NEW INVENTIONS.

Improved Ships' Hank.

Mr. Samuel Barker, of this city has taken measures to secure a patent for an improved Hank, which is employed to secure the sails of vessels, each to its proper stay. The hank is a hoop divided into two equal parts and connected by a joint; the hoop on the side opposite the joint has a socket attached to it, which is also divided into two parts, one being attached to each part of the hoop, so that when the said hoop is distended, the socket is opened. Friction rollers or rings are placed upon the hoop for the purpose of diminishing friction and preventing the wear of the stay. The hoop is placed around the stay by distending the ends which have the parts of the socket attached to them: the two parts of the socket are then brought into contact and secured by a screw which has a ring on one end. An eye of a circular form fits in the eyelet of the sail, and it has a shank which is secured in the socket of the hoop by a screw rod. The eye and shank are composed of two parts connected by a pivot, by which the eye may be opened and placed in the eyelet.—There are a number of hanks to a sail, and they are employed to secure the sail properly to the stay. When the sail is raised or lowered, the hanks traverse the stay. Every person who sails a boat, schooner, or any vessel which carries a sail, will find this hank to be a good improvement over the common hoops now employed for furling and unfurling angle sails.

Letter Printing Press---The Typographer.

On page 166 (this Volume of the Sci. Am.) we published a letter from Mr. John Jones, of Clyde, Wayne Co., N. Y., which was sent to us as a specimen of a letter produced by a new printing press—it was a sample of printing by machinery, the press being a substitute for writing with a pen. In that letter Mr. Jones stated that he had devoted his attention to the subject some years ago, but gave it up almost in despair. His attention was again directed to the subject by our calling for "an invention wanted—a convenient machine to print letters, as a substitute for writing." This resulted, he states, in the discovery of the true principle of action, to make it work successfully; and, in truth, it is a most valuable invention. Mr. Jones has taken measures to secure a patent; we have seen his model, and feel proud and pleased with it. It can print a letter faster than the majority of men can write one with a pen, and we wish that one was in every family. The machine is simple and not expensive. Since the first one was constructed, Mr. Jones has received many applications for machines, and we have no doubt but he will yet reap, as he should, a rich reward for his studies and labors. This invention is an evidence of the great good of a paper devoted to invention and mechanics, by directing the attention of inventors to particular subjects.

Rifled Cannon.

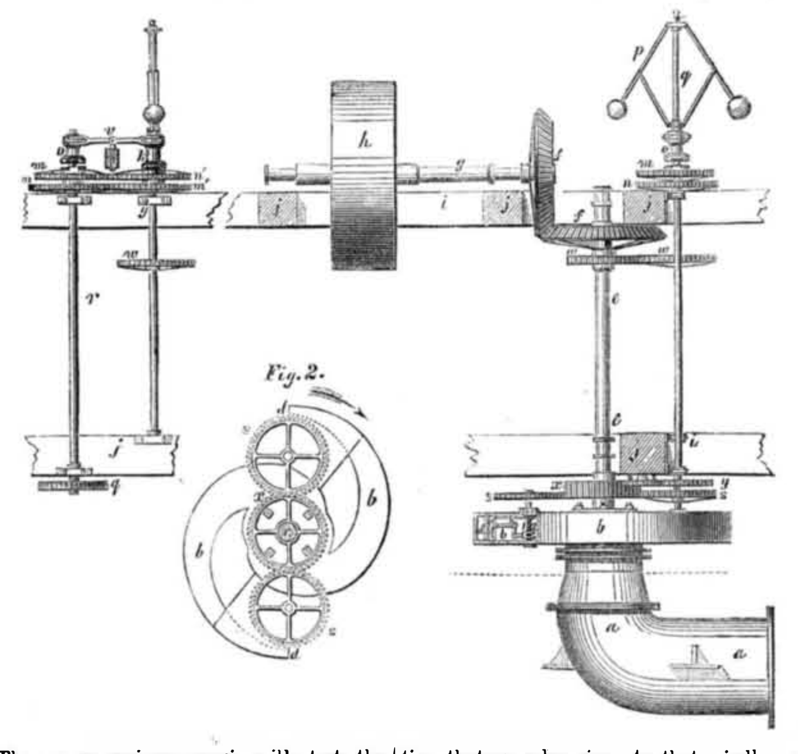
A nine-pounder field battery gun has been grooved at the Royal Arsenal, England, on the rifle principle, and experiments will shortly be made with it to ascertain its merit compared with the usual nine-pounder field battery gun, when charged with spherical shot. The four grooves in the cannon are about half an inch deep by half an inch broad each, and the shot and shell intended to be fired from it are made of the cylindro-conical or sugar loaf shape, with four projecting parts on each to enter and fill the grooves. Both shot and shell are galvanized, and so smooth and not liable to rust by that process that they may be rammed home with the greatest ease, the simple pressure of the hand being sufficient to place them an arm's length into the mouth of the cannon, although they are made to fit more full than the spherical shot does, and consequently they will have less windage and require a less charge of powder. The sugar-loaf shape of the new galvanized iron shot renders it of a far greater weight than a nine pounder spherical shot; and the principle on which it will proceed after being fired from a rifle cannon, being similar to an arrow, instead of revolving in the same manner as spherical shot, is expected to cause it to go more direct to the mark, and to have a much longer range.

Tubular Tunnel.

M. Horeau, a Paris architect, proposes to lay a railway in the bed of the sea between England and France. The road is to be enclosed in a tube similar to that which crosses the Menai Strait—and, if we understand the particulars, the tube is to be fastened down in its bed by huge iron pins at intervals of a mile throughout the twenty-one miles of its submarine course—which pins will perform the further service of carrying lights on their heads at night to warn ships against anchoring over the railway. M. Horeau estimates the cost of the scheme at fourteen millions sterling.

FINLAY'S PATENT DIFFERENTIAL GOVERNOR.

Figure 3. Figure 1.



The accompanying engravings illustrate the Differential Governor of Mr. James Finlay of Cold Spring, Putnam Co , N. Y :—

Fig. 1 is a side elevation of the governor as applied to Whitelaw & Stirratt's patent water wheel. Fig. 2 is a plan of the gearing on the top of the water wheel, in connection with the governor; and fig. 3 is a front elevation of the governor, apart from the water wheel, and for a view of the wheel in full, see page 208, Vol., 6, Scientific American.

b b is the water wheel; *d d* is the jet apertures; *a a* the main pipe; *e* the water-wheel shaft; *f f*, the main gearing, by which the power is transmitted to the main shaft, *g*, and drum, *h*, and from thence by a band to any machinery on which it may be intended to act. *i i* and *j j* are parts of the framing. *p* is a revolving pendulum, mounted on a spindle *q*, which in the view shown, fig. 1, is situated beyond a second spindle, *r*, as seen in fig. 3, and is supported by a step on the upper edge of the lower frame at *i*. This spindle is driven from the water wheel shaft by the cog wheels, *w w*, and carries cog wheels, *m' n'*, of different sizes, which gear into two similar cog wheels, *m n*, on the spindle, *r*. These wheels are reversed in position, so as to have the smaller on the one spindle, to gear into the larger on the other. *n'* and *n* are keyed fast; *m'* and *m* are loose, but are capable of being engaged by the clutch boxes, *o* and *k*; the prongs of the latter being sufficiently long to engage *m'*, by extending down through betwixt the arms of *n'*. This clutch box is connected by links to the arms of the revolving pendulum, so as to be drawn upwards or pushed downwards, in accordance with the centrifugal action of the balls, consequent upon the variations of motion; and it is also connected with the clutch box, *o*, by a double forked lever, movable on the centre, *v*. The result of this connection being to communicate to the clutch box, *o*, the upward and downward motion given to clutch box, *k*, by the arms of the revolving pendulum. The motion thus communicated will be seen to be in opposite directions; the one clutch box moving upwards, whilst the other is moving downwards, and vice versa. *x* is a cog wheel fitted loosely to a turned seat on the shaft *e*, so as to be at liberty to revolve freely round independent of that shaft. It is connected through an intermediate stud wheel, *z z*, with a wheel, *y*, which is keyed fast on the bottom of the spindle, *r*, and consequently must partake of any variation of motion that may be given to that spindle. *s s* are cog wheels which gear also into, *x*, below *y* and *z*. These wheels are mounted on short spindles, which revolve in bearings attached to the water wheel, and have screws formed on the lower end; one of which is seen at 2, fig. 1. On this screw there is a nut with two projecting ears, which are embraced by the forked end of the horizontal arm of the bell crank, 1; the vertical arm of which is connected by the link, 4, with a movable adjusting plate, which forms the inside of the jet aperture at *d*. It will now be obvious, that if the cog wheel, *x*, be made to revolve in either direction the wheels, *s s*, with their spindles, will revolve accordingly; and by the action of the screws, the nuts held by the forked ends of the bell cranks will either ascend or descend, in accordance with the direction of the motion given to *x*, and will act on the adjusting plates through the agency of the bell cranks and links, so as either to push them outwards, and diminish the width of the jet apertures, or draw them inwards and increase that width.

Such being the general arrangements of the parts of the governor, its action may be thus explained:—Assuming 37 revolutions per minute to be the proper speed of the water wheel, and also the proper speed for the revolving pendulum; let it be supposed that the water wheel having been put in operation, is making 37 revolutions per minute; it will transmit the same speed to the spindle of the revolving pendulum through the equal sized cog wheels, *w w*, and draw up the clutch box, *k*, and also the double forked lever in connection with it, to the exact position at which they will stand under those circumstances. But by the same action the fork on the opposite end of the lever will push down the clutch box, *o*, on the spindle, *r*, to a corresponding distance. In this state of things the lever is supposed to stand in a level position, holding both clutch boxes out of gear with their respective loose wheels, *m'* and *m*, as represented in fig. 3. It will be obvious that no motion can in this case be transmitted from the spindle, *q*, to the spindle, *r*, and consequently no motion can be transmitted to the wheel. *x*. So long therefore as this state of things continues, no change can take place in the widths of the jet apertures.

Suppose now a part of the resistance to be thrown off the water wheel, the speed will then begin to increase, but the moment this takes place, the balls of the revolving pendulum will, by their increased centrifugal action, recede further from the centre of motion, and raising up the clutch box, *k*, will push down the clutch box, *o*, so as to engage the wheel, *m*. The consequence will be, a speed transmitted through the spindle, *r*, to the wheel, *x*, as much greater than the speed of the water wheel, as the wheel, *n'*, is larger than the wheel, *m*. But the wheel, *x*, being free to move, independent of the water wheel shaft, and being driven in the same direction, will have a relative motion round that shaft precisely equal to this difference of speed. For instance, should this difference be five revolutions per minute, the wheels, *s s*, will each make five revolutions per minute, which acting through the arrangement of parts already explained on the adjusting plates at *d d*, will communicate to them an outward motion, tending to diminish the width of the jet apertures, and this action will continue until the water wheel resumes its proper speed; when the lever and clutch boxes will return to their former position, until another change of resistance calls for a renewed action of the governor.

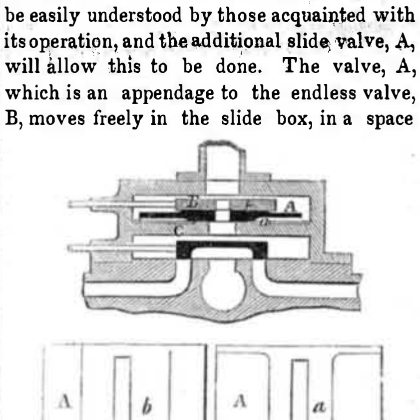
Let it now be supposed that the resistance taken off has been again put upon the water wheel, and it will be seen that an action precisely similar to what has been already described will take place, but in a contrary direction. The wheel, *x*, will then have a relative motion in a contrary direction to the motion of the water wheel, and an action will consequently be transmitted to the adjusting plates, to draw them inwards, and increase the width of the jet aperture.

The advantages possessed by these wheels, whether relating to cheapness, durability, or efficiency, are such as cannot fail to recommend them wherever they are known.—Twelve, of 200 horse-power each, have recently been furnished to the Morris Canal Company for working the machinery of the inclined planes on the Morris Canal, where they may be seen in full operation any time during the continuance of navigation.

For particulars address James Finlay, manufacturer and patentee, Cold Spring, Putnam Co., N. Y.

Cut-Off Valve.

The accompanying engraving is a section of a cut-off valve. A simple cut-off valve, moved by an eccentric, or by mechanism connected to the same, gives only one entirely correct expansion; the stroke, if altered, will let steam enter either too early or too late, and in both cases there is a loss of steam. To overcome this difficulty, it is necessary to have the operating eccentric keyed or arranged to the shaft in a right angle to the crank, which will be easily understood by those acquainted with its operation, and the additional slide valve, A, will allow this to be done. The valve, A, which is an appendage to the endless valve, B, moves freely in the slide box, in a space



equal to the width of the hole for the admission of steam, and its touching surface, *a*, upon the plane of the slide box, is one-third, one-half, or one-quarter of the surface of *b*, of A in contact with the valve, B. The touching surface between A and B being larger than between A and C, the result will be that A moves together with B until A reaches the limit of its stroke, and causes the steam communication to be always opened at the centre of the stroke of valve, B, and the engine moving back or forward, using more or less expansion, it will always give a correct admission of steam. H. A. Luttgens.

New York.

Prof. Park says there is annually preached in the United States an amount that would make 120,000,000 octavo pages.