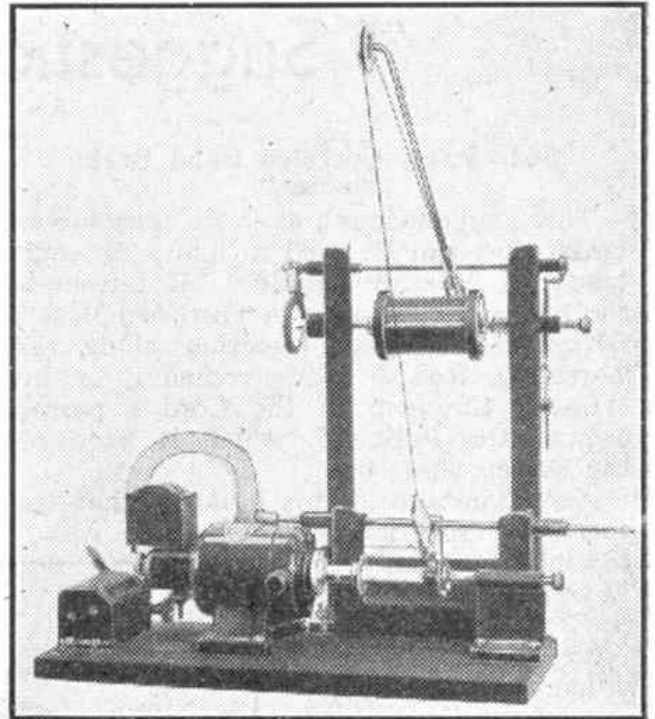


in the third picture. It will be seen that the machine is an almost identical copy of the model in every main feature.

The model is driven by a Klaxon Electric Motor running at a speed of 5,000 r.p.m., and is capable of turning out about 20 completely wound coils per hour. The bobbin of wire 1 that forms the stock is mounted on a spindle 2, which is free to revolve except that a light friction brake is incorporated to prevent the wire from over-running as it is withdrawn at high speed. This brake consists of a 1" Pulley shod with a Rubber Tyre, and contacting this Tyre is a short Strip 3 fixed to a Coupling on the Rod 5. This Rod carries also another Rod 7 at the extremity of which is a guide pulley formed from two  $\frac{3}{4}$ " Discs. The wire is led from the bobbin through the guide pulley and thence passes through a feed guide formed from two Curved Strips 9, which lead and feed it on to the core of the coil. The latter is mounted on the shaft 8, which is coupled direct to the main output shaft of the Klaxon Motor and runs at a speed of 5,000 r.p.m.

In order to feed the wire evenly along the core, and wind each turn close up against the one before it, a special feeding device was necessary. This consists essentially of a heart-shaped constant feed cam 15, cut from a piece of sheet metal, which is fixed on the secondary shaft of the Klaxon Motor and rotates at a speed of 100 r.p.m. This cam contacts a  $\frac{1}{2}$ " Pulley fixed on the end of the Rod 17, which carries also the Curved Strips 9.



As the cam turns through the first half of a revolution, it pushes the Rod 17 forward at a constant rate, so carrying the wire evenly across the length of the coil core. As the cam turns through the second half of its revolution, Rod 17 is drawn backward by a Spring 14. It will be seen therefore that for each revolution of the cam two layers of wire are wound on the coil. The cam is designed to give a rate of feed of  $\frac{1}{1000}$ " for each revolution of the main shaft of the Electric Motor, on an extension of which the core of the coil is mounted.

## The "Roman" Road on Blackstone Edge

THE appearance in the "M.M." for February last of an article describing the "Roman" road on Blackstone Edge has had an interesting sequel. The general belief that the road is Roman was challenged by Mr. J. L. Maxim, Rochdale, and here we give an extract from his letter on the subject.

"The short stretch of about  $1\frac{1}{4}$  miles of paved highway on Blackstone Edge is by no means proved to be Roman at all, although that is the popular notion, based largely upon a paper by Dr. H. C. March given to the Lancashire and Cheshire Antiquarian Society, published in their first volume in 1883, and which others have tried to support. The claim that it is 'the finest Roman road remaining in Western Europe' is an unwarranted assumption, nothing of an undoubted Roman origin ever having been found on or near to it. Its proximity to and parallelism with an authentic old pack-horse track or causeway from Rochdale to Halifax is indicative of great age, but certainly nothing like 2,000 years.

"This stretch of roadway does not branch from the modern Blackstone Edge Road at the 'White House,' but lies on the open moor about  $\frac{1}{2}$  mile to the east of that noted hostelry. The old track leaves the new road at the 'Rake Inn' below 'Windy Bank,' near

Littleborough. And again this particular length of causeway does not rejoin the modern highway at 'Bailings Gate,' but crosses it at Baitings Gate. As for the entire length being paved by the original gritstones laid by Roman Legions with masoned stones, these are all gratuitous assumptions and wishful thinking, which follow the first presumption of a Roman origin on a supposed highway from Manchester to York by this route, instead of by Castleshaw, where a Roman camp was actually explored years ago.

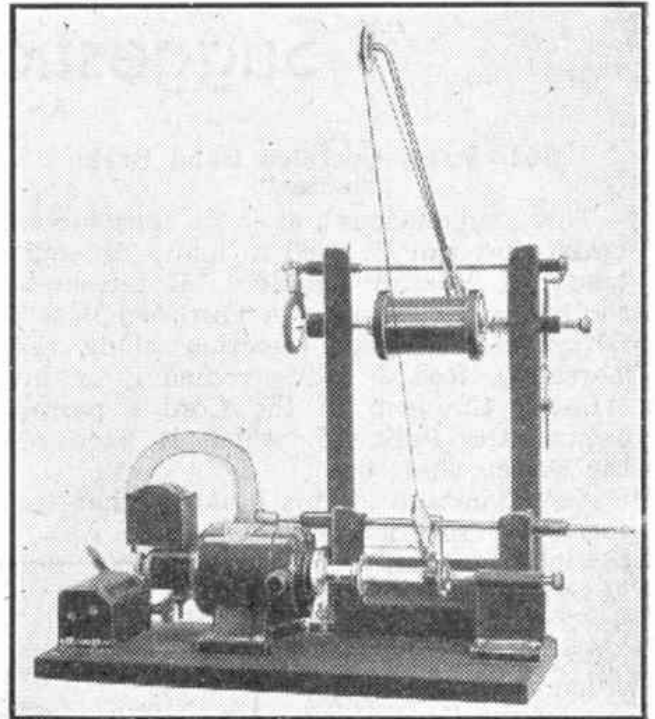
"No fewer than a dozen different theories have been put forward to explain the singular manner in which the central trough stones are grooved—well shown in the photograph—but nothing has been generally considered feasible except perhaps some form of skidding, and even then it need not be of Roman origin. At the crest of the hill there is an open area, but no traces of a courtyard to a military post of anything like Roman date of construction. (You may know that Col. Roseworm had troops on the Blackstone Edge in the Commonwealth period). The so-called stone-bridge is nothing but a restored culvert about 3 ft. high to cross the shallow mountain stream flowing down Black Castle Clough, where the old pack horse road crossed it, and the so-called 'Roman' road.

"I may add that I am aware of most, if not all, the matter which has been published on this interesting and unique stretch of roadway in my native district Rochdale, and have not made the statements without due reasoning and forethought."

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# Meccano Helps to Invent Motor-cycle

By LT.-COL. McKECHNIE.

In this article Lt.-Col. McKechnie tells how very helpful he found Meccano. The Colonel, who describes himself as being "a Surgeon by profession and a Scientist by inclination," was Commandant of a War Hospital in India at the time he invented his motor-cycle. We feel sure that all readers of the "M.M." will be interested to read of the original Meccano Model of the McKechnie Motor-cycle.

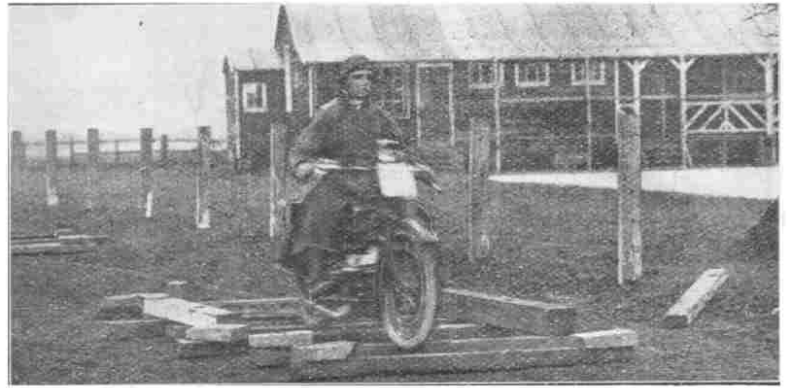


Photo by courtesy of]

["The Motor Cycle."]

Trial over sleepers to demonstrate the perfect springing of the McKechnie Motor-cycle.

At the time I invented the motor-cycle that bears my name I was stationed at Karachi, a tropical sea-port town of India. Karachi is surrounded by a



FIG. 1.



desert, across which communication with the interior is effected by a single railway. There is practically no rain-fall and the desert supplies no food for horses, so that although horses are usually used elsewhere in India they are not of much use in Karachi. Here the Europeans nearly all use motor-cars, but there are many who, like myself, cannot afford to do so.

Having neither horse nor car, and finding that a push-bike was an impossible means of locomotion owing to the tropical heat, I purchased a handy little motor-cycle. Although this carried me very well and enabled me to get through my medical work much more quickly, it shook me up a good deal for there is only one good road in Karachi, between Government House and the station. On the other roads the rigid frame and 24" wheels caused a great deal of vibration that jarred me from head to

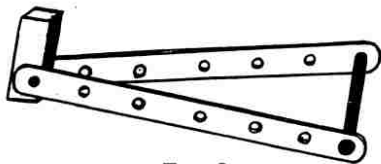


FIG. 2.

foot, for though my machine was fitted with spring saddle and spring forks these were quite inefficient on such rough roads as are encountered in India. This discomfort made me determine to invent a spring-frame motor-cycle.

As most of my readers know, nearly all motor cycles have rigid diamond frames, for they have been evolved from the push bicycle. The first motor cycle was merely a push cycle with a petrol engine clamped to the frame, and from this beginning the present-day motor cycle has been evolved.

Having made a number of sketches and drawings I sought for a means of testing my ideas. Knowing that Indian workmen are unintelligent and moreover are aggravatingly slow, I realised that there was likely to be an interminable delay if I decided to have them make me a model. Suddenly I remembered that the young son of one of my medical officers had a Meccano Outfit, and an interview with his father resulted in my being able to borrow the Outfit. The Outfit was a No. 6

and I found the Meccano parts quite satisfactory for building a model of my suggested motor cycle, except that there were no suitable wheels. I soon supplied this deficiency, however, by using two wooden bungs from large stone jars in which we stored medicine.

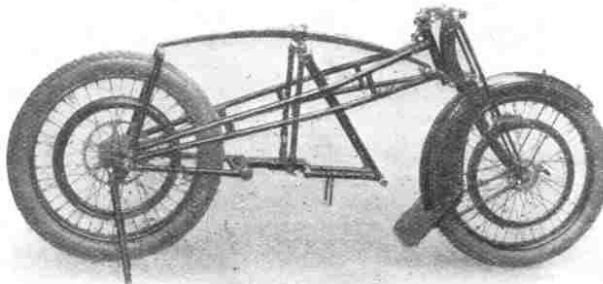
It took me about an hour to construct the model, but only thirty seconds were necessary to show that it could not possibly work! Although I had obtained excellent springing, I had failed to anchor the back wheel axle to the steering head. As soon as a weight was placed on the saddle, the wheels flew apart! A few minutes' study of the model showed what was wrong and the difficulty was soon overcome and another model built. To all intents and purposes this model was identical with the McKechnie motor cycle shown for the first time at Olympia in November of last year.



The McKechnie Motor-cycle in its final form fitted with a 5/7 H.P. Coventry-Victor engine.

Briefly the model consisted of a rigid frame formed of two tension members joining the steering head and the back axle (Fig. 1) and giving a triangulated girder (Fig. 2). Two compression members were added to maintain the correct slope of the steering head (Fig. 3) the whole forming a rigid triangulated frame, which carried no weight but served simply to fix the back axle immovably with respect to the steering head.

The weight-carrying frame was next constructed with a Meccano strip (representing a leaf spring) running horizontally from the bottom of the steering head to a bridge-piece, over the back axle (Fig. 4). The engine was supported by a special cradle, the construction of which allowed independent freedom of movement so that both back and front wheels could follow the irregularities of the road. The cradle was supported at the rear by the back axle and suspended at the front from the centre of the leaf spring (Fig. 4). Other important details in regard to rigidity, etc., were subse-



Details of the spring frame construction of the McKechnie Motor-cycle.

quently carefully worked out and embodied in the finished model.

With the Meccano model before me, it did not require a great deal of imagination to visualise in my mind's eye what the actual motor cycle would be like. I worked on my Meccano model and experimented with it until I learned exactly how the spring should be placed to give the easiest riding positions; the nature and location of the strains the frame would have to undergo, and whether they were strains of tension, compression or twisting.

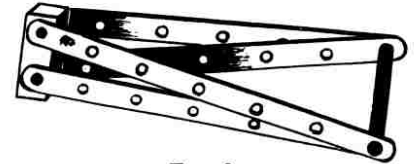


FIG. 3.

Although I had first worked it out in my head and then on paper, it was the Meccano model that filled me with joy and confidence. It seemed so substantial when braced up, so springy and business-like that I could almost imagine it saying:—"Here I am, sprung like a car—even my engine—with a springing that is better than you will find in many cars. There is nothing tinny about me. I have no shackles or tiny joints that

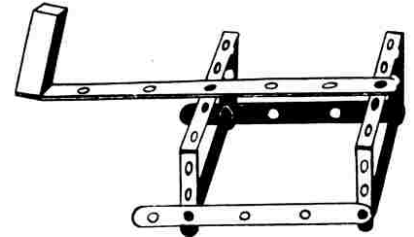


FIG. 4.

will wear themselves to pieces. My frame does not whip and the metal is disposed where it is most wanted. I am truly rigid where I should be rigid, and truly flexible where flexibility is needed."

My Meccano model seemed to say all this, and a good deal more, as I handled it and pressed on its spring or cradle. From it I knew that my idea was sound, and I felt convinced that I could face and overcome the many obstacles that lay between the conversion of the Meccano model into the finished product of the McKechnie Motor Cycle.

The little boy who had lent me his Meccano Outfit became very restive at my prolonged use of it. More than once his father came to me and said he wanted it back, and several times I put him off because I had not finished my experiments. At last, however, the first model of the McKechnie Motor Cycle was resolved into its component parts and the Outfit returned with grateful thanks to its owner.

Now that my vision is realised and the McKechnie Motor Cycle an accomplished fact, I have had the added pleasure of sweeping along the road on it and discovering in it a new vehicle of locomotion that combines the glorious sensations of sitting on an easy-actioned thoroughbred horse and speeding in a fast car.