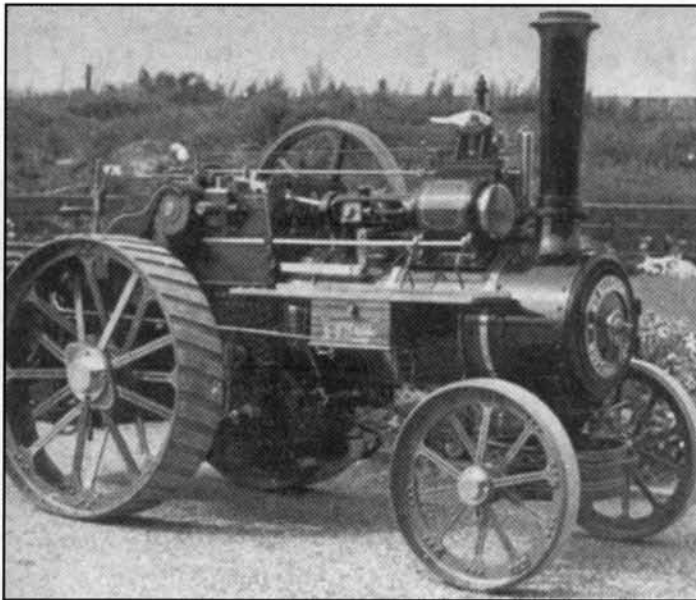
Crankshaft and gearing

The crankshaft is machined from a solid slab of steel, with the cheeks left square. It was here that the model deviated from the original, which like most single cylinder engines had the crankshaft forged from round bar. In other words, those crankcheeks should be round in section, and I have high hopes that when time allows Mr Stubbs will lift out the crankshaft and have a go at it. Certainly it would greatly improve the appearance, and much of the surplus could be removed by milling.

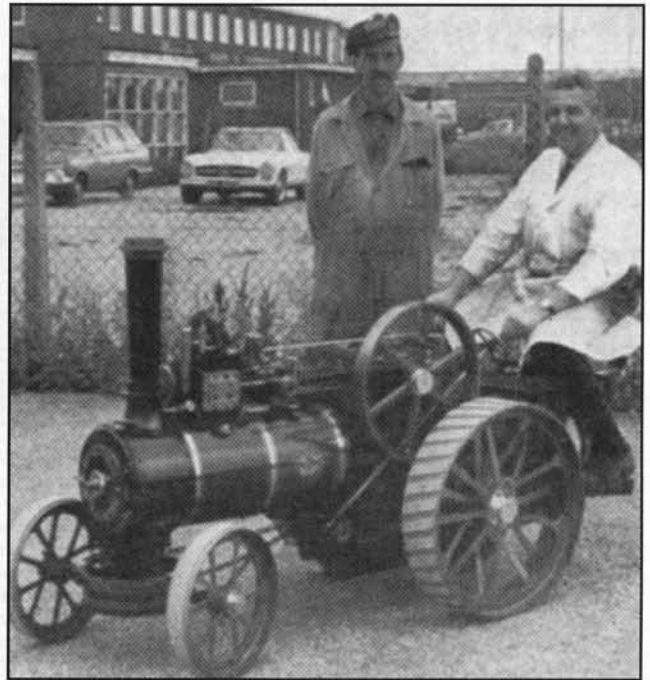
A deviation which is not noticeable is that the crankshaft and second shaft both revolve in ball races which are housed in the brasses. The bearing brackets are four of the few castings which were used in the model; others are the eccentric sheaves and the water pump body, but all such items as hubs, fore-carriage fork and turntable, and brackets for gearchange and regulator levers are fabricated.

All the pinions and spurwheels of the drive are





An off-side view (above) and, right, Mr Stubbs driving with Mr Scothern behind.



steel change-wheels from scrapped old lathes, faced up to thickness and otherwise adapted to the requirements of the model. Those which form the change-speed pair slide on four splines milled from the solid on the second shaft. The bevel wheels and pinions of the compensating gear were contracted out, however.

The wheel hubs were fabricated from steel, with bronze bush inserts. The rims were made by rolling up from sheet, with the webs of the tee rings welded in. Jigs similar to those which I described for the 1½ in. version were used to ensure accurate assembly of hubs, spokes, and rims.

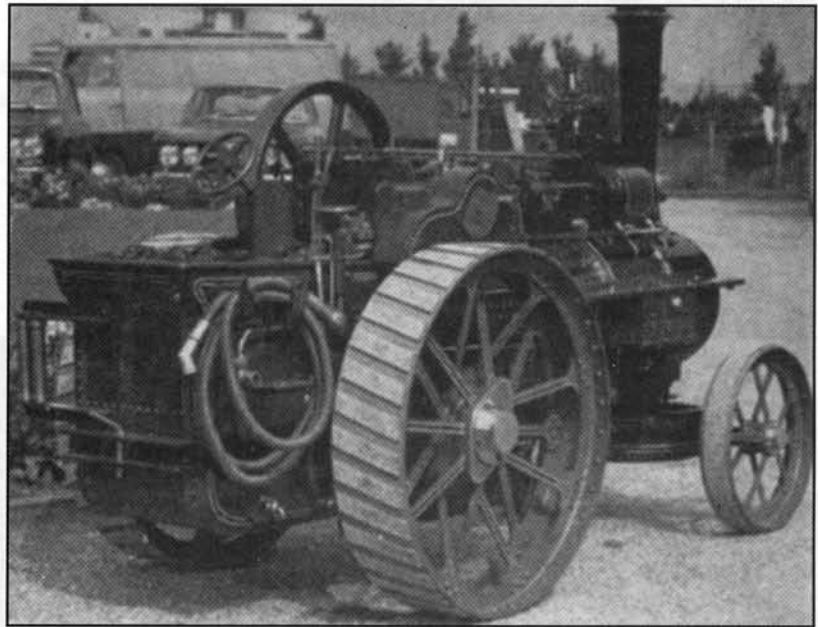
The tender is made from ¼ in. plate in the orthodox manner, with the sides flanged and the back, bottom coalplate and footplate riveted on. Naturally it has all the correct fittings—drawbar and drawstraps, fairlead, water pocket and water-lifter, hose and hose brackets, and so on.

For a full-size driver to cope with this one third size model, a tractor seat is hung from the tender. Its mountings are extended downwards, and a cross-bar fits nicely into the drawbar, with a footrest at each side. This provides a comfortable driving position, with one's legs at each side of the tender, and the controls within easy reach.

The model weighs about 12 cwt. It is very nicely painted and lined out, with a pair of 'maker's transfers' on the boiler which Mr Stubbs has had made by the screen printing process. Mr Scothern told me that the painting had been done by spraying thinned down 'Valspar,' which had been built up to thickness by successive coats. However, each coat had been applied whilst its predecessor was still very slightly tacky, which had prevented runs and 'orange peel' effect.

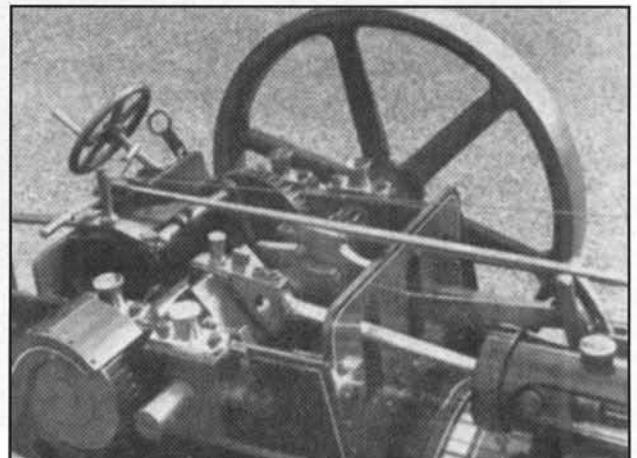
After a preliminary look at the model in the workshop, Mr and Mrs. Stubbs took me off for lunch—a very pleasant social occasion. When we returned, Mr Scothern had raised steam, and we proceeded to put the engine through its paces.

It was very easy and pleasant to drive, and exceedingly fast in the high gear. The firebox and boiler capacity are sufficiently large that stoking is needed but infrequently, and the pump has to be run with the bypass cock partly open. There is an injector which works well, but is not often needed. As to performance, the engine has hauled a load exceeding four tons quite easily, on fairly rough ground and a slight upgrade, and in high gear. What her performance would be if loaded to capacity is anybody's guess, especially in slow speed!



A rear three-quarter view of the engine.

At the present time, in the workshop ate three more traction engines under construction. Two of these are 3 in. scale Burrells which Mr Scothern is building, and the third is a 4½ in. scale Burrell by Mr Stubbs. They are all in the early stage yet, but bid fair to rival the Allchin for excellence. I should also mention the original 1½ in. scale Allchin, whose forlorn parts have been gathering dust for some time now. This, too, is a fine job, and I hope that some day I shall be able to visit Beeston to compare the finished engine with her bigger sister! ●



Motion and gearing; note the "square" crank.

TWO LARGE ALLCHINS

described by W. J. Hughes

Recently I had the pleasure of visiting Severn Lamb Ltd. at Stratford-on-Avon in order to inspect two 6in. scale Allchin traction engines which the firm has built for private individuals. They were not quite complete when I was there, but by the time this appears their new owners should be in possession.

Certainly an Allchin is very impressive in this size, with the polished copper chimney cap at about eye level and the rest in proportion. Many folk, of course, would say these were not models at all, but full-scale engineering jobs—however, each to his own taste. For my part, I think 3 in. scale is too big for a model, but who am I to say? It must be admitted that to have one of these 6 in. scale jobs in my garage would give me a considerable kick!

The two engines are virtually identical, both having been built by scaling up my own 1½ in. scale drawings by four to one. One difference from my arrangement is that a balanced crank is fitted instead of the correct 'bent from the round bar' appearance. I did not like this personally as not true to prototype, but it was to the customers' orders, to try to eradicate some at least of the oscillation which occurs when the motion is running free.

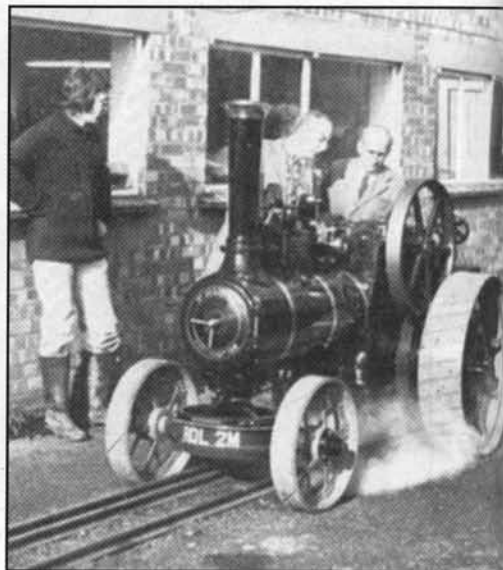
The big ends too are of the marine type instead

of the correct strap and cotter type, and I thought them ugly—but again he who pays the piper... The gear ratio has been increased, but this only shows in the dimensions of the gear guard which few onlookers would notice. However, I think that in practice there will be found to be more speed in fast gear than the steersman can cope with adequately.

A considerable amount of pattern making was involved and for example the steam ports are cast into the cylinder. This is of 4 in. bore by 6 in. stroke. The boiler is of welded construction in steel, with the valves set to blow at 100 p.s.i. and the homplates are bolted through the stays.

The wheel hubs are built up in a similar manner to the 1½ in. scale ones, and the tee rings are fabricated by having steel plate rings (on edges) welded inside rolled up plate rims. The strakes are riveted on, but also are tack welded for extra security. They are to be clad with rubber tyre segments cemented to rolled steel plates bolted on outside the strakes.

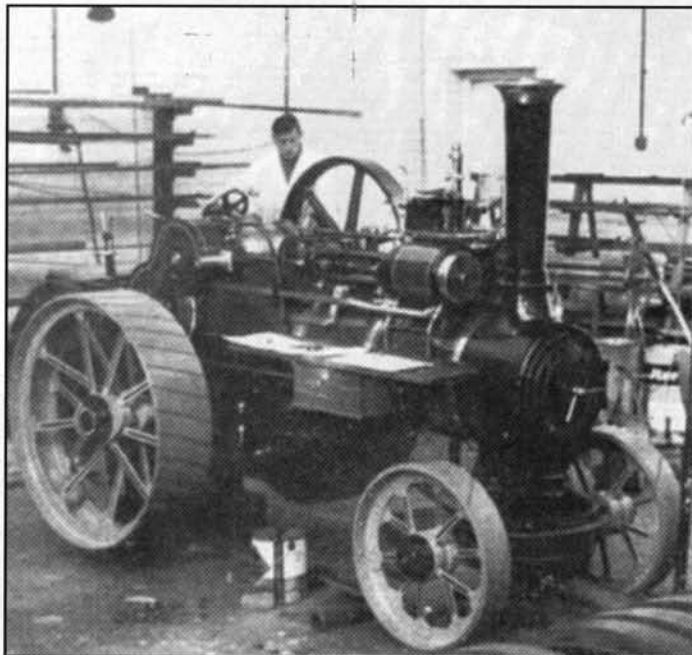
Different liveries have been chosen by the two customers. One is in the standard colours for Royal Chester, crimson with vermilion wheels, whilst the other is green—about Great Western colour—with orange vermilion wheels. Both are lined out in black and yellow, and both look very attractive.



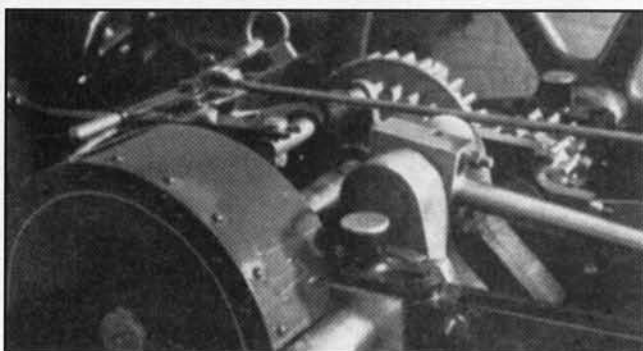
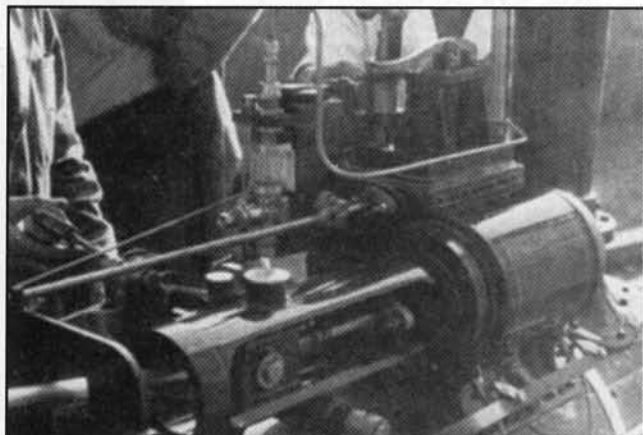
I first saw and heard one of the engines tried out under compressed air, and she had a very nice even beat which, with the wheels jacked up and the brake partly on, sounded really beautiful.

Later on, with the engine outside the workshop on a lovely autumn morning, the first was lit and steam raised. No attempt was made to hurry, as this was the first time of steaming and an eye had to be kept on everything. Natural draught was used, but in about forty minutes it was possible to use the engine's own blower and it seemed only a very short time before the needle was up to eighty.

Now came the crucial moment. The flywheel was turned to bring the crank to the top, the regulator was opened gently, and away she went, running



One of the engines nearing completion at Severn-Lamb's works.

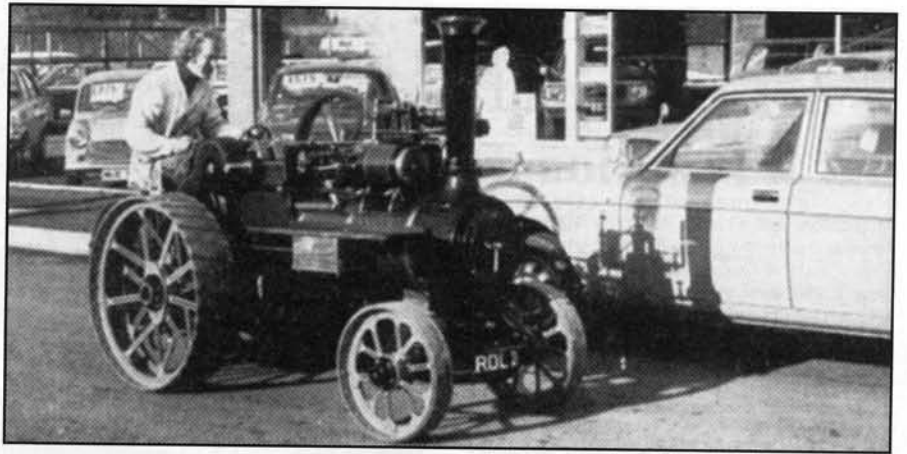


Two close-ups of some of the motion parts.

free and easy with a nice musical "tum-tumtum" in the chimney. Careful checks were made, with a gland adjusted here and a nut tightened there, and much stopping and starting, both in forward and reverse. But all was satisfactory—a tribute to the way the engine had been built and assembled.

Then came the second crux. The driver climbed aboard, the slow gear was engaged and the brake released, and she was off slowly down the driveway. Two or three turns up and down, and then it was into the road outside the works, where she was put thoroughly through her paces. And the performance in slow speed—at least six m.p.h. at a moderate regulator opening—did seem to indicate that she will be very fast indeed. But time will tell whether all the speed will be usable!

Certainly a very good time was had by all, and I look forward to being there when the next steam road vehicle is tried out at SevernLamps in perhaps six months' time. It is to be a 6 in. scale Burrell showman's engine! ●



Out on the road, the big Allchin showed a fine turn of speed.

March 5 1993

A Very Long Tale

A.F. Phelps asks "Is it possible that I can claim the dubious honour of establishing the longest time in the construction of a Royal Chester 1½ in. scale traction engine, and even perhaps of any steam driven road vehicle?"

I was introduced to *The Model Engineer* and *Practical Electrician* as it was then, in 1930 and been an avid reader ever since, although I have had a few breaks in between.

My main interest has always been with anything steam and in particular road locomotives and traction engines, mainly because they do not require a track to run on which means they can run anywhere.

Under these circumstances, it was with considerable interest that I started to read the Allchin series introduced by W.J. Hughes during December 1951 and carried on intermittently until the final article in December 1957. This was, I believe, the first complete series about any 1½ in. scale traction engine. I collected the complete set and put them safely away for contemplation at a future date.

After making a 3 ft. model steam yacht, complete with engine and spirit fired boiler for, as I told the wife,

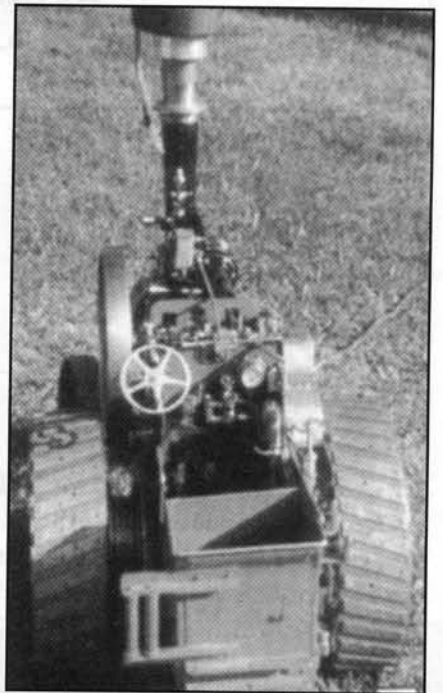
the children, there was a gap whilst I looked for a new project. Cleaning up the workshop I found a sheet of brass which I thought would do for some type of model, so looking through the back copies of the magazines I had saved, I came across the Allchin series.

The brass sheet was the correct gauge for the tender, so in 1960 I set to work.

Being short of cash at the time (weren't we all) I decided that I would make as much as possible without castings. With this in mind I started on the tender and was quite pleased with the completed unpainted result.

Another maritime interlude

Then out of the blue, as it were, an old friend of mine decided to move to New Zealand and gave me the bare hull of a 6ft. destroyer he had under construction and could not take with him. This brought the Allchin to a halt whilst I set about designing and

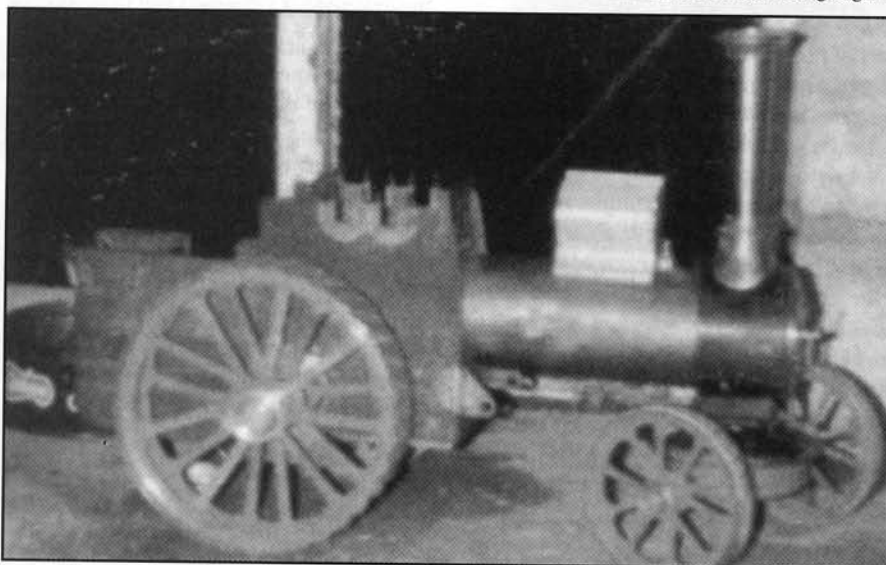


The first steam-up. Although the winch and guide rolls are in place, the rope has yet to be fitted. This will be attended to when the model is stripped

making water tanks, boiler, blow lamp, engine and gear box to fit in this hull before I started and made the superstructure. Taking longer than I expected, it was at least 3 years before I completed the boat and had successful trials.

Then back to the Allchin, when I started on the horn plates. These were cut, filed and drilled, then fitted to the tender, complete with towing bracket. By this time my son had become an apprentice toolmaker and still sticking to the no casting rule, he made up all the bearings and brackets which attach to the horn plates by cutting, filing and silver-soldering to their respective shapes.

Several holdups then occurred. The first when I obtained a job away from home and coming back only at weekends, gave me no time for model making so the Allchin went into cold storage again. This stoppage was far longer than I anticipated and it was several years before I could get back to model making again. We had moved house twice in a fairly short period, but it did progress as at November 1990, the boiler is made and effected and the "liberated" chunk of gunmetal, now converted to the cylinder, is fitted.



JUST PUBLISHED

A Century of Traction Engines

by W. J. HUGHES

A member of the Newcomen Society, the Road Locomotive Society and the National Traction Engine Club.

IN THIS superb work for the connoisseur, Mr. Hughes presents the results of many years' patient and enthusiastic research into traction engine history. He tells the whole story from the very beginning and describes the development of the many different types and the work of the early engineers and pioneers. The author's flair for blending history, reminiscence and mechanical detail into a lively and interesting account makes the book vastly entertaining. He has also included a really unique collection of photographs, drawings **30s.** and old prints to delight the enthusiast.

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MODEL ENGINEER

iv

10 DECEMBER 1959

have advantages as I now worked for a large ship building company who allowed us to raid the scrap metal bins. This was an Aladdin's cave of scrap steel plate, bar, brass and phosphor bronze rod offcuts.

My son had by now opened his own small engineering works which gave me the use of a full size mill. So, dusting of the tender and horn plates, I contemplated the next step. The wheels seemed the most obvious, so I obtained 6 flame cut steel blanks, 4 for the rear and 2 for the front and machined them to size. The hubs

were next and made from plate and bar material as per drawings, but again no castings. A simple clapper tool was used to produce the spokes and the front wheels being easier, were the first to be assembled.

Next, came the rear with the same procedure. The large mill was a great help in these operations. The wheel were then finally set up, bored and reamed to suit the axles. I did make one mistake on the rear wheels and hope that it does not show too much, the strakes are at a slightly greater angle than they should be.

I then moved on to the spud pan and front axle complete with spring, which was made from an old clock spring and centre pivot post. Seeing the front wheels assembled as a unit pointed to the fact that I needed a smoke box, so this was the next time to be taken in hand. This was fairly straightforward and was completed with the front opening door. Next came the chimney, with the rather difficult job of making the base from a large bar of steel, but with some turning, milling and lots of filing the correct shape and a good fit to the smoke box and smoke stack was obtained. As can be seen from the photographs this has yet to be bolted on.

Seeing the front and rear of the engine, I now began to wonder how the completed engine would look, so I obtained the boiler material. Which my son immediately took charge of and the boiler started to take shape. Whilst this was under way, I turned all the boiler and fire box stays, then made up the dummy rear springs, which again used the clock spring and fitted them to the horn plates. The stays were fitted to the boiler and the complete assembly brazed up and tested to 200 p.s.i. without any sign of leaks.

I obtained, and don't ask me how, except I did work in a shipyard, a large block of cast gunmetal, large enough to shape the cylinder. This was cut to the shape as shown in the photograph, but a lot more work is required on this item.

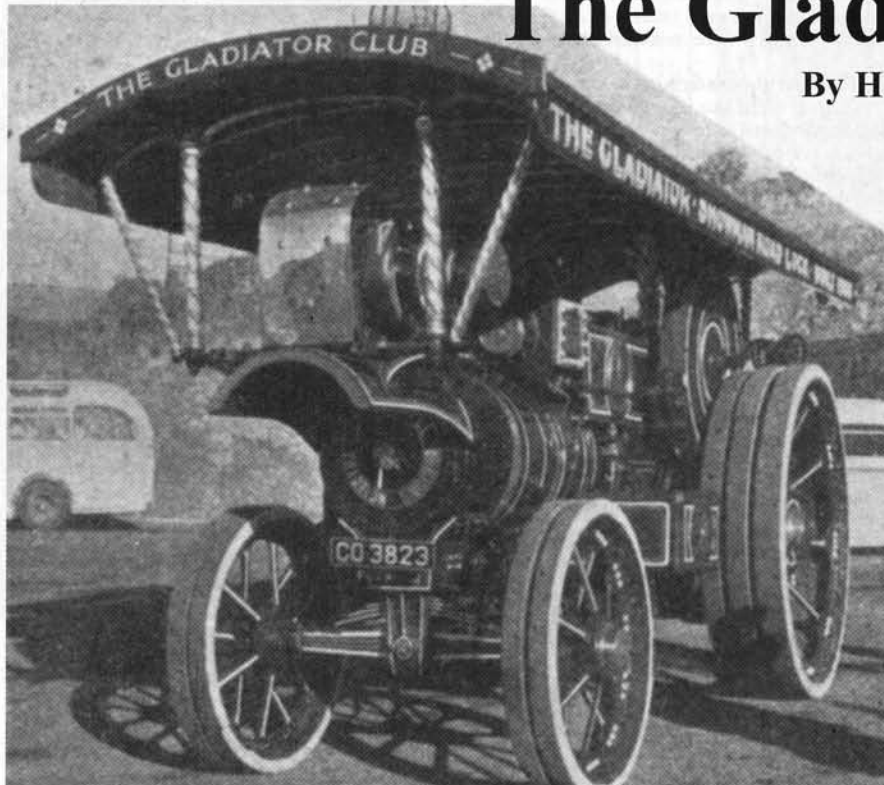
The winding drum and various other items which cannot be seen, have now been completed. Progress has slowed down a little over the past year—but the castings for the completion have been ordered. With these in hand, perhaps it will not be another 30 years before we see the Allchin on the road. We hope to keep you informed. ●

March 17 1955

There is a good deal of technical information in this story of the discovery and refurbishment of Burrell No. 3159 Gladiator. The Gladiator club later acquired an organ which travelled with the engine to rallies. Travelling almost everywhere by road this combination became very well known in the West country.

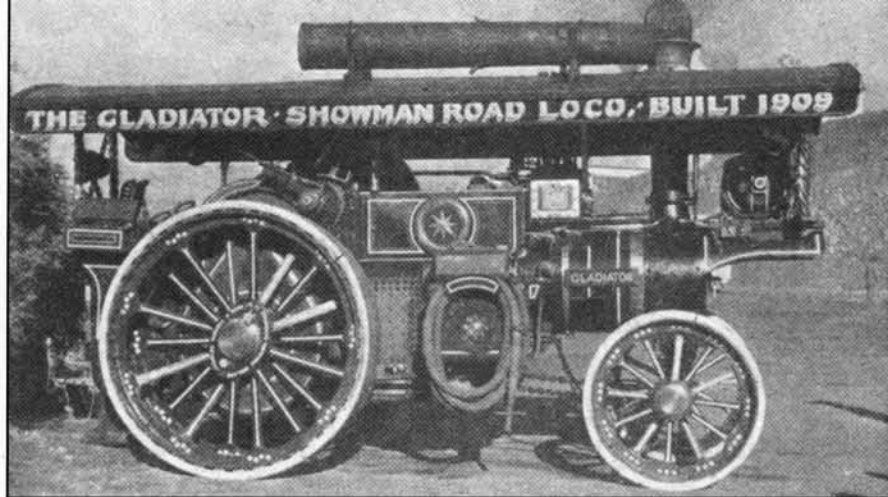
The Gladiator Club

By H. Mitchell



The Gladiator Club of Redruth owes its existence to a model engineering exhibition held in the town in September 1952, for it was here that a fine scale model of a showman's road locomotive created much interest and revived old memories of the days when these magnificent engines could be seen in gleaming splendour on our West Country roads, and at fun fairs. The result of this was a resolution, made by a small number of enthusiasts, to find out what had become of these giant machines that, up until the middle 1930s when they began to be replaced by the modern diesel tractor, were the centre and soul of the fair to many interested admirers. Quite a lot of information was collected, which showed that a number had been scrapped, whilst others had been sold for use as portable power plants for timber work, stone crushing, etc. Others however had been sold for preservation, and there were still a few scattered about the countryside which were not being used, and were in danger of being scrapped, of which the famous old Gladiator was one. The engine was located, abandoned and overgrown, but an examination showed possibilities, and it was eventually purchased for preservation.

The history of the engine showed that it was built by Messrs. Charles Burrell & Sons in 1909, and delivered to Messrs. Anderton & Rowland when at Pontypridd. It remained in the Bristol section with the Venetian Gondolas until 1921, when the complete outfit was



Off-side view, showing gearing, safety-valves and water-lifting equipment



Three-quarter near side view, showing flywheel, worm drive for steering gear and copper top on chimney.

transferred to Capt. Arthur Rowland's Cornish section. In 1932, Gladiator was sold to Messrs. T. Whitelegg & Sons, and took charge of their American Radio Cars. A new canopy was fitted, and the engine was repainted about 1935, and continued in service until the second world war stopped its activity.

It was then laid up at Launceston from 1941 to 1946 when it was towed to Messrs. Whiteleggs yard at Exeter, where it stood idle until July, 1953; when it was steamed over a hundred miles to Redruth. This was no small achievement for a 44-year old engine that had not been in steam for 12 years and had become overgrown with weeds and bushes, and well settled in its hind quarters; indeed, it was no small achievement for the driver, who, not without incident, carried out the somewhat hazardous task of bringing the engine to its new home.

The reappearance of this monster in the streets of Redruth caused considerable excitement, and long before it reached the town it had a long stream of followers. The reason for its re-appearance soon spread amongst those interested in such a venture, and there were many offers of help in all kinds of ways. Subsequently a meeting was arranged to discuss the future of the engine; in order to expand the original idea and to put it on a firmer basis, the "Gladiator Club" was formed on December 23rd, 1953. Since that date, a great deal has been done to the engine, which has regained much of its former glory. It has been on show at several carnival parades, and was once again proudly generating current at the 1954 Redruth Whitsun Fair, as it had done so many times previously.

It is thought that a few details of the engine might not be out of place here.

The Gladiator is a 7 n.h.p. double-crank compound showman's load locomotive, having a three-shaft double drive with three speeds, and is spring mounted. It was built by Messrs. Charles Burrell & Sons Ltd.,

Engineers, Thetford, completed on December 16th, 1909, and was given the works number 3159.

The h.p. cylinder has a bore of 6 in., and the l.p. cylinder has a bore of 10 in., each with a stroke of 12 in. Each cylinder is fitted with a slidevalve driven by separate link motion reversing gear. The flywheel is of the spoked type, having a diameter of 4ft. 6in., a width, at the face, of 6 in., and is fitted with an ornamental disc having a polished brass ring. A mechanical lubricator is provided, driven from the h.p. motion, and a Pickering governor is also fitted for stationary work, the drive for this being taken by a belt from the crankshaft to a countershaft, and thence by a second short belt to the governor pulley. The action of the governor is readily adjustable for various loads and speeds by means of a wingnut, which varies the tension of a spring attached to the valve spindle and acts against the centrifugal force of the weights. The cranks are at 90 deg., and the l.p. cylinder is fitted with an auxiliary h.p. steam valve for starting the engine when the h.p. crank is on a dead centre. The boiler has a length over tube plates of 5 ft. 7 in., and an outside diameter of 2 ft. 5 1/2 in., and there are 35 firetubes 2 in. in diameter, giving a heating surface of 101 sq. ft. The firebox has a grate area of 6.11 sq. ft., and a heating surface of 35 sq. ft., giving a total heating surface of 136 sq. ft. The working pressure of the boiler is 200 lb. per sq. in.; twin safetyvalves are fitted. Water is fed to the boiler by two live steam injectors, supplied by two front tanks, mounted on each side of the boiler, immediately in front of the driving wheels, and a rear tank situated under the footplate and coal bunker, giving a combined capacity of 290 gallons. A steam water lifter is fixed just forward of the offside front tank,

which has a bracket for carrying the flexible hose. The ashpan has a front damper only, which is controlled by a lever on the footplate, but it appears that the original ashpan had front and back dampers.

Boiler fittings include a steam siren, 1 1/4 in. organ whistle, blower, water gauge, test cocks, blowdown cock, pressure gauge, and handholes at the top of the smokebox tube plate, and on the top of the barrel, whilst at the bottom front corners of the firebox, and centrally placed at the rear, are mudholes. A wash plug is also provided at the bottom of the smokebox tube plate.

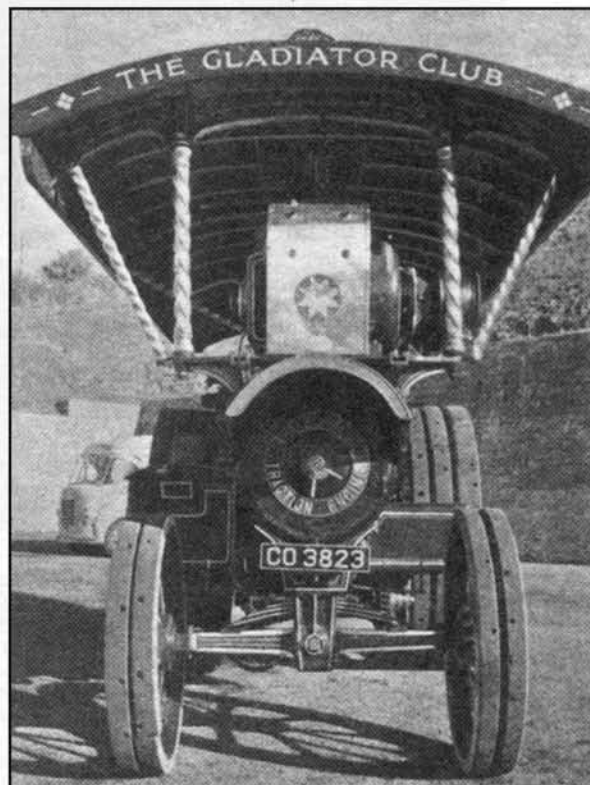
The four road wheels are fitted with rubber tyres, the driving wheels being 6ft. 6in. in diameter, by 1ft. 8 in. wide, and the leading wheels 4 ft. 11 in. in diameter, by 9 in. wide. Brakes are fitted to the driving wheels, and to the flywheel, and are controlled by handwheels. A wire rope drum is fitted on the driving wheel axle, between the near side driving wheel, and the gear wheel, and when in use, two drive pins are withdrawn from the centre of the adjacent driving wheel, to prevent the rotation of the driving wheels and axle.

Built as a showman's engine, it has a full length canopy, supported by twisted brass pillars and crossstays, etc., motion side plates, with brass beading and ornamental rings with star centre pieces, and also brass hub boiler bands, cylinder drain cocks pipes, tubes carrying the steam from safety valves through the top of the canopy, and solid brass handwheels for brakes and steering.

A compound wound 110 volt, d.c. generator is mounted in the usual manner on a smokebox bracket, which also has a brass front shield and pulley end cap. The chimney has a large and shapely polished copper top.

In restoring and repainting the engine the original colour scheme of "Burrell" dark red, lined out in yellow, black and light red, was copied as truly as possible but in places where there was originally gold leaf, yellow paint has had to suffice. The weight of the engine empty is 14 tons 4 cwt. 1 qtr. ●

Front view, showing canopy supports and ribbing, dynamo mounting and smokebox door.



The 'Tale of a Traction Engine' is a natural stablemate to the *Gladiator* story. I like the bit where Mr Cooper, having been offered a Marshall traction engine in an orchard, to quote 'I will sell it to you quite cheaply; in fact, almost give it to you,' dashed home and was soon sorted out. 'If you bring one of those here I will leave you'. One day I would like to buy a traction engine. Keep on dreaming.....

THE TALE OF A TRACTION ENGINE

BY G. W. COOPER



The Garrett tractor No. 33818, built in 1920. H.J. Holland & Sons, Threshing Contractors, Dallinghoo Woodbridge. Still in use. Photographed near Ipswich 17/10/1938

It all began a very long time ago before World War I, around 1910 or 11, that wonderful period of the only millennium we have ever known. As a boy of 10, I shall always remember the lovely sights that were to be seen. Many farmers had portable engines and some traction engines, and contractors or threshing men had fleets of them, especially in the corn-growing district of Suffolk.

The lovely continuous drone of the threshing drum would tell me the direction in which to go to find a steam engine quietly doing its job. Its flashing connecting rods and eccentrics held a fascination for me, and still do. The cream of it all was a visit to Framlingham of Mr. Bert Stocks' Fair with his lovely 16ton Burrell compound Princess Mary, its twisted brass columns all ashine and dynamo gently humming, the whoop, whoop, whoop of the centre engine on the roundabout and the magnificent model all a gleam.

Suffolk I believe, more than any other county, was the home of many builders of fine engines. What names to conjure with, Ransomes, Whitmore & Binnion, Garretts and quite close in Norfolk, Youngs of Diss and Burrells of Thetford. From the foregoing,

you will see that I have a love of these fine engines. Just after World War II, I had a serious illness, and then took in THE MODEL ENGINEER and joined the Ipswich Club of M.E.s. The bug had bitten, but not too deeply as yet.

One day, I went to see a farmer friend to buy a huge walnut tree that had been blown down. Standing in the same orchard was a fine old Marshall farmers' engine, a single. As I showed considerable interest in this engine, my old friend said, "I will sell it to you quite cheaply; in fact, almost give it to you." Now this is the saddest part of the tale, I dashed home to tell my wife, and you should have heard what she had to say. "Do you think I want to see one of those great things standing on our drive? If you bring one of those here I will leave you." In the end, I had quietly to give up the idea of bringing one home!

I did not give up altogether; I tried the club at the annual general meeting. Would they like one? No, they would not, for all my impassioned appeal. The urge for the moment died away, with many heartlongings every time the "M.E." published a photo of some fine engine.

Time flowed on and we come to the present day,

and most of these fine engines have fallen under the scrap man's torch. Shame on the brutes! Then one day along comes Michael Collyer, a younger member of the club and whispers in my ear, "I am told that you are interested in traction engines? so am I." Brother, oh brother! I had a fellow conspirator; this was something! I asked "Where do you think we can find one?" Mike found them here, there and everywhere in all stages of decay, some in Norfolk, some near, some far. "Look here," I said. "This is no good, we shall get nowhere like this. See Bloomfield and ask his advice." I ought to explain that Mr. Bloomfield is our local expert on all matters pertaining to steam. Mike did so, and we were sent to see a Mr. Holland of Dallinghoo. Yes, he had one engine, his last a Garrett 5ton road tractor. "Are you wanting it for scrap?" he asked, No, we want to preserve it," Mike said.

"Ah, a very worthy idea, I will help you. You can have it for the same as I was offered for scrap and I deliver it to you," replied Mr. Holland, "She is licensed till the end of year."

With the aid of my fellow conspirator I broke the news to my wife and she took it like the lamb she really is!

I ought to explain here that my drive is about 40 yards long and passes, at an angle to the garage, on to the house, leaving a spare triangle of ground. Here, on the foggiest Saturday last November, the Garrett 5 ton compound was brought to rest about 11 am. Five members of the club also arrived and steam was raised in 1 hr. 15 min. and she was ticking over.

Now, let's we if everything works. Injector? Yes. Wonderful. The pump also worked, with a bit of wobble. Mike looked over the guard and shouted with glee, "Look at that box of tricks going round!"

Someone else shouted, "George, come and see the elephant drink." They had found the water lifter. Every, one was happy, even the wife who brought out copious cups of tea for all and biscuits. With the day pulling in we shut down, feeling well satisfied.

You would be surprised to know t number of people who have called see the old engine; and some of them, what people! Yes grand people to know. On the Monday, following arrival a countryman called to see me. He said " My grandfather used to be Burrell's chief engineer' I've got a lot of his things, books and so on. Would you like them ? "

I now possess a Burrell catalogue and an instruction book, also some tube expanders.

Another man, going home to lunch on the Saturday thought my garage was on fire and almost called the fire brigade. Thank goodness, he looked in first.

During the Christmas holidays a small car stopped and out got a small active looking man. "Do you mind if I come in to look over the old engine," he asked.

"What for?" I said in my best droll Suffolk. "I've been on those engines of all kinds for 40 years and I love them," he replied. He held out a hand with the centre digit missing. He said, "said, "Hawes 3 speed Burrell had that off." His pocketbook was full of pictures of engines from all over East Anglia.

"What are you going to do with her?", he asked. "Not scrap her, I hope."

"No we are going to do her up all over," I replied. "Gosh! Can I come and help? I know, where to look for trouble and wear."

"Yes, rather glad to have you," I said. "Can I bring my brother?" he asked. "He's as good as me, driver too." Wonderful, we had two local men with all the knowhow—now we could really get going.

Before we go any further, I ought to introduce the team is it now stands. Mr. Burch, skilled turner and fitter (foreman), Mr. Lumpkin, Mr. Ronald, W. Richard, apprentices at Reavells and at Ransomes, the brothers Forster, drivers, Mike Collyer and myself.

On the following Sunday morning at 9.30 all the above turned up attired for work. Our principal trouble is the main driving pinion on the second shaft. This is completely worn out. We had been very lucky in being able to buy a new one from Mr. M. Bloomfield, who informed us that they were shrunk on hot. There was nothing for it but to cut the old one off with a cutting torch down to one of the keys. This was done and without damaging the shaft. We can now withdraw the second shaft and examine bearings. Removing left hand rear wheel and differential gearing took us two Sunday mornings, and the planet pinions being sloppy, we decided to take them out. The wear was found to be on the pins, so four new pins are being prepared.

While all this was going on, two of the team removed the smokebox baffle plate and about 1 cwt. of fireclay; this will not go back. Some owners put them in to keep the heat off the smokebox body. The following weekend, we removed the guards and cases, all nicely beaded with brass.

Mr. Forster and Mike removed L.P. crosshead and connecting rod, I removed slipper and packed with 6thou. shim brass. Valve case was opened, and valve, which was loose on buckle, was adjusted and set. Face and valve perfect. Our last operation, so far, has been to remove right hand rear wheel. This was a fine game, as the engine was now sitting comfortably on some of my best oak baulks. When we jacked her up, she gradually took on an alarming angle. We tumbled to it at last; you cannot maintain an even keel with a ½ ton wheel still hanging on one side.

So we jacked her down again, scraped a little earth away and pulled the wheel off.

Our next job is to remove the flywheel and lower it to ground, and then the crankshaft and refit main bearings and big-ends of the connecting rods. By the way, we have removed the ashpan. The firebox is in lovely condition, which bears out what Mr. Bloomfield told us before we bought her.

Now, this engine is works No. 33818, built in 1920, so is a comparative youngster. She was owned by

William Summers of Norwich, an amusement caterer, so was a little showman's engine and had twisted brass columns. These were removed before Mr. H. J. Holland bought her.

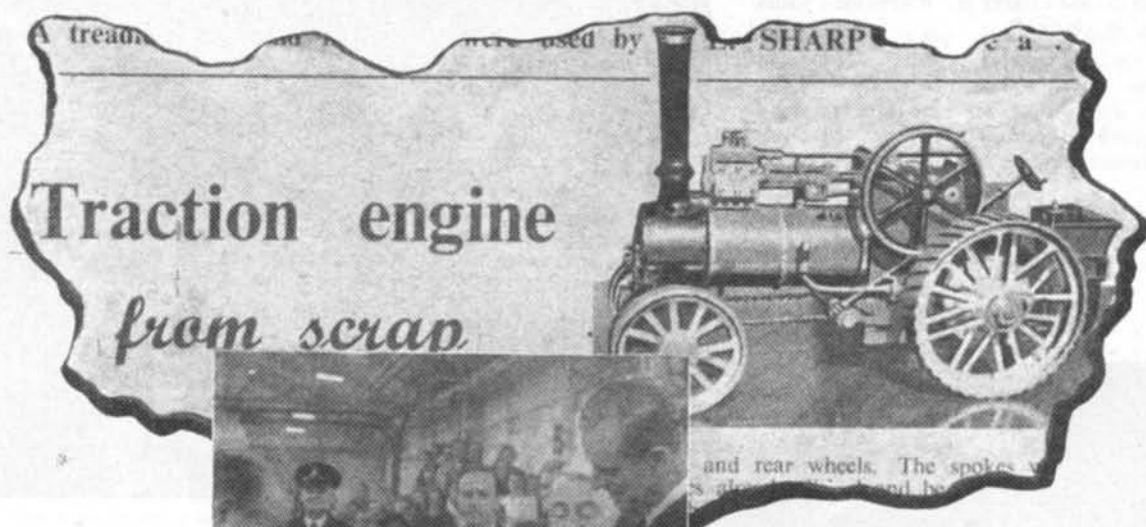
The best thing about this engine is her boiler and firebox. We could have done nothing if those had been poor. The road gear definitely is worn, but we can deal with that, bit by bit. We were exceedingly lucky in securing the new pinion. Other owners have had to resort to building up the old teeth by welding an expensive business.

The photograph was taken by Mr. R. G. Pratt of the Road Locomotive Preservation Society, to whom also I owe many thanks for information regarding her earlier history. He has many photographs of her at work threshing. I feel sure many readers of *THE MODEL ENGINEER* will be interested in this concerted effort on the part of a few enthusiasts to save and preserve a faithful old servant.

The tale is not yet ended; as work progresses and she is completed ready for the road again, you may bear more of her adventures. ●

December 29 1955

I think we may be one up on the railway boys with Prince Charles. He was once given a traction engine for a birthday present. I wrote to His Royal highness asking if he might offer a few recollections but had no reply. Shame. But I guess if I was asked about a present I received some 40 odd years ago for a birthday I could fairly claim a memory lapse, but there again I was never given a traction engine.



**By
Charles
Tunstall**

On November 10 we described a traction engine which began its life on a bench in a model engineer's workshop; recent events show that its future will be spent on the floors of Buckingham Palace

PRESENT FOR A PRINCE

Model engineering received a royal boost when H.R.H. The Duke of Edinburgh accepted a model traction engine as a gift for Prince Charles.

The model, made by waterworks engineer Jack

Sharp, of the Cumberland Guild of Model Engineers and Craftsmen, was accepted by the Duke at the Maryport works of Electroflo Meters. The firm included a display of models and workshop craft in its arrangements for the Duke's visit.

The Duke spent most of his time at the Cumberland Guild's display. First he examined precision made tools, then extended a warm hand to 17 year old Brian Miller, the guild's budding model engineer, with whom he chatted cheerfully as he

examined models. At 15, Brian Miller won an M.E. Exhibition bronze medal.

"I hope there is a book of instructions," said the Duke, gazing with some surprise at the model traction engine, "and spare parts." B. Duglinson, president of the guild, had just explained that the Cumberland Guild would be greatly honoured if he would accept the model as a rather belated birthday present—"for your son, Prince Charles."

"It will make a splendid Christmas gift," said the Duke and, turning to Jack Sharp, discussed its construction with keen interest. Then, realising its intrinsic worth, asked: "Are you sure you can part with it?" Jack hardly needed to reply; his face showed his profound pleasure.

"The miniature fascinates me," Sharp confided as we discussed his model engineering activities during my visit to Cumberland. His scale model traction engine, built from odds and ends of scrap metal, measures 7½ in. to its chimney top, 10½ in. overall length, 4½ in. over the rear wheels and weighs just over 6¼ lb. You could almost slip it in your overcoat pocket.

I saw other evidence of Jack Sharp's creation of the miniature. So did the Duke of Edinburgh. Chatting with Brian Miller he suddenly saw a 2½ in. tall, model steam engine. Taken immediately by its jewel like beauty he picked it up with obvious surprise and pleasure.

It was a twocylinder, double acting, slide valve steam engine, ¾ in. bore x ¾ in. stroke (reversing). It has a 2 in. dia., 4 bladed screw and is part of a power unit to be installed in a 40 in. long displacement boat Jack hopes to build some day. It has a bicycle pump adaptor. Vigorous Pumping will take it up to about 1,000 r.p.m. "It hums like a bumble bee," he told me. ●

CHUCK . . .

. . . THE MUDDLE ENGINEER



"I hope there is a book of instructions"



Quizzical glances all cast on the traction engine. Jack Sharp looks over the shoulder of B. Duglinson, president of Cumberland M.E. Society.

If a 6 ton traction engine was to live next door what tests do you think would be suitable to ascertain if it would 'ruin the amenities of the area'? Personally I would jump for joy. What could possibly be better?

'LITTLE SAMSON' WINS YEAR-OLD FIGHT FOR HOUSING ROOM

Kenneth Barrett reports a two-day inquiry into a live steam enthusiast's planning application

Mr Ian Fraser is a live-steam enthusiast. As a graduate of the Institute of Locomotive Engineers and a retired employee of the former London and North Eastern Railway he has had the rare good fortune to be able to combine hobby and profession.

For 12 years he has owned Little Samson, a six-ton Marshall traction engine, originally built in 1915, which he rescued from oblivion after it had lain for ten years in a yard at Carnoustie. Earlier it had led an energetic life, first with a Glasgow firm of contractors who used it at Gleaderton reservoirs, and later, after being sold to a Carnoustie firm, on threshing duties in various districts of Angus.

Mr Fraser restored the Marshall to its original condition and its gleaming motion is now a familiar sight in the streets of Arbroath, where he uses it for occasional shopping expeditions. In fact, his engine serves him in the manner that many cars serve their owners.

He once expressed his own feelings thus: "I have set my heart on an engine house-cum-workshop of my dreams and it has been designed with the greatest care to provide just what is wanted and at the same time to conform with the amenity of the district. It is in the centre of a half-acre site, and in time to come my activities can be suitably screened from neighbours. In any case, does not a traction engine tone in well with a 19th century coach house? It belongs to the same period as the coachman and the carriage and pair."

The house, designed by Mr W. K. Wilson, a Dundee architect, is of brick, roughcast, with stonefaced walls on the south-west elevation. The chimney

head will be on the west gable, and the pitched roof will be red tiled.

Accommodation will comprise a living room, dining room, large kitchen, bedroom, cloakroom, utility room and large fuel store on the ground floor, and three bedrooms, bathroom, store, box room and cupboards will occupy the upper floor.

Fashioned after the style of a 19th century coach house the engine shed will match the house in external details, being of brick and roughcast appearance with a pitched roof covered in red tiles, surmounted by a steeple bearing a weathercock.

But there its association with the house and the era of the horseless carriage ends, for internally the shed is laid out to meet the demands of a traction engine.

It will incorporate a machine and fitting shop, oil store and lamp room. The miniature live-steam track which Mr Fraser hopes to erect in the spacious grounds will have a spur into the shed with an inspection pit built into the track. There will be lifting beams to raise the locomotive (a 2 ft. gauge is envisaged), an asbestos lined smoke shoot, an ashpit, a coal stage, a water column—in fact all the usual appurtenances to give the necessary atmosphere and provide the required equipment.

It was this desire to build the engine shed of his dreams that led Mr Fraser through a long civic argument on the merits and demerits of such a project. Because we think Mr Fraser's case is unique we give below a detailed account of the moves and countermoves which ended in his victory.

The long fight in which Mr Ian Fraser, of Arbroath, has been engaged to secure permission to build an engine shed for his Marshall traction engine has at last been won.

It was just a year ago when the opening moves were enacted in the Arbroath Dean of Guild Court when permission was granted for him to build a house and shed—the latter to accommodate his 44-year-old traction engine—on a half-acre site at the rear of Viewfield Road, Arbroath.

This early success met with a major setback when Mr Fraser's application came before the Arbroath Town Council in January. Household occupiers occupying property adjacent to the site which Mr Fraser wishes to develop objected to the erection of the engine shed on the grounds that it would ruin the amenities of the area.

The local planning committee had already discussed the application and the objections, and its recommendation to the Arbroath Council, sitting as the planning authority, was that permission be granted. Councillor D. Goodwillie, convener of the planning committee, put this point forward as the basis of the recommendation:

"This building is in place of a garage. The traction engine is Mr Fraser's private car to all intents and purposes. The shed as planned is a very good building—better than many houses in the town."

Councillor D. D. Wilson, however, felt that the decision should be taken by a higher authority and he argued: "Would the council support the idea of

having an engine shed of this nature in one of our own housing schemes? If we grant planning permission, that is final. The objectors cannot appeal. If we refuse planning permission, Mr Fraser has the right of appeal to the Secretary of State.

"The fairest thing the council can do is to keep the matter wide open and leave it to the Secretary of State. It may seem like passing the buck, but this is a case where we ought to pass the buck."

The planning committee had considered an objection raised by W. and J. Mackintosh, solicitors, acting on behalf of Mr J. McGregor, of 1 Viewfield Road. It was stated that Mr Fraser was using a traction engine for private purposes whereas in fact it had been built for industrial use. It was also stated that driving the engine along the access road to the half-acre site behind Viewfield Road would have an adverse effect on Mr McGregor's property, particularly as the approach road came within 6ft. of the gable of his house. Attention was also drawn to the probable contravention of the Clean Air Act, 1956.

A letter from Clark, Oliver, Dewar and Webster representing Mr Fraser, maintained that these objections were irrelevant as they did not affect the question of planning. They amounted to what might have been the creation of a nuisance at law and they should be dealt with in a court of law when, and not before, the acts complained of had been committed.

A further letter from W. and J. Mackintosh was placed before the council. It maintained that the

weight of the engine would cause vibration and danger to the neighbouring buildings and also that the nuisance at common law was also a matter of amenity. Smoke and fumes from the traction engine would endanger the amenity of the area, and the noise would also affect the district. Viewfield Road would be encumbered by so large a vehicle and the trailer which accompanied it.

After debating these issues, the council as the planning authority for Arbroath, refused Mr Fraser's application for the shed on the following five grounds:

1. The cubic capacity of the engine shed and coal shed together substantially exceed 4,000 cu. ft. or $\frac{1}{10}$ the cubic capacity of the proposed dwelling house.
2. The proposed engine shed and locomotive shed were both out of keeping with, and injurious to, the amenity of the surrounding residential area.
3. The proposed engine shed and locomotive shed are in themselves, and in their use, of an industrial nature, and consequently are industrial buildings.
4. The height of the proposed engine shed is 22 ft from ground level to the level of the ridge, while the height of the proposed dwelling house is 27 ft from ground level to the level of the ridge.
5. The proposed engine shed and locomotive coal shed are not required for the enjoyment of the proposed dwelling house.

Mr Ian Fraser did not accept this decision without a fight. He appealed, and an inquiry was ordered by the



Mr Ian Fraser's "runabout". This live-steam enthusiast ignores the modern automobile, preferring his trusty Marshall for shopping expeditions.

demonstration went very well. He was asked to climb the incline at the back of the sloping wall, which can be seen in the illustration.

Unknown to him when the demonstration began, someone had placed a glass of water full to the brim on the edge of the roadway. Mr Fraser spotted the glass just as the rear wheel was passing close to it, and he noticed that the surface was undisturbed. The witnesses were obviously impressed. Then someone stamped beside the glass and the water rippled!

Washing inspected

Mr Flatter was asked to blow the whistle and he responded with a cock's crow, to the amusement of Sir Robert. There followed an inspection of Mrs Annie Allan's washing (Mrs Allan lives next door to Mr Fraser); the clothes were found to be entirely unbesmirched.

Mr Fraser conducted the company round his workshop. Sir Robert showed great interest: he closely examined a 3in. x 5in. horizontal mill engine built by Ian's father in 1875, and much admired the 2½in. gauge coal-fired locomotive constructed by Mr Fraser.

Back at the inquiry, Mr Fraser was questioned by Mr W. D. Smith, the town clerk. He could not agree with Mr Smith that smoke and noise from his engine would create an annoyance to people in nearby houses. The smoke nuisance was not greater than that from a domestic chimney or a washhouse fire.

Smoke test

Mr Douglas Steen, a Consulting and constructional engineer, of Dundee, said he had inspected Mr Fraser's engine and found it to be well maintained. When idling out of gear its noise was comparable to that of a light lorry. When moving it compared in noise to that of a heavy diesel lorry. He had carried out a smoke test and found nothing excessive.

Mr Robert G. Pratt, of Ipswich, chairman of the Road Locomotive Society, spoke in support of Mr Fraser's appeal.

Mr Wilson, the architect, said that he had acted on the instructions of Mr Fraser in trying to improve the appearance of the engine shed in order that it might fit in better with the amenities of the district. It was designed in the fashion of an old coach house and the buildings were planned for the centre of the site so that they could be as far away from the houses in the area as possible.

The suggestion put forward by the town council that the buildings were of an industrial character was preposterous for they had been designed to fit in with the immediate environment.

Mr Alexander F. McIndoe, a town planning consultant, said that the proposed engine shed was well designed, would be well constructed, and was in keeping with the amenities of the area. By insisting that the engine shed should conform to the character of the area, Mr Fraser had probably added £1,500 to his bill.

Official report

Summing up, Mr Ross said that if permission to build the engine shed was not granted there was nothing to prevent Mr Fraser from parking the traction engine in front of his house. It was not, he maintained, within the competence of the planning authority to decide whether there would be noise or vibration from Mr Fraser's engine. They should be concerned only with the building.

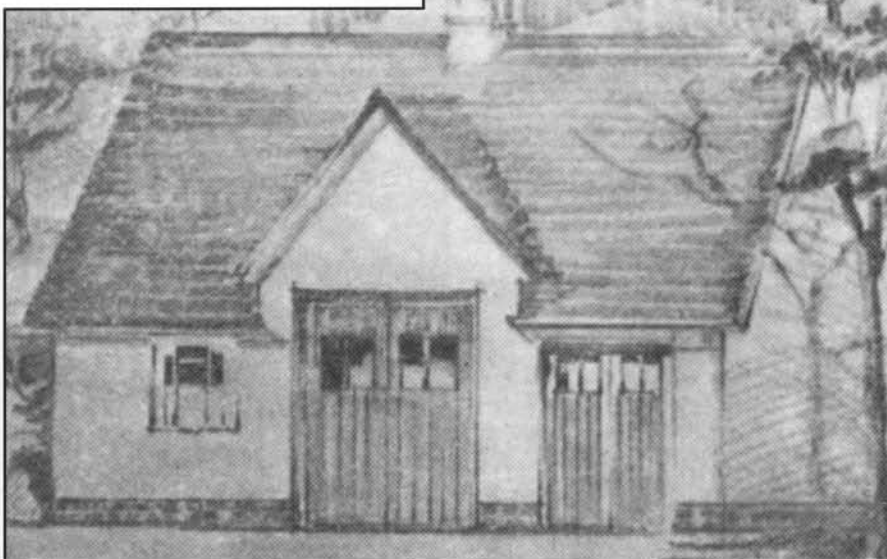
The mystery of the glass of water was answered in the official report subsequently prepared by Sir Robert Russell, in which he recommended that Mr Fraser's appeal be sustained.

He commented. "At the local inspection I observed the traction engine in operation. It was fairly noisy on the tarmac road but no noisier than a diesel bus. On the entrance drive, which is topped with road metal, it was much less noisy. In the yard, which is topped with quarry dust and fine gravel, it was fairly quiet.

"In operation, steam was just visible but little smoke. I had more coal put in the furnace to see the effect of stoking up but the amount of smoke was small....

"As one witness stated that his windows shook

Cause of trouble. This 19th century coach-house style engine shed was designed to the specifications of Mr Fraser. It not only suits the purpose for which it was built but harmonises with the background.



Secretary of State. The result was a two-day hearing in Arbroath at the end of April, the inquiry being conducted by Sir Robert E. Russell. Mr Donald M. Ross, advocate, appeared for Mr Fraser. So that an objective appraisal could be made of the complaints

about noise and smoke, Sir Robert, together with agents and some of the witnesses, adjourned the inquiry for an hour while Mr Fraser demonstrated the movements of Little Samson.

Mr Fraser remarked later that he thought the

whenever the traction engine passed his house, a vibration test was made by placing a tumbler full of water on the ground 3 ft from where the engine passed. The vibration ripple on the water was hardly perceptible."

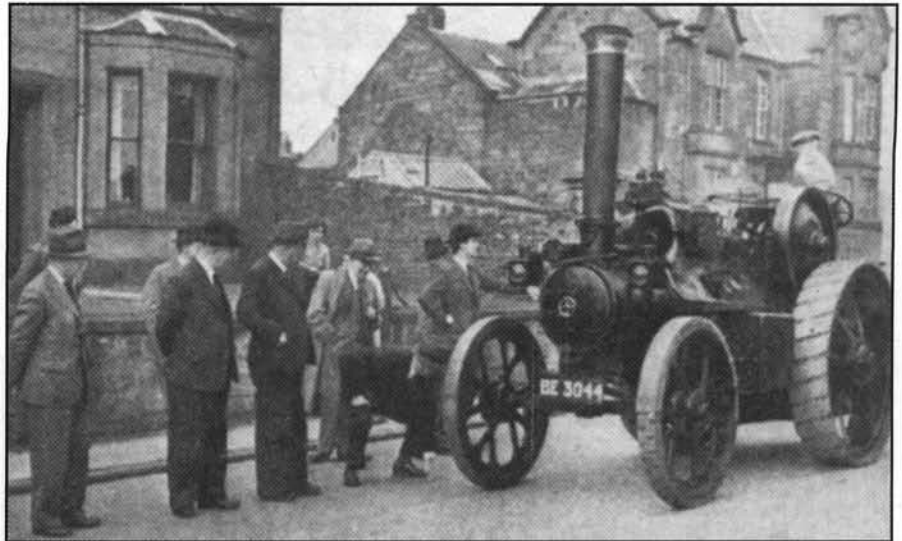
The most important reason for the town council's refusal, said Sir Robert, was on the grounds of amenity and that the engine shed was not required for the enjoyment of the dwelling house.

The question of amenity was one of evidence and opinion. It was obvious from the testimony on both sides that it was nobody's contention that the proposed buildings were visually objectionable. The real contention was that their use to house the appellant's engine and the activities on the site relating to this engine, were harmful to the amenity of the neighbours.

Site screened

"A traction engine or a small gauge locomotive," said Sir Robert, "is no uglier to look at than a motor car or any other recognised form of transport. Indeed, many people admire them. The appellant intends to screen his site from the neighbours by planting which, so far, most of his neighbours have failed to do for their own gardens.

He concluded: "On the merits of the case I am of the opinion that sufficient reason has not been shown to warrant refusal of the permission that the appellant seeks. The grounds given by the local authority in their decision are inadequate." ●



Watched by a group of interested parties, Mr Fraser reverses the 44-year old Marshall traction engine during the demonstration he gave for Sir Robert E. Russell who conducted the enquiry for the Secretary of State.

1950's

The following are a small number of unrelated 'bits and bobs' from the 1950s period. As with the rest of this volume, space constraints meant that great difficulty was experienced in trying to keep them down to a sensible number.

AN OLD ROAD LOCOMOTIVE

Mr. H. J. Wilburn recalls some memories of a Fowler traction engine, "Spider Legs," about 60 years ago

I have read with interest the articles in *THE MODEL ENGINEER* on traction engines and the photograph reproduced below is of one of three I had charge of in 1889. This is an 8 h.p. by J. Fowler & Sons, Leeds.

A few remarks concerning this particular engine may be of interest to some readers. It was used for carrying the 43 cwt. pipes from the railway to the works on the Thirlmere and Manchester Pipeline, a distance of four to nine miles. The usual load was four and six pipes on lorries. In top gear it could easily travel eight or nine miles per hour, and in low it was very powerful and could negotiate some very steep hills with ease. The other engines were very good but lacked the power of this one, especially on soft ground.

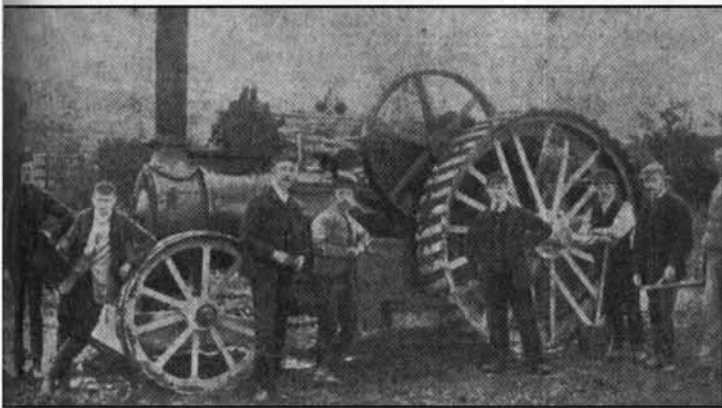
The roads at that time were not in the same condition as they are today. It was an old engine then but I cannot say how old. Then was a number-plate but I cannot remember its registration number, and this is hidden in the photograph by the driver who is standing against it. He was at that time in his early twenties but was an expert at his job and was usually called if any of the other drivers were in difficulties. "Spider Legs," as the engine was christened, was always in demand to help them out. I may say that, in those days a man was supposed to walk in front with a red flag, but as the roads were mostly bylanes in the country, he was usually on the engine unless some farm horses were on the road. In this case he usually helped them past. I must say I have been

with traction and ploughing engines since the age of twelve and am now in my 84th year. I have handled nearly all makes but always had a warm spot for a Fowler, and have not the slightest interest in internal combustion engines. I have been a reader of *THE MODEL ENGINEER* since it was first published in January, 1898, and, until recently, had No. 1 copy.

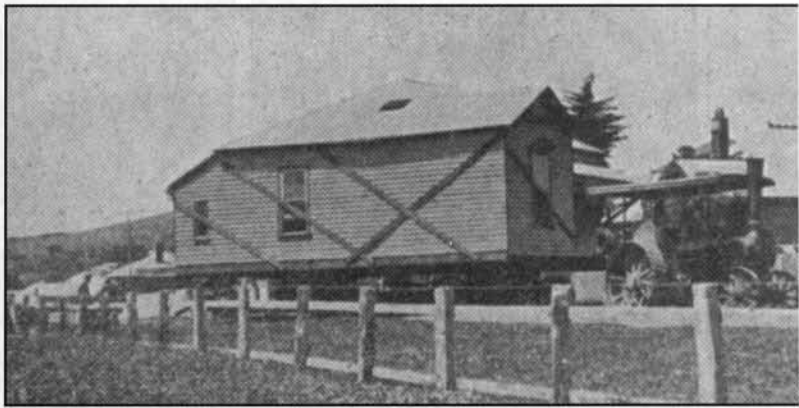
House-moving Extraordinary

The photograph reproduced here shows one method of housemoving which has been successful in Australia. The original print was loaned to us by Mr. R. R. Ravis, of Malton, Yorks, who borrowed it from a friend because of the interest of it and, to us, the novel use of a traction engine.

We think there is little room for doubt that the engine below is a Fowler, though when we examined the original print under a lens we could see no trace of the familiar nameplate on the smokebox door. The photograph was taken at Victoria, Australia, in 1922. ●



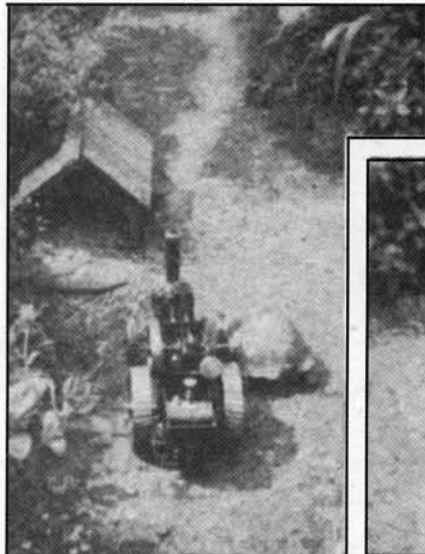
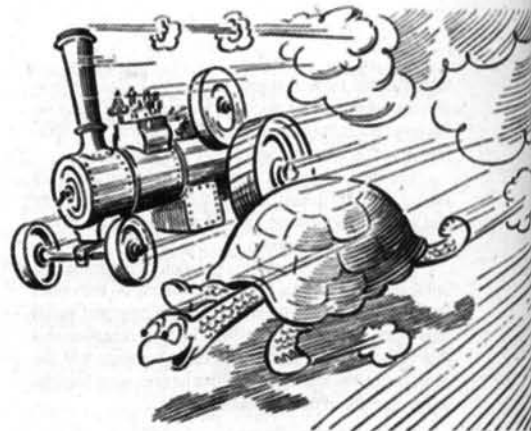
A reproduction from a very old photograph taken about 1899 of an 8 h.p. Fowler traction engine



April 7 1955

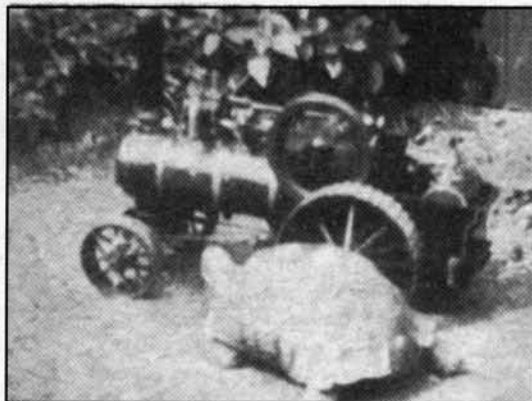
Traction Engine v. Tortoise

by C. E. Gillingwater



Left: Toby tries a little bumping and boring at (3 m.p.h.)

Below: Coming up for a photo-finish—very fast (4 m.p.h.)



The photographs show the race in progress, the contestants fighting grimly for first place. On account of underhand tactics such as bumping and boring, the tortoise is often disqualified.

The engine is built to the "M.E." one inch scale drawings with some slight modifications. The gearing on

the original was considered too high and reduced to 30:1. The steam regulator was altered to a screw thread control.

Firing is by a small home made Primus with an adjustable jet. It works well on petrol or paraffin, not a quiet burner, but it gives the "therms."

On test, the engine had one bad fault; when running up hill, condensed water collected in the smokebox and would flow back through the tubes, putting out the fire. A small hole drilled in the bottom of the smokebox cured this. With spuds on, the engine can pull a cwt. of cement without jibbing.

The tortoise is, perhaps, forty years old. He roams at will in the garden where he has a small wooden house. On warm days, he is usually asleep on the refuse dump in the sun. The sound of the engine's chuffing, however, soon rouses him and the race is on.

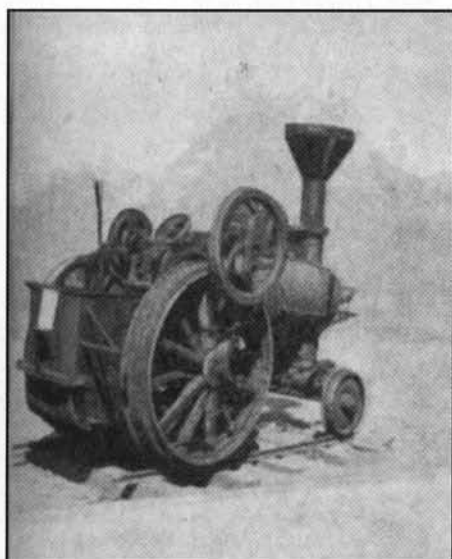
The race, proper, begins on the garden path. The tortoise is simply tearing along and the engine going "all out"; I lock the controls and stand back to watch the fun. The engine gives forth its primus roar, a cloud of steam and the wheels revolve quicker and quicker. Travelling fast, it goes bumping over the uneven surface of the garden path. The tortoise sets his beak grimly, and sprints forward with all his might. On an ordinary day, the engine wins, but if the day be hot, then the reptile wins hands down!

The engine has always attracted the tortoise, perhaps on amount of its gay paint, red, green and black with gold trimmings. ●

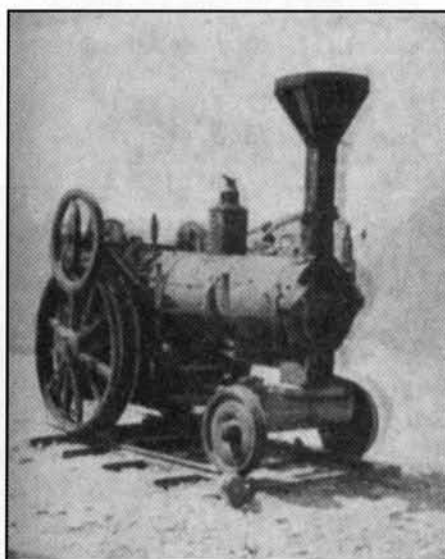
TRACTION ENGINE THAT TOOK TO RAILS

By G. ROSEKILLY

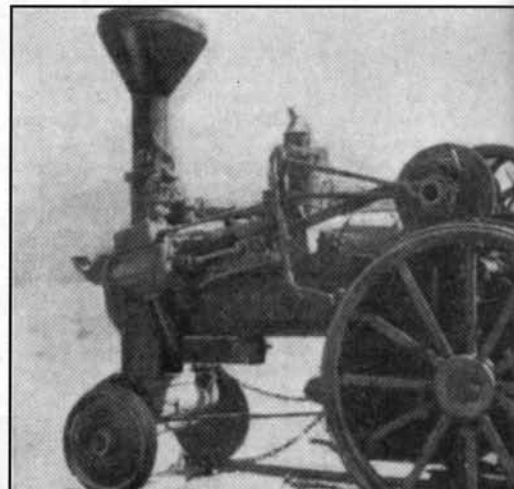
A quaint engine that started life on the roads and ended on the track



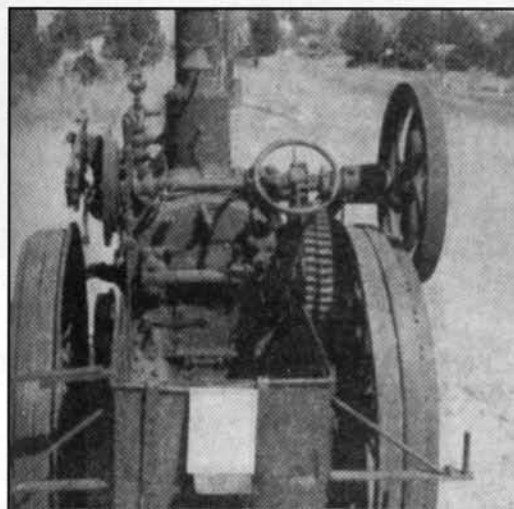
This very old traction engine was converted to a loco by fitting bands to its rearwheels. A picture taken at Angel's Camp, Calif.



General view of the engine on its base at Angel's Camp.

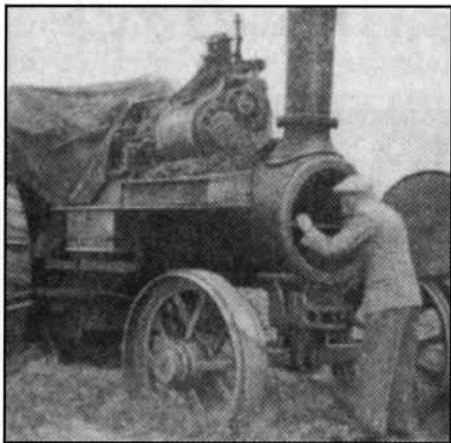


Note the one inclined cylinder, feed water heater, and valve gear!



Not much is known of the history of this quaint engine. It was once used in lumber work and is probably of British manufacture.

November 29 1956



Traction engine for the club

Through the keen, hard work of three members, the East Anglian Traction Engine Club now has an engine upon which members may try their hand.

C.F. 3440 is a typical Burrell farm engine, exhibited at the Suffolk Show at Bury St Edmunds in the year 1909, she was bought by my late uncle, John Honeywood. For many years she worked at threshing, chaff-cutting and steam-sawing in the parishes of Lawshall, Hartest and Boxted. in due course she went to Brockley Hall in Suffolk and subsequently became derelict.

Gerald Dixon peers inside the Burrell's smokebox during her hibernation at Brockley Hall.

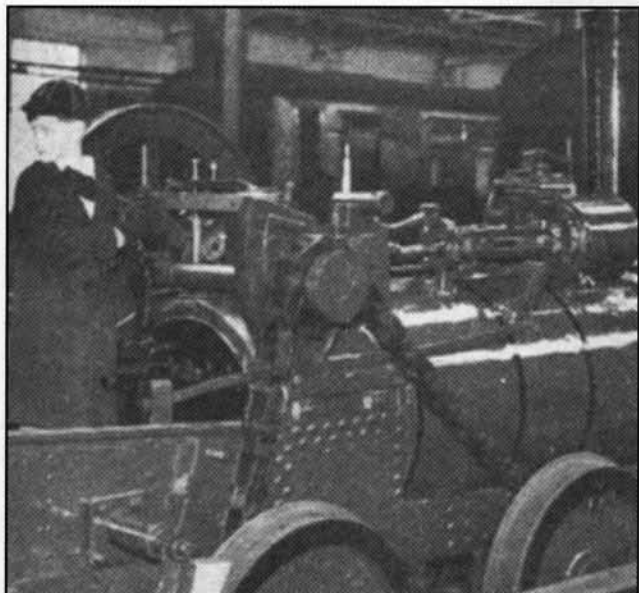
The late Mr Spencer Delienharn kept track of her whereabouts an informed three founder members of the East Anglian club, that she might be bought. So Norman Dickson secretary, Stanley Smith and Gerald Dixon fetched her from Brockley on a low-loader. She was at once given a cold water test and all boiler fittings were put in order.

A temporary big-end was fitted and she was ultimately steamed and took part in the club's first rally at Saling airfield.

Since that time she has been cleaned, painted, the big-end remetalled and the stop-valve faced. New spindles were fitted and an overhaul given. — ANON. ●

March 11 1957

An historic loco



Recalling memories of eighty years ago

For ten years No 807 lay abandoned in the brickyard. Then, in 1950 it was rescued by the I.L.S.

In the following year London Transport agreed to hold it in safe custody at Neasden depot, North London, until a final resting place was ready for it. In the meantime, by arrangement with the society, London Transport carried out the work of restoring it as far as possible to its original condition and livery.

Its single cylinder, mounted horizontally on top of the boiler, is surrounded by a steam jacket. Motive power is transmitted from the transverse crankshaft by spur gearing to a countershaft carrying a chain sprocket at the other end. The final drive to the wheels is by a chain passed round the sprocket and a chain wheel mounted on each axle behind the driving wheels, which are thus coupled together.

The countershaft bearings are located in curved slots in the supporting brackets to adjust the tension of the driving chain, and a heavy flywheel is mounted on the crankshaft. The boiler is fed by a pump worked by an eccentric on the crankshaft. A water tank is situated under each end coupled by a pipe.

The boiler was constructed from Staffordshire plate, and the firebox from Lowmoor iron. The boiler tubes are 5ft 7in. long x 2¼ in. dia., the cylinder 7¼ in. x 10in., flywheel 3ft. 6in. dia., and the driving wheels 3ft dia. The weight in working order is ten tons.

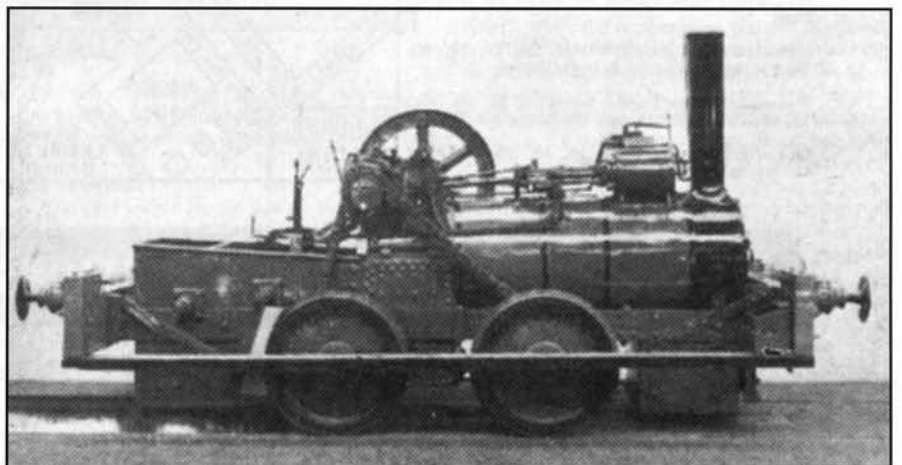
Gear details: crankshaft gear 11t., countershaft gear 38t., countershaft chain sprocket 5t. and the driving wheel gear 9t. ●

The Industrial Locomotive Society has presented one of the two original locomotives used on the old Quainton Road—Brill branch line to British Transport Commission for preservation in the commission's collection of historic locomotives.

The locomotive, Aveling and Porter's No 807, was in service on the Brill Line—then known as the Wotton Tramway—from 1872 to 1894, together with its counterpart No 846. They cost £400 each.

This type of engine was first built by the company for tramway use in 1866, and was similar to the traction engines already successfully produced by them in 1862.

In 1894, when the line was taken over by the Oxford and Aylesbury Tramroad Company, the two engines were sold to the Nether Heyford Brickworks, near Weedon, Northants. The one which has now been restored was used as a shunting locomotive until 1940, when the brickyard was closed. The other failed to pass a boiler inspection early in its brickyard life and was cannibalised to provide for the surviving one.



August 14 1958

Next Wednesday is Opening Day!

Model Engineer Exhibition



This model caused a stir at last year's Exhibition.

Rail car racing.



Live steam track.



B.R. diesel-electric loco models.



R/C. demonstrations on the water tank.



Model engineering demonstrations



'OO' gauge railway layout.



Hundreds of superb models.

11 a.m.—9 p.m.

DAILY (CLOSED SUNDAY)

Admission 3s. Juniors 1s. 6d.

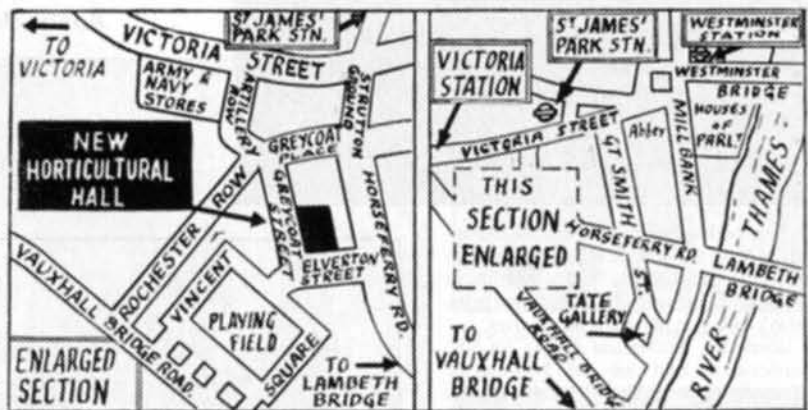
Get there by any of these routes, then follow maps.

St. James's Park Station by Circle or District lines

Victoria Street. Buses: 10, 11, 24, 29, 39, 46, 76, 134, ask for Army & Navy Stores.

Vauxhall Bridge Road. Buses: 2, 2a, 36, 36a, 57, 69, 169, 185, 181, ask for Rochester Row.

Horseferry Road. Buses 10, 46, ask for New Horticultural Hall.



NEW HORTICULTURAL HALL, WESTMINSTER • AUG 20-30

MODEL ENGINEER

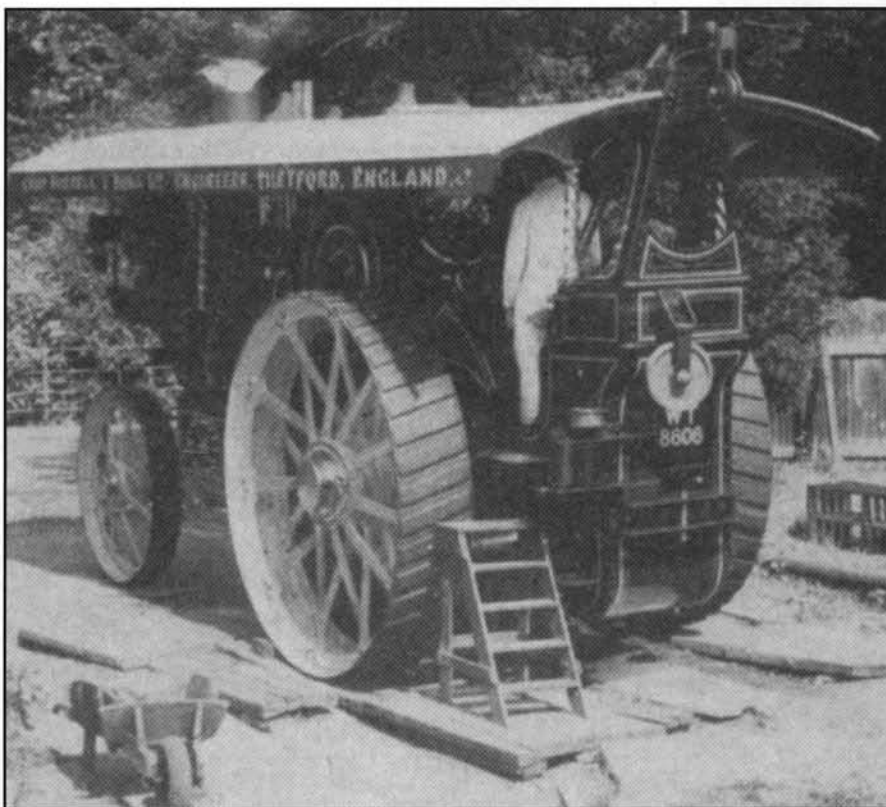
ii

14 AUGUST 1958

Ex-Mayor is a engine that is very popular and widely travelled on today's rally fields. Recently she has been taken completely to pieces for a new firebox and other boiler work, being reassembled in her correct Great Eastern blue. In these notes W J Hughes recounts an earlier restoration.

TALKING ABOUT STEAM

Rebuilding the **BURRELL SHOWMAN'S ENGINE EX-MAYOR**



The engine has a crane turret and pulleys to allow use of winding rope.

The last of the Burrells, No 4094 King George V has been in the possession of one family all its life. The same could not be said of Burrell No 4000 Ex-Mayor, which left Thetford at the end of February, 1925.

This engine went to Tuby's, the Doncaster showmen, who looked after her well enough. Then she fell on evil days of neglect. Eventually she came into possession of Eptons, of Bolingbroke, who put her in running order again, and thence to her present owner, Mr J. Salem, who lives in Cheshire in a delightful house situated in a pleasant park. The latter, incidentally, contains magnificent 3½ in. and 7¼ in. tracks, with a wonderful stable of locomotives.

When Mr Salem became owner of Ex-Mayor he had already had the experience of rebuilding two engines.

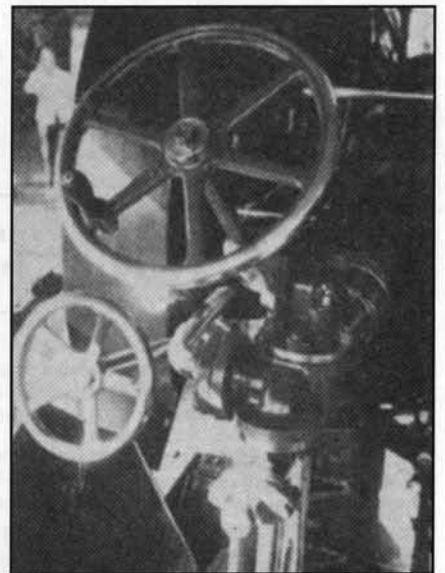
The first of these was the Fowler showman's engine No 14862 Excelsior, which was subsequently purchased by W. D. Miller, of Brighouse.

Scenic showman's engine

Mr Salem's second rebuild was the Burrell two-speed five-ton tractor No 3846, new in 1920. She is now in perfect condition.

Burrell No 4000 is a scenic showman's engine, with a platform behind the chimney for a separate exciter for the dynamo, and also with a turret mounted on the tender for a 30 cwt crane. These scenic engines were developed especially for the switchback railway type of ride. This required a large jolt of electricity when starting, and a crane capable of lifting the heavy cars from track to truck and vice versa, when tearing down or building up the ride.

This account by W. J. HUGHES tells how a road locomotive enthusiast tackled the three year task of making No 4000 an engine of superlative splendour



Beneath the steering column is the wheel for the flywheel brake, and also the pump. The bypass cock is the fitting which is nearest the camera.

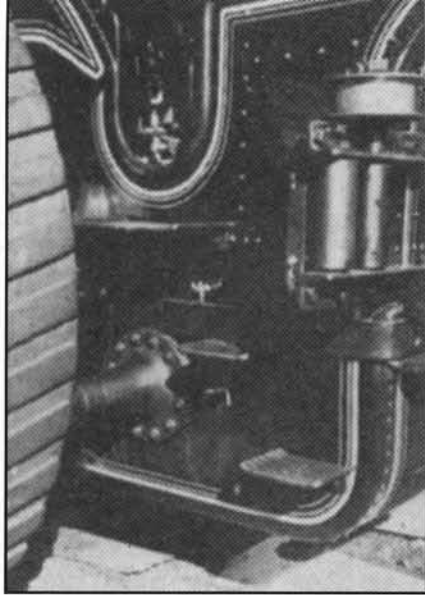
Unfortunately the original dynamo and exciter are missing, and Mr Salem has only managed to secure a dynamo for the front platform.

Transmission systems

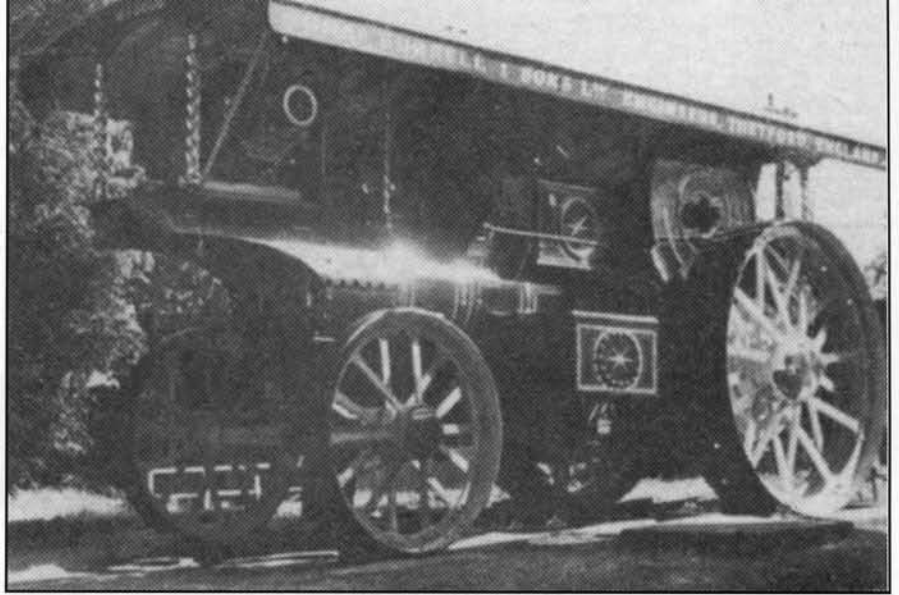
She is a single-drive engine, which means that the final drive is by gearing on the nearside, with a live axle transmitting the motion to the offside hind wheel. Burrells also used extensively their twin-drive system, where the compensating gear or differential is on the countershaft, with a pinion at either end of the latter driving a spurwheel attached to each hind wheel separately, the hind axle being "dead" in this design. Apart from the different gearing arrangement, the single-drive scenic engine has a larger tender than the twin-drive, and the hornplates are not cut away at the top front edges.

The engine's name derives from the fact that Mr Tuby became successively alderman and then mayor of his native town, and his earlier Burrells received those titles respectively. When a third Burrell was acquired, what was more natural than to name her Ex-Mayor to join her stablecompanions?

The rebuild of No 4000 began about three years ago when she was sent to a commercial firm in Crewe for the fitting of a new smokebox. On return, she was entirely stripped down. All parts of the motion were cleaned and polished to remove bruises, scratches, and other blemishes in the metal surfaces.



Arrangement of brake shaft bracket, footstep, fairlead, and drawstrap to drawbar to relieve strain of haulage.



EX-MAYOR gleaming with paint and polish

Replacements were made, including a new chimney and fine copper cap, bearings were relined or re-bushed, parts were remachined and refitted, and the result is a motion which runs as smooth as silk.

The old blue livery had been stripped off and rubbed down, and Ex-Mayor now stands resplen-

dent in the more conventional showman's colours of deep crimson with primrose wheels, all beautifully lined out. In most respects No 4000 is at least equal to new, and in some features better.

In all the work involved, the chief conspirator has been Louis Raper, whose name is well known in the scale model locomotive field—remember his

Championship Cup winner, the Lancs and Yorks Aspinall 0-6-0? Without doubt, as Mr Salem says, Louis is one of the finest builders of locomotives in the country, and he has carried this perfection to the rebuilt Burrell. It is as a result of their co-operation that this superlative road locomotive now stands as a tribute to the name of Burrell. ●

May 19 1960

A traction engine doing over 70 miles an hour under its own steam? The smallest traction engine and a bitza. Back numbers of the M. E. have all the answers!

FAIRGROUND RACERS

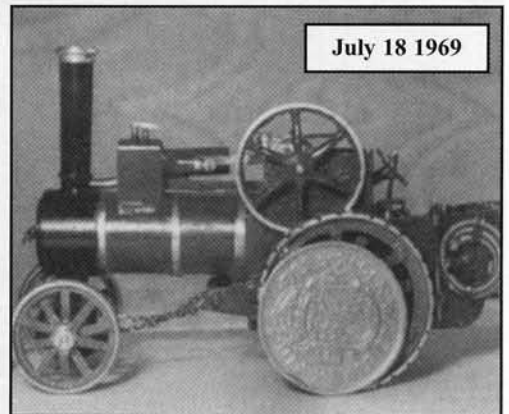
Sir,—This photograph is of American steam traction engines converted to road and track racers by mounting them on surplus petrol truck chassis. They have obtained speeds on public highways as high as 72 m.p.h., certified by a friendly highway police officer. We use them as fairground racers at county fairs, etc.

E. ROBERT GRIMM
Wautoma,
Wisconsin.

Two converted road rollers as described in the letter above from Mr E. R. Grimm, of Wautoma, Wisconsin, doing their stuff. When this picture was taken they were travelling 35m.p.h., they are capable of 55 to 60 m.p.h.



July 18 1969



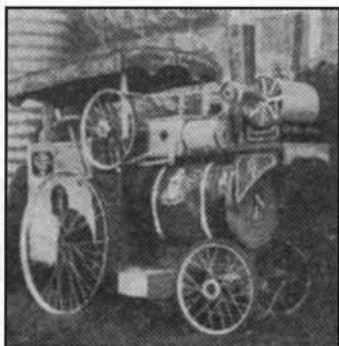
Is this the smallest working model traction engine in the world? It was made by Mr. F. F. Rodgers of Wendover. Photograph by H. B. Snowdon.

September 22 1960

ANY MORE?

SIR,—The photograph which I am sending you is of my model showman's engine with a halfcanopy and dynamo. It is a non-working model and was made out of pieces of scrap. It took me a month to make in October 1959.

I should like to know if anyone else has made one like it? I have read MODEL ENGINEER since 1949 and I enjoy any traction engine news.
TONY T. GRANT.
Shutford,
Oxfordshire.

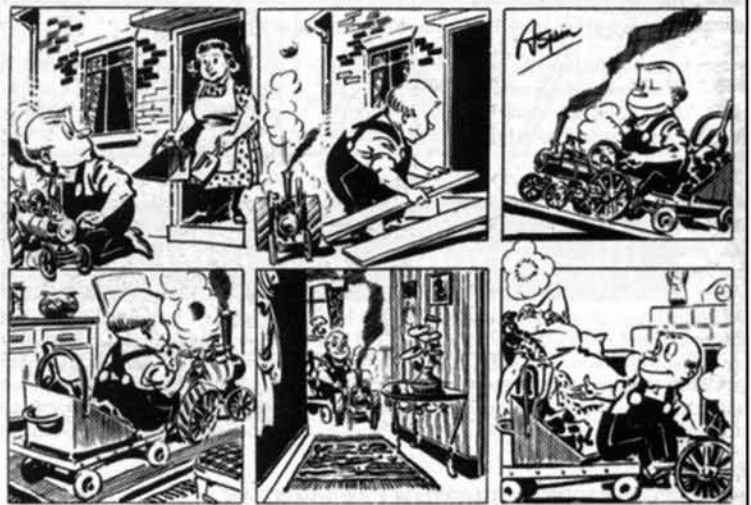


"Has any other reader one like this!" asks a correspondent.

March 16 1961

CHUCK . . .

. . . THE MUDDLE ENGINEER



The Burrell single cylinder is a popular model. In the larger scales of 3 and 4½ in. they seemed to reign supreme on the rally fields of the late sixties and through the seventies. 'Plastow' who's name is most associated with the drawings and castings for these fine engines, used once to trade as the Company 'Lion Engineering' mentioned in the text. The designs are still available, nowadays from Plastow Traction Engines, Braye Road, Guernsey, Channel Islands, GV3 5XA. It is pleasing in this selection of articles to include one by Ted Jeynes. I would have liked to have been able to include more of his writings but since many of them were on topics other than Road Steam I hope other Centenary issues will find some space for his undoubted wisdom.

May 3 1962

Model traction engine will haul over a ton

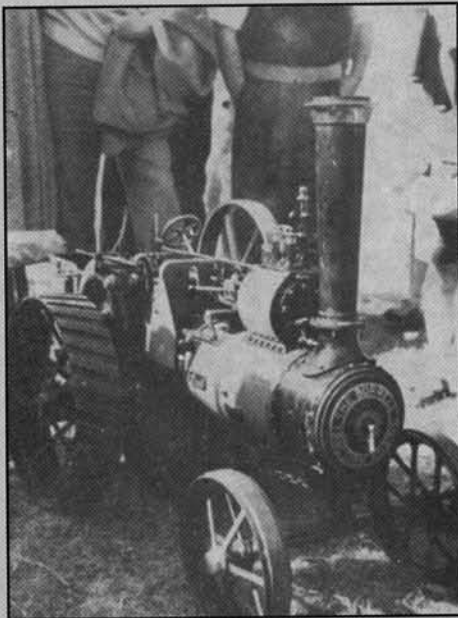
By R. V. BOWLER

Although not anything like as efficient or perhaps as clean as the present day modes of travel and power, this exhibit at a traction engine rally in Hertfordshire still captured the interest and imagination of many spectators, young and old alike.

The photograph is of a model Burrell 6 hp. agricultural engine with a working pressure of 90 p.s.i. Although only a model, the engine is still amazingly powerful, and is capable of hauling a load of about one and a quarter tons on a level surface. All the fittings of a real engine are incorporated including a water lifter which will raise a gallon in sixty to seventy-five seconds.

The expert will undoubtedly notice that the model is incomplete and the exhibitors were fully aware of this when it was on show at the rally. The manufacturers are able to supply castings and drawings for building this model traction engine, which is now becoming quite popular.

The model was built by enthusiasts at the Lion Engineering Company, 81 Linden Gardens, Enfield, Middx, who can supply castings and drawings.



May 17 1968

Building a 3 in. scale Traction Engine

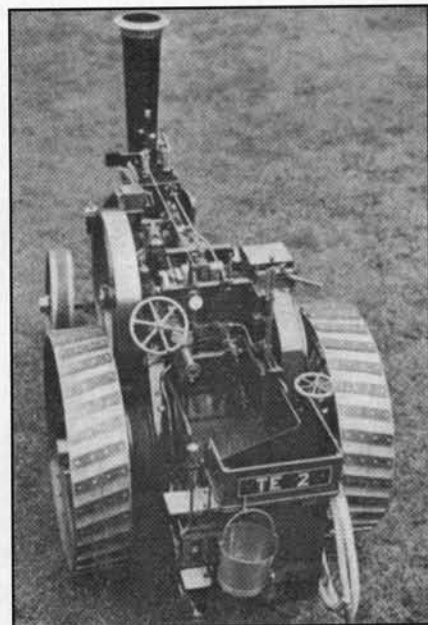
by R. W. Fenwick

SOME EIGHTEEN months ago, I saw a beautiful model of a traction engine standing like a young pony in the showroom of one of the M.E. advertisers, and there and then I decided to try and build a similar one, it being quicker to do that than to save up and buy one.

I made contact with a friend who gave me some

details of drawings and a supplier of castings and, after enquiring from the Lion Engineering Co. of Cambridge, I made a start with the building and, at the same time, searched through back numbers of M.E. for traction engine articles.

With most of the models that I have built, I have tried to give them a name as early as I could



during the construction period; this makes it easy to refer to them when requesting leave of absence from household chores so as to work on the model.

Being connected with fire engines, the name Fire King was of a steamer that I was interested in and it seemed an appropriate name for my engine. Little was I to know that Mrs. Cherry Hill (at that time Miss Cherry Hinds) would bring the name to the fore in M.E. circles later on. The lamps on my engine are replicas of a pair of fullsize steamer lamps that I have. To most of us the cost of materials concerns us to some extent and with this engine I studied the drawings to see what castings I could dispense with by adapting from other odds and ends; some of these were:

Smokebox—offcut from a trolley bus pole standard.
Chimney base—electric alarm bell.

Copper chimney cap—6 in. dia solid copper billet turnings sold back to scrap merchant!
Smokebox door nameplate—built up with letters soldered on.

Crankshaft—built up from round and square sections, pressfitted and pinned.

Eccentrics—slices of bronze bar.

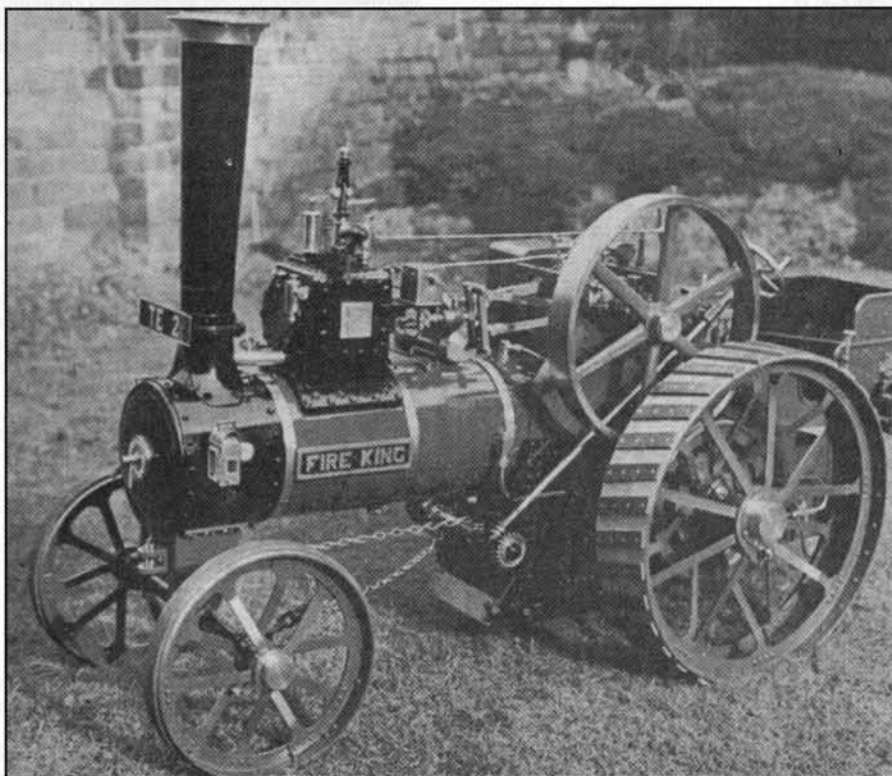
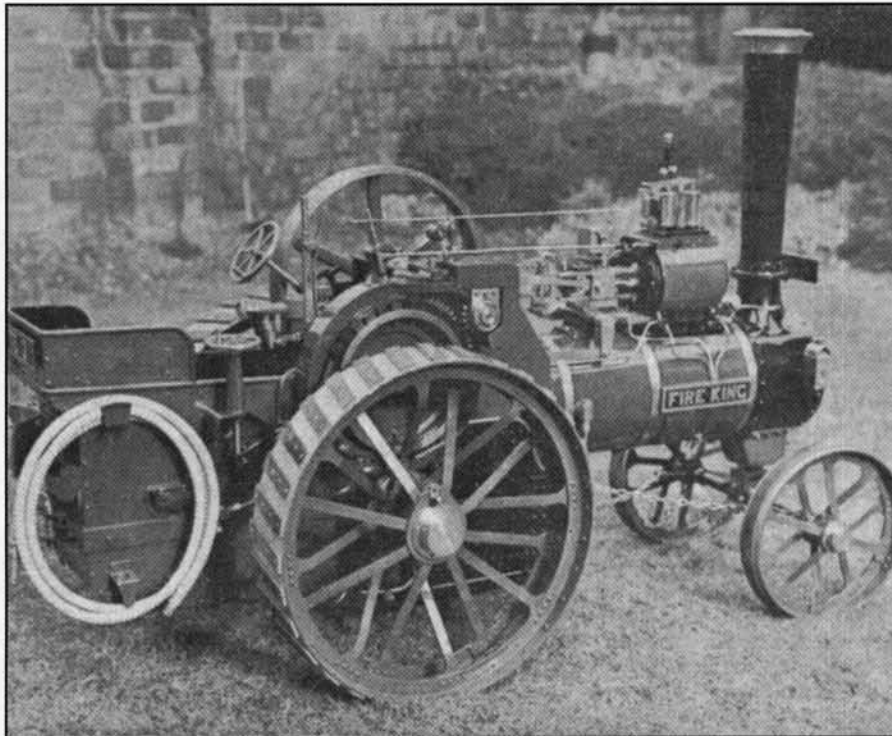
Main bearing horns—slices of 5 in. dia. steel bar.

Body of water pump—Built up and silver soldered.

Steering wheel—cut from steel plate.

Many other small fittings were made from odd pieces of metal, some of which were kindly donated by friends.

Before I started to build the engine, I knew that I would not be able to machine on my ML7 lathe such castings as the flywheel or the large gear blanks; however I obtained the use of a big old lathe in the local blacksmith's shop to machine these items and here suffered a setback to my pocket, for when taking the finishing cuts on the flywheel casting, it sprang out of the chuck and broke into three pieces, which resulted in my not chancing a repeat performance, but getting the Lion Engineering Co. to supply me with a new wheel, ready turned. They also cut all the teeth on my set of gear blanks, making a very good job of them and in a short time. One of my pleasures at that time was to be quoted three weeks delivery time for some of the machining, and then to receive the parts,



finished, within one week—usual disclaimer.

Machining the cylinder casting required certain parts of the lathe to have their limits extended, such as the cross-slide. The cylinder was machined completely on the cross-slide, starting off by flycutting the ends, boring with a cutter between centres, flycutting the saddle and end milling the steam chest cavity and ports with the cutter held in a vertical drill press, which in turn was bolted to the lathe bed.

Machining the cylinder was a long job because the lathe speed had to be kept very low and every new face to be machined needed packing up in a different way and accurately set up mainly by using a large drill pad in the

tailstock as a register. The cylinder is also honeycombed with various steam ports and stud holes and most of them had to avoid each other. I had only one small hole run into another and I hopefully plugged and sealed it with Araldite.

Making the splines on the crankshaft proved interesting to me. I settled on a compromise for proper splines by milling shallow grooves along the shaft and then used the grooves to hold press fitted square sections of steel which were finally held by countersunk screws. The positions of the grooves were registered by a simple index plate and the same plate was used to index the cutting of the internal splines on the small gear wheels, the

bores of which were plugged then drilled through, part in the plug and part in the wheel. The plugs were then removed and the "half" holes filed square until the wheels would slide without shake along the crankshaft splines.

The copper boiler proved reasonably easy to make, being similar to the locomotive type and, apart from one snag regarding the reluctance of silver solder to cover one of the joints, which the M.E. query service assisted me to overcome, proceeded quite quickly until it came for the accurate fitting of the many hollow stays to hold the hornplates to the fire-box sides and the blind bushes to take the cylinder saddle bolts. With these, the positions on the boiler top were marked from the saddle, the bushes pilot drilled and fitted, then the saddle placed in position and the bushes tapped with the tap passing through the saddle wherever possible.

Using a gasket between the cylinder saddle and the boiler, I discovered that when the cylinder was bolted down, the cylinder centre in relation to the boiler could be varied slightly, according to the pressure exerted by the bolts. To allow for this when lining up the cylinder with the crankshaft and valve gear, I provided adjustment in the form of double eccentricity in the intermediate valve spindle by drilling the valve spindle fixing hole slightly off centre and fitting an eccentric bush held by a locknut in the motion plate. By securely bolting the cylinder in position and the motion plate on the boiler, I was able to line up everything with the adjustments provided.

The road wheels were built up from "T" ring castings set out on a board; the castings did not need turning, only a clean up with a file. Cutting the spokes took some time and energy; they were sawn and filed from steel strip in batches of four, then bent and temporarily held to the rings by nuts and bolts until the wheel was built up and ran true, then one by one the bolts were removed and replaced by rivets. Care had to be taken with the riveting, because if one hit the ring rather than the rivet it was easy to distort the whole wheel.

I did not wish to rivet the smokebox to the boiler and so cut threads to take nuts on some iron rivets and used these to hold the two items together.

After I have built a model, I have found it difficult to recall all the details and events that occurred in the building of it, and this one is no exception. But two things I remember: one was during the final stages when the model was too large for my bench and I had to lay on the floor to fix some of the smaller parts that were out of my vision, and the other was when it was completed and it took two friends and myself to get it out of my upstairs boxroom workshop, and down stairs and for the first time I saw the engine in full daylight, and could walk all round it without moving it first. ●

October 3 1980

