

THE COVENTRY TRICYCLE.

The tricycle, as it is designated, shown in the accompanying engravings, consists of a rectangular frame made of iron or steel tube, which carries a double cranked shaft in patent parallel bearings. The driving wheel, 43 inches in diameter, is arranged on a left hand side of the rider; and the other side of the rectangular frame is produced, front and back, for carrying the forks of two 22-inch steering wheels. These forks are connected by a rod, fixed to the outside of of one and the inside of the other, so that both wheels are turned together by the steering handle. The effect of this arrangement is that the rider is enabled to thread his way between other vehicles with the greatest ease; and it is even said that he can describe a figure 8 in a length of 12 feet. The seat is mounted on four steel springs of S form, which

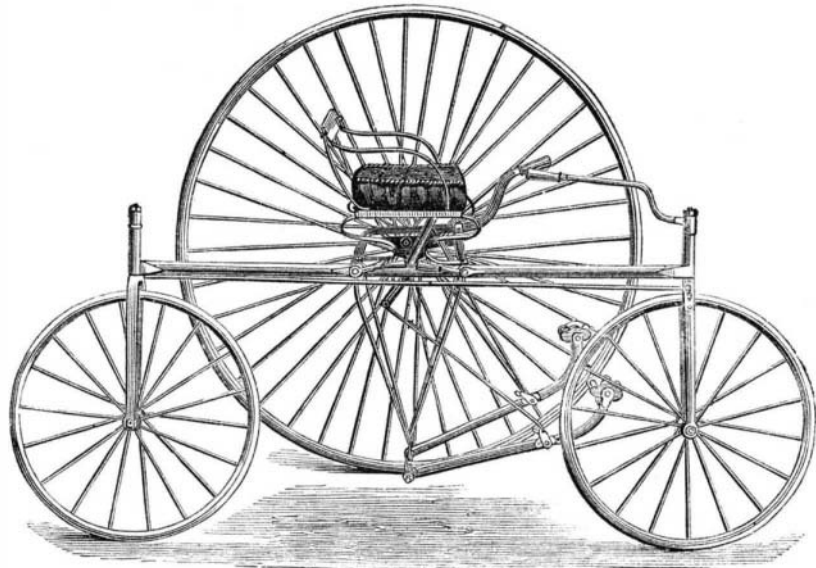
the compartment nearest the fire; that in the middle compartment a less degree of heat was obtained, while in the compartment the furthest from the fire the temperature was below the boiling point. This showed that by the time the gases reached the end furthest from the furnace they became cooled down to a lower temperature than the steam generated at the end of the nearest furnace; and therefore exerted a condensing influence on the steam already generated, thereby causing a tendency to prime, in addition to the direct loss of heat. The result of these experiments was that the form of boiler described above was adopted as the type of all those constructed in future by the firm.

All radiation of steam from the cylinders is effectually prevented by an ample steam jacket, which also takes the place of a dome, carrying the safety valve, the heating, and

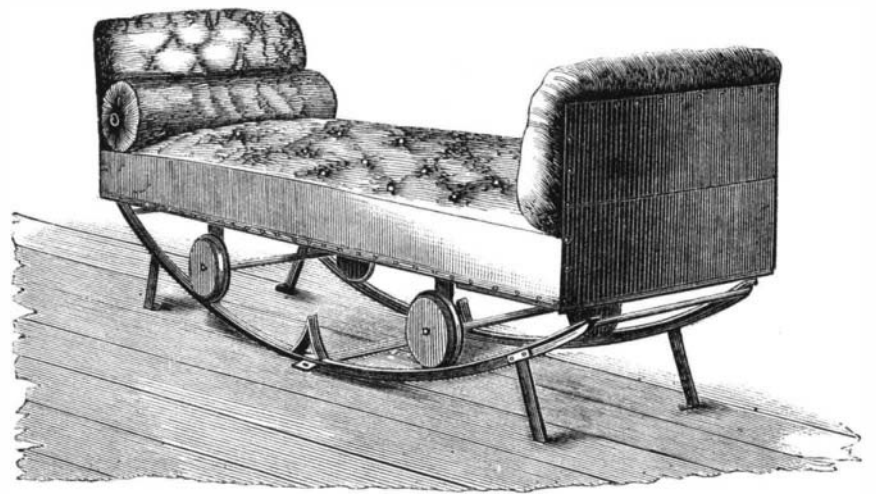
internal thread to be stripped off by the tool used for clearing out the mud.

The crank shaft has a spur pinion keyed on its end, which works into an internal or annular spur wheel keyed on the drum shaft, in the proportion of 1 to 9. The drum runs loose on its shaft for lowering, until connected by a sliding clutch for raising the cage; the barrel is of wrought iron, but it has cast iron flanges, with a rim for the brake to act upon. On the end of the drum shaft is keyed an eccentric crank disk for working the spear rod; it is provided with a slot in which the pin is adjustable, so as to give a longer or a shorter stroke to the pumps, as may be required.

The starting lever of the engine, the striking lever of the clutch, and the foot plate of the lever acting on the brake, are all within reach of the driver, and his position enables him to see the pit mouth, so that overwinding is almost an



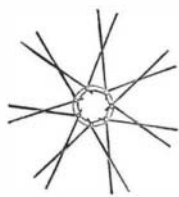
THE COVENTRY TRICYCLE.—Fig. 1.



ANDERSON'S EQUILIBRIO COUCH.

are attached to the frame by nuts on the screwed ends of the stays carrying the pin on which the pedals work. Rods jointed to the pedals turn the crank shaft, as will be seen in the engraving, Fig. 1. The second handle is merely to afford support for the left hand while the right is occupied in steering.

Fig. 2.



The machine can be readily taken to pieces and packed in small compass.

IMPROVED MINING ENGINE.

We reproduce from *Iron* the engraving and description of an engine called the Tuxford Mining Engine, which has been erected for the Votty and Bowydd Slate Company, Festiniog, North Wales.

The fire box rests upon a cast iron ash pan, while the smoke box end of the boiler is supported on a crutch, forming a feed tank and heater. The crank shaft is geared to the drum, from which is worked the spear rod attached to the bell crank of the pumps.

In all the Tuxford engines, great attention is paid to economy of fuel; and it may be said that the proportions of the boilers differ from those adopted by any other maker. The fire box has an unusually large surface, but the grate area is reduced by fire logs mitred at the corners; the tube surface is unusually small; indeed, the tubes are only six feet long. The effect of this is to make the boiler remarkably short and compact; and it will be interesting to state the reason why these proportions have been adopted.

About ten years ago Mr. Tuxford was led to make

some experiments with boilers to ascertain the relative value of great area and tube surface, and of long as compared with short tubes. He had a model boiler of the horizontal type constructed with three tubes, and divided vertically into three compartments; on trying the temperatures of these compartments with the thermometer, he found that steam of high temperature, and therefore pressure, was generated in

regulator valve. In this way the steam enters the cylinders at boiler pressure by a short and direct passage, instead of by a long, tortuous pipe, which is apt to throttle the steam as well as reduce the pressure, owing to radiation. The pistons have two cast iron rings, each divided into three segments, so that the wear on the inside of the cylinder is perfectly uniform. These segments are arranged outside a circular steel spring, being held in position by tongues fixed by means of studs and back plates. At the back of the ordinary slide-valve works the expansion valve, consisting of two iron plates; the sheave of its eccentric may be shifted on the main shaft to any angle, so as to cut off the steam at any desired point in the stroke. The rods are supported in bearings fitted to the governor bracket, so that the glands of the stuffing boxes are relieved of all weight, and only have to perform their legitimate office of keeping a steam-tight joint. A Watt governor, with a spiral spring to quicken the fall of the balls, acts directly on the throttle valve; but its effect on the speed of the engine may be regulated according to the work in hand. The fork is provided with a stud, which may be adjusted on a small slotted quadrant attached to the throttle valve spindle, so as to regulate the opening of the

impossibility. This arrangement is, in fact, the great feature of the engine.

ANDERSON'S EQUILIBRIO COUCH.

This couch is designed for use in passenger ships, to counteract the rolling motion, and so provide for its occupant a means of exemption from the principal cause of sea sickness. Its dimensions are similar in all respects to those of an ordinary couch. Any number may be placed together, end to end, when they will act in unison, and occupy very little more space than is required for ordinary couches.

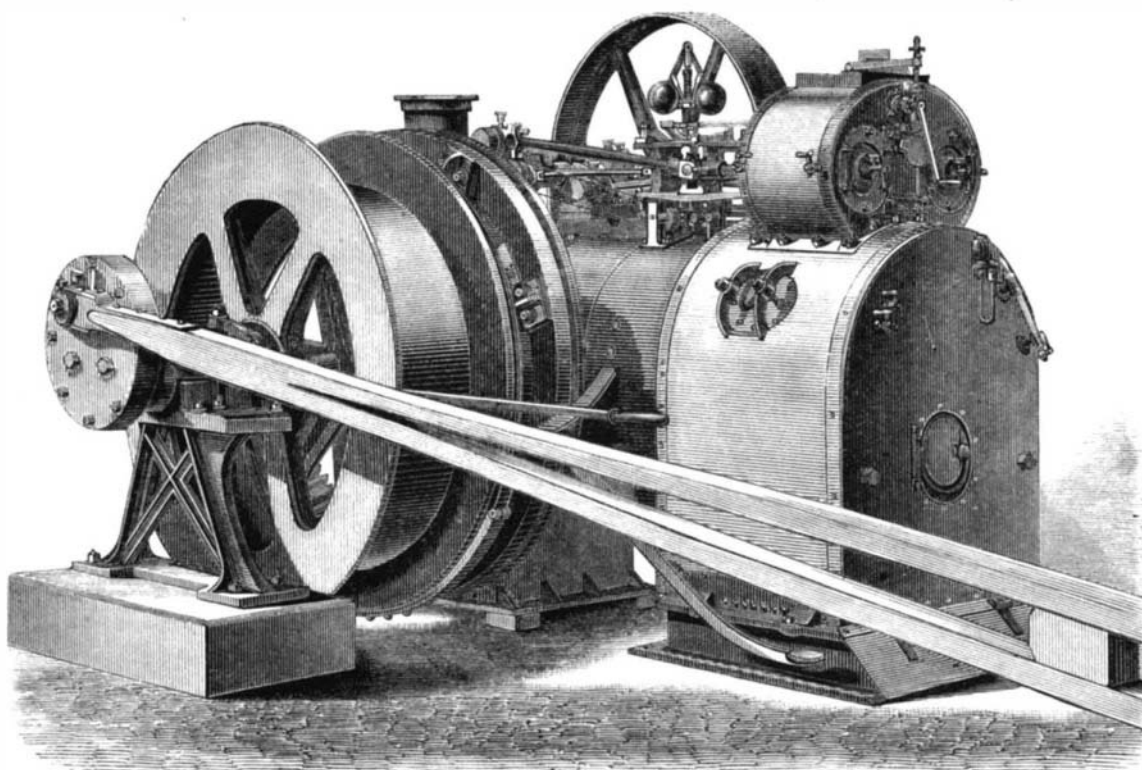
The couch is provided with two pairs of flanged wheels, with india rubber tires running upon concave rails, attached to any suitable frame, and forming arcs of a circle, of which the length of the couch may be the radius, and consisting of as many degrees on either side of the center as it is desired to counteract; it is thus caused to maintain its own level by the influence of gravity, and when placed transversely across the ship, remains horizontal while the latter is rolling.

The extent to which the motion of the ship may be thus neutralized is only limited by the length given to the concave rails, a very slight extension of which—in the ratio of

about an inch to a degree—will considerably increase the counteracting action. The rails in our illustration do not exceed the length of the couch itself, but the couch will nevertheless counteract 15 degrees of rolling each way, or 30 degrees in all, and will therefore allow of its free action in either direction while the ship may be rolling to that extent. The india rubber tires on the wheels render the motion and the checking of the couch easy and noiseless. —*The Engineer.*

Telegraph Wires Melted by Lightning.

A very severe thunderstorm passed over London on the evening of July 5. Between eight and nine there came a very brilliant flash of lightning, followed by a deafening peal of thunder. Many people were stunned, and in several cases were found quite insensible. Immediately after it was found at Kilburn that the telegraph wires, running from the top of the Queen's Arms to a



THE TUXFORD MINING ENGINE.

latter by the action of the governor balls. By means of a regulating valve, any portion of the exhaust steam may be turned into the feed tank with the surplus water from the pump; in this way the feed water may be raised to boiling point before being forced into the boiler. The mud plugs are screwed into the boiler, and have an external screw for receiving the cap, so that there is no

house about 300 yards higher up the Edgeware Road, were struck by the lightning, and fell in red-hot fragments, varying in length from six inches to an inch, all along the road, a great deal of yellow smoke attending the fall of the wire. This shows that ordinary telegraph wires are not probably large enough to carry heavy strokes of lightning with safety.