

MECHANICAL INVENTIONS.

Mr. Thomas Long, of Boston, Mass., has patented an improved centrifugal drying machine, which can be charged and discharged without stopping the machine. The invention consists in a conical perforated hood attached to a studded receiving plate contained in the upper part of the hood and attached to the top of the shaft of the machine, which receiving plate throws the sugar or other material down upon the annular bottom of the hood, which bottom is attached to arms fastened to a sleeve surrounding the shaft and resting on the shoulders of a number of springs attached to the lower thicker part of the shaft, accordingly as the bottom of the hood is to be in a raised or lowered position. When this bottom is to be lowered the above-mentioned springs are pressed outward by means of a sleeve with a lower beveled edge and mounted in a fork of a pivoted lever.

An improved indicator for scales has been patented by Mr. Valentine M. Fulcher, of Hughes Springs, Texas. This improvement dispenses with the slides and provides for automatic indication of weight. This invention consists in a weighted rocker and indicating arm combined with a scale beam, by which it is operated.

Mr. Robert J. Mitchell, of Girard, Ill., has patented an improvement in thill couplings. It consists in a packing strip of leather and an angular concaved block made of compressible material. The leather strip is pressed upon the thill iron by the concaved block.

IMPROVED STEAM ENGINE.

The Innis Manufacturing Company, of Oil City, Pa., has, for several years, been making a specialty of building a 9 x 12 engine for oil well drilling, the design of which is represented in the accompanying engraving. This engine is fully secured by patents, and is made only by this company, who now have about 1,500 in use in the oil region. These engines having given such universal satisfaction, the Innis Manufacturing Company have determined to introduce them for other uses. The demand in the oil regions for this particular size has been such as to enable this concern to arrange tools to build them on the duplicate plan, using templates and gauges for all the parts, thereby reducing the cost, while unnecessary finish is dispensed with to meet the wants of a cheap steam power. All of the working parts are strictly first class. The cylinder, valve bore or chamber, exhaust chamber (which also acts as a portion of the heater), and the supports or leg of the cylinder, are all cast in one piece, to which the bed is firmly bolted. The valve, which is of the piston kind, is placed directly below the cylinder, and the exhaust chamber directly below that. By this arrangement the cylinder readily frees itself of condensed water, as the ports are open from the bottom of the cylinder downward to the heater when exhausting. There is a steam passage around the outside of the cylinder and under the jacket that conducts the steam into the central port of the valve, from which it passes up into the cylinder from the ports near the end alternately as the valve travels back and forth, and exhausts down past the end into the exhaust chamber or heater.

The valve (which is seen lying on the engine block) is claimed by the inventor to be a great improvement over the ordinary piston valve. It really acts as its own steam chest, being always full of steam up to as nearly boiler pressure as practical. It is a long hollow shell, very thin and light, having a large amount of bearing surface in proportion to its weight, and consequently subject to but very slight wear. We are informed that one in the manufacturer's shop, after five years' constant use, appears as good as new. It being a balanced valve, the wear of the eccentric and all the valve gear is very slight. The bed is of a very rigid form, being trough-shape, the top edge of which forms the lower slide for the crosshead, and is on a line of the center of the cylinder and main shaft, and takes the strain in a direct line of the power applied. The pump is worked in the usual way from the crosshead. The heater is composed of four one-inch pipes, the entire length of cylinder and bed, and delivers the water to the boiler very hot. Pump and heater are dispensed with when not required. All parts are easily accessible.

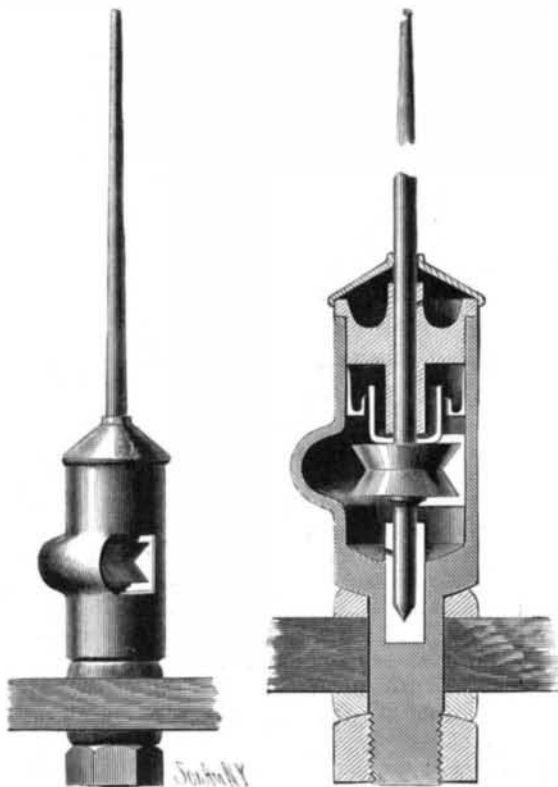
This engine is very strong and rigid, and is at the same time inexpensively constructed. Further particulars may be obtained by addressing the manufacturers as above.

NEW DANISH POLAR EXPEDITION.—The Danish Chamber voted, March 17, an appropriation to help pay the expenses of an Arctic expedition, which is to start from Copenhagen in July next.

IMPROVED SPINDLE.

The engraving shows, in elevation and in section, an improved device for supporting and lubricating the spindles of ring spinning frames, lately patented by Mr. Walter I. Tinkham, of Taunton, Mass.

The step supporter is provided with a screw shank having a nut for clamping it to the spindle frame. A tubular standard extends upward from the step support, and has fitted in its upper end the bolster in which the spindle runs. The tubular standard is larger in internal diameter than the wheel, and has two openings for the driving beam.

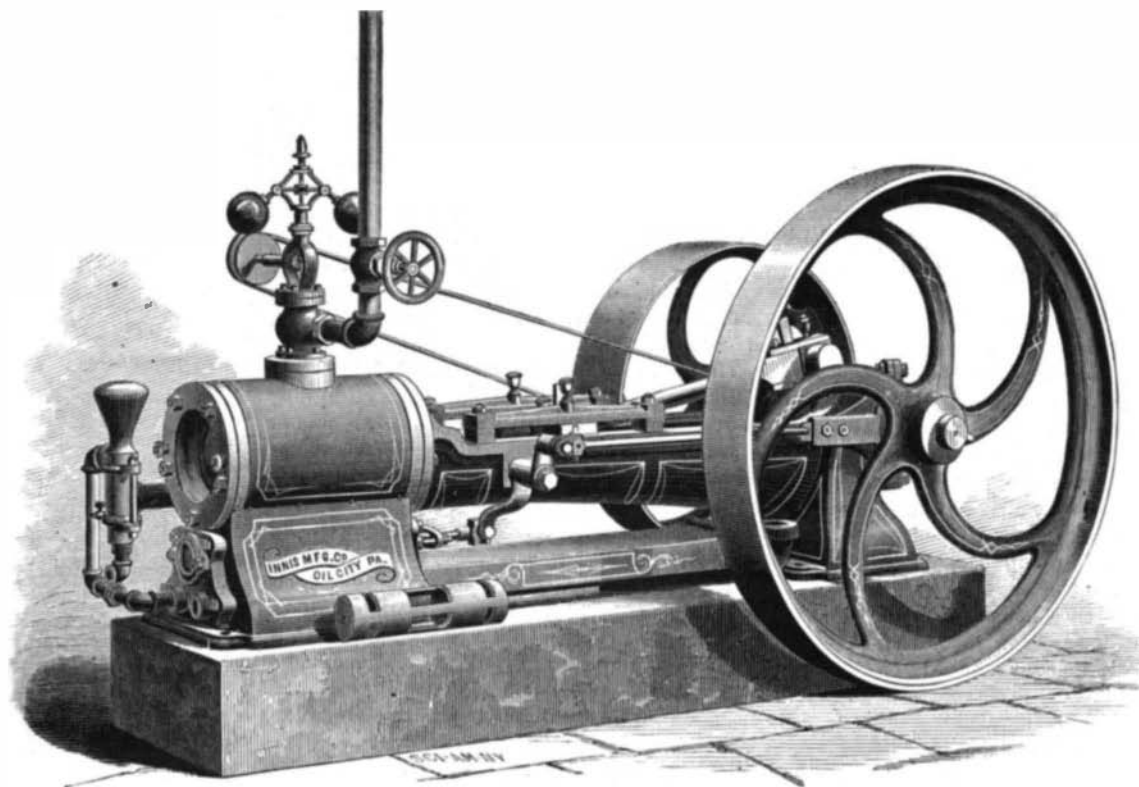


TINKHAM'S IMPROVED SPINDLE.

In the top of the bolster there is an annular oil receiving trough communicating by a small hole with the bearing of the spindle. The bolster has a cap, which confines the oil and excludes dust from the annular oil trough and from the bearing of the spindle.

Concentric with the spindle, and just above the wheel, there is an oil intercepting cup, which revolves with the spindle. This cup is encircled by another cup arranged in the tubular standard, and having discharge openings, which deliver the oil to the inner surface of the tubular standard, down which it flows to lubricate the spindle and step.

The oil cup of the bolster being supplied with oil, the bearing surfaces of the bolster and the part of the spindle within it will be lubricated. The oil escaping and flowing from the bolster down the spindle will be caught by the in-



INNIS' STEAM ENGINE.

tercepting cup, which, revolving with the spindle, will by centrifugal force cause the oil to rise and flow out of it and into the surrounding stationary cup or receiver, and through the holes in the bottom of which the oil will be discharged against the inner surface of the bore of the standard, or so as to drop down to the bottom of the bore without falling upon the whirl or the driving band. From the bottom of the bore the oil will flow into the step and lubricate it and the spindle foot, the step being perforated so as to allow the oil to pass freely into it.

Novel Barometers.

In the January number of the *Archives des Sciences* Professors Dufour and Amstein describe a simple registering barometer now in use in the Meteorological Observatory of Lausanne. It depends on displacement of the center of gravity of a glass tube containing mercury. The form of the tube may be described as that of an L leading down to a U by a vertical portion. The lower end is open. The tube swings in the plane of its angles on a horizontal axis placed above the center of gravity; with increased barometric pressure it inclines to the right, with decreased pressure to the left; and these movements are recorded by means of a style attached to the U part and applied to a moving strip of paper. By a simple contrivance the pendulum of a clock is made to impart a slight shock every second swing to the tube, so as to destroy any adherence of mercury. The instrument is easily made and proves very sensitive and trustworthy.

A description of a barometer for distant points of great altitudes which could be read by means of the electric current was given at a late meeting of the Royal Scottish Society of Arts. The electric barometer consists of twenty-five tubes placed side by side on a board or round a pillar. Into each of the upper ends is fused a fine platinum wire, dipping down by tenths of an inch, so as to get a range of twenty-five tenths, or two and a half inches, with the whole instrument. A wire is taken from each of the twenty-five wires, carefully insulated from each other, together with a return wire from the cistern ends. In all twenty six wires are made into a cable and continued to any convenient place for the observer. In the observing apartment the wires are separated and attached to a dial, which is connected with an electric bell and battery. If the barometer were placed on a hill and a cable taken therefrom to the observer, the height of the mercury would be ascertained by finding the shortest wire, when in circuit, which would ring the bell. To arguments which might be urged that readings of tenths were not fine enough, it might be said that such readings were better than no observations at all.

How to Increase the Light of Gas Flames.

Mr. W. Lascelles Scott lately stated that he had arranged an ordinary fish-tail burner at an angle of from 60° to 45°, and allowed finely divided alkaline earths to percolate through the flame; and he found that without any increased consumption of gas, a fairly marked increase of light resulted. The mean results of several experiments were as follows: With a normal flame of 16.71 candles, the addition of pure lime gave 17.95, of magnesia 17.13, and, curiously enough, of an intimate mixture of lime and magnesia, a larger increase than either separately, namely, 18.23. The same mixture, with the addition of ten per cent of another earth, gave 18.34. With a specially constructed Argand burner, the flame being conical, the light was raised from 62.4 candles, burning gas alone, to 67.3 with the addition of lime only, and with lime and magnesia to 68.5.

Daniel Drawbaugh's Telephones.

The People's Telephone Company has obtained the testimony of about one hundred and thirty witnesses at Harrisburg, Pa., to show that Daniel Drawbaugh, who resides in the adjoining county of Cumberland, invented the first magneto-telephone, and its side of the great case will soon close in this city with the examination of an expert electrician who has tested all of Drawbaugh's inventions. The testimony given thus far goes to show that Drawbaugh invented at least half a dozen speaking telephones before Bell conceived the idea that sound could be transmitted by electricity. Drawbaugh, according to this testimony, began thinking about sound transmission in 1861, and in 1867 invented a machine which carried sound by means of a voltaic battery. In 1871 he made a magneto-electrical instrument which transmitted speech, and which is said to embody all the principles of the Bell telephone of today. In 1874 and 1875, it is claimed, he made marked improvements on this invention before Bell had any thought of telephonic communication. Since the Bell telephone went into

operation Drawbaugh has invented a machine which he claims, according to tests made, will carry speech at least one thousand miles, and will not be affected by atmospheric influences. This same instrument, he thinks, can be made to transmit sound an indefinite distance. The American Bell Telephone Company, which is resisting the claims of the People's Company will begin taking testimony in a few weeks. In New York, next summer, it will be decided whether Bell or Drawbaugh invented the first magneto-telephone.—Operator.