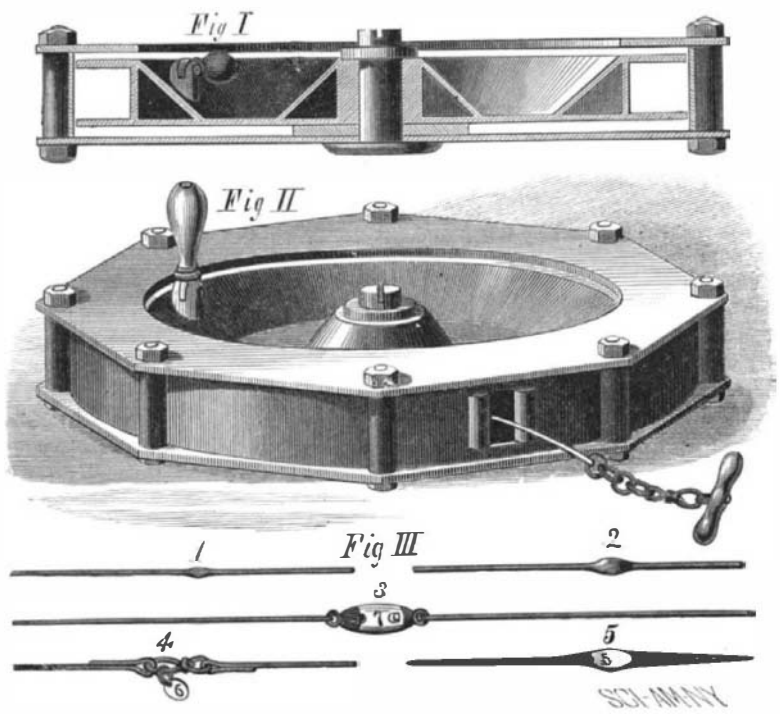
WIRE MEASURING DEVICE.

The engraving shows a wire measuring device for surveying and other purposes, recently patented by Mr. Alfred Atkins, of Wanganui, New Zealand. Figs. I. and II. show very clearly the form and construction of the reel. Between the head of the screw and the spindle is inserted a washer, which rests upon the upper edge of a bearing fixed to the wheel. The spindle is fixed to the back of the frame, which is separated from the wheel by a leather washer. Upon the periphery of the wheel is formed a groove, in which the wire is wound. The reel is provided with a jointed handle, and is placed in a case or frame, in one side of which is a large circular aperture as shown in Fig. II.

The wire is fractionally divided, thereby dispensing with a separate tape or measure for giving the fractional parts, and is composed of several sections, which are united by swivels to prevent kinking. The swivel may be formed as shown at 4, Fig. III., and furnished with a tally to indicate the distance; or it may be made as shown at 3, in which the number is cut upon the flat portion in the center. The smallest divisions —say links—are formed by a very small swelling, shown at 1; those for the next larger divisions—say five links—by a larger swelling of the same form, as at 2; and those for the next larger divisions—say ten links—by a slightly larger but flattened swelling with the number cut upon it, as at 5. When considered necessary, a spring swivel can be attached to the inner end of the wire next to the reel, to be used when any distance is to be measured with extreme accuracy.

By inserting swivel joints in the wire at regular intervals all danger of kinking and breaking is obviated; and as the marks separating the several divisions are easily and quickly perceived, distances—as in surveying—can be measured rapidly and with almost no chance for error.



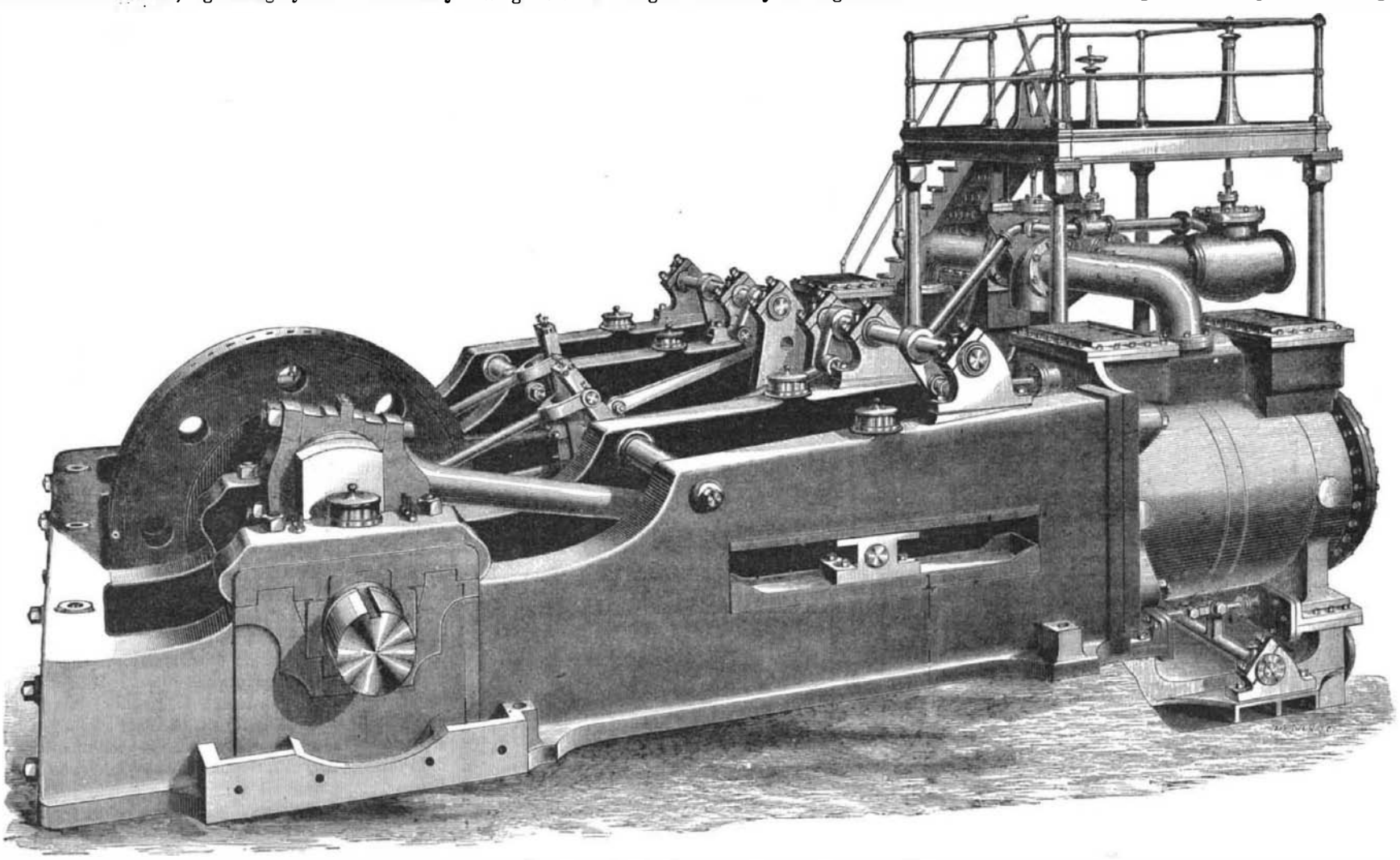
ATKINS' WIRE MEASURING DEVICE.

An Invention Wanted.

A correspondent suggests that a simple and cheap device for registering the distance traversed by a bicycle or other wheeled vehicle would be an invention of which great numbers could be sold. Here is a chance for some ingenious individual to rack his brain.

REVERSING RAIL MILL ENGINES.

The accompanying engraving represents a pair of high pressure rail finishing engines recently erected by W. and J. Galloway & Sons, Manchester, for which we are indebted to the *Engineer*. The pair of engines has cylinders 50 inches bore, and a stroke of 4 feet 6 inches, the pistons being unusually deep, to dispense with back slides. The crank shaft is of the double sweep description, with journals 18 inches diameter, the crank pin being of the same diameter by 15 inches long. As will be seen from the engraving, the framing is of most substantial character, and one of the principal features in connection with these engines is the arrangement of the steam admission and exhaust valves, which consist of simple flat plates, which are found in practice to maintain during wear their original efficiency and tightness. The exhaust valves being placed underneath the cylinders, enable any water that may pass into the cylinders to be discharged freely, without the necessity for special relief valves. The engines are fitted with link motion of the Allen type; the reversing is effected by a steam cylinder, the piston being suitably cushioned, and actuated from the stage where the driver stands.



IMPROVED REVERSING RAIL MILL ENGINE.

Disinfecting the Sputa of Phthisis.

Dr. J. Sormani, Professor of Hygiene at the University of Pavia, gave some interesting details at the Hygienic Congress of the Hague concerning experiments made this year on 150 Guinea pigs with the sputa from phthisis. The object in each case was to ascertain what chemical or other methods would neutralize the bacillus which, it was previously ascertained, existed in large numbers in the sputa. The results of these experiments were summarized in the following manner: 1. The bacilli of tubercolosis were generally very difficult to destroy; dryness, exposure to oxygen, putrefaction, and most disinfectants failed to produce any effect. 2. A temperature of 100° C. only killed the bacilli after at least five minutes of ebullition. 3. The artificial digestion of bacilli showed that they were the last of all living organisms to be destroyed by the gastric juices or chloridic acid. A very active digestion is necessary to kill this microbe. A healthy man may destroy the bacilli in his stomach, but an infant or an adult with his digestive faculties impaired would easily allow the germ to pass the stomach intact, and retain its virulence in the intestinal tube. This determined enteric ulcerations, etc. 4. The bacillus of tuberculosis can be preserved intact for a whole year when mixed with water. It is probable, though not proved, that it has retained its virulence during that time. Thus drinking water may become the means of propagating tuberculosis. It is probable that contaminated linen retains its virulence for five or six months. 5. Alcohol does not destroy the germ, and hard drinkers often suffer from tuberculosis. 6. Cod liver oil, ozone, oxygenated preparations, and other similar remedies have no effect in killing the bacillus, nor are benzoate of soda, salicylate of soda, sulphate of zinc, and carbolicacid, iodide of silver, bromide, camphor, etc., of much greater use. They injure, perhaps, but do not absolutely destroy, the bacillus, at least not in the doses that can be taken without danger. 7. A more decisive action may be attributed to creosote, eucalyptol, pure carbolic acid, the naphthols, and bichloride of mercury. 8. For disinfecting spittoons, carbolic acid solution at 5 per cent is thought sufficient, and Dr. Sormani asserts that the breath never contains any bacillus. He also suggested that essences of turpentine or eucalyptol should be diffused in the houses as an agent for the destruction of this special germ. —*Lancet.*

Change of Plumage in the Wild Duck.

The drake leaves his mate, says a writer in *Familiar Wild Birds*, as she commences to hatch, and then undergoes, in common with many other male birds of the duck family, one of the strangest transformations known to naturalists. The plumage of the drake is, up to this time, exceedingly handsome. The bill is yellowish green; the irides hazel; the head and upper part of the neck a rich glossy green, with a ring of white; the lower part of the neck and the back a grayish chestnut-brown; the rump and upper tail-coverts bluish-black; the middle tail feathers velvet black, and curled upward; front and sides of the neck rich dark chestnut; breast, belly, vent, grayish-white; under tail-coverts velvet black; legs orange yellow. As already mentioned, a wonderful change takes place in the appearance of the drake at the time of breeding. First, the back and breast change color, then the curled feathers are lost, the splendid plumage of the head and neck becomes dull and gray, and about the first week in July all the handsome markings have disappeared, and the bird has assumed the dull brown color of the female.

A Large Gun Tube.

Sir Joseph Whitworth & Co., Manchester, have completed for one of the 110 ton guns now being built for the government a steel tube which is the largest that has ever been made for ordnance purposes. The length of the tube is 42 feet 6 inches, the outside diameter 27 inches, and it is made of fluid pressed steel forged hollow, with a hole through 14¾ inches diameter. The weight of the tube, as delivered by Sir Joseph Whitworth & Co., is 26 tons, but if it had been made in a solid casting it would have exceeded 40 tons.