

**IMPROVED WATER WHEEL.**

Among that large number of persons who have been studying the turbine water wheel, considerable attention has been given by many to the problem of regulating the power by varying the capacity of the wheel, and the accompanying engravings illustrate an invention in which this is accomplished.

Fig. 1 is a perspective view, and Fig. 2 a horizontal section, the improvement consisting of a modification of the center-vent wheel with radial buckets. The water enters at A, and passes through the bottom at the center, being forced into the wheel, by the eccentric scroll which surrounds it, acting on the radial buckets, c c c c, in its passage, and thus turning the wheel. The plate, B, which forms the top of the wheel, has a vertical motion, which, in connection with a corresponding motion of the plate, D, which forms the top of the channel, varies the capacity of the wheel by varying its vertical depth according to the power required; the slits in the plate, B, for the buckets being sufficiently wide to permit the plate to slide up and down without any considerable friction. These motions are effected in a manner by which they are made to conform to each other. The plate, B, is fastened rigidly to a rod which extends up the inside of the shaft, e, the lower part of which is made hollow for the purpose. At the top of this inner rod a pin passes through it, and runs in a groove in the sleeve, g, and at the ends of the arms of the sleeve, g, are the three rods, h h h, to the lower ends of which the plate, D, is attached. By raising or lowering the sleeve, g, a corresponding motion is given to the plates, B and D, and thus the depth or capacity of the wheel is varied. The gate, K, is fastened to the plate, D, and moves with it, thus adjusting the supply of the water to the size of the wheel.

In order to counterbalance the upward pressure of the water against the wheel, which would increase the friction of the bearings, the water is let in through the passage-way, L, upon the top of the wheel, the pressure being thus taken by the top of the case.

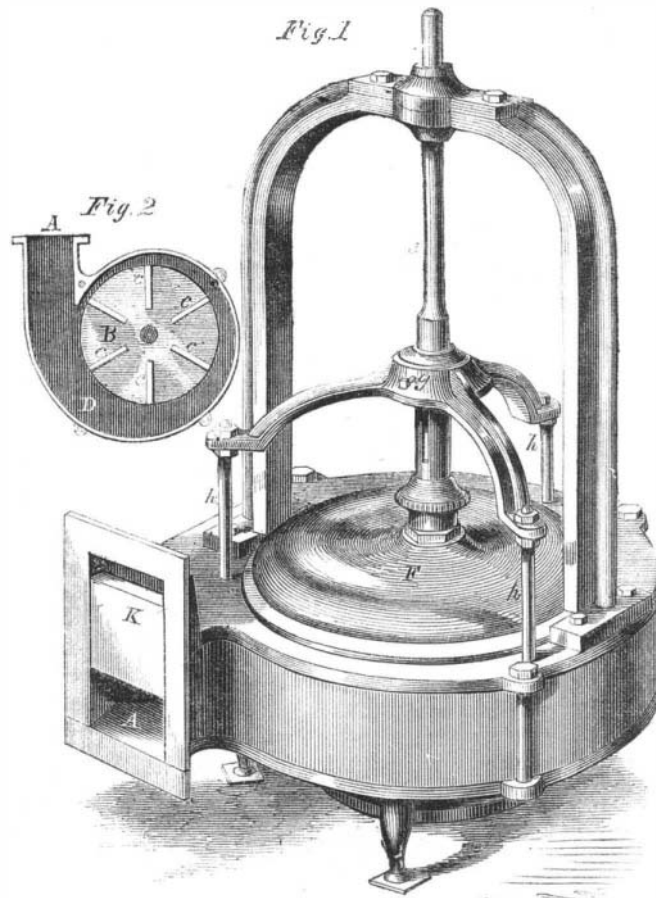
Application for a patent for this invention has been made through the Scientific American Patent Agency, and persons desiring any further information in relation to it will please address the inventor, Robert Ross, at St. Albans, Vt.

**LAWRENCE CALAMITY**

Some of the English papers have commented freely upon the terrible disaster that occurred at Lawrence, Mass., on January 10th; and they all seem to have arrived at the same conclusion as to its cause, namely, the defective nature of the building. They certainly could have arrived at no other opinion by reading any published account whatever of that tragedy. The coroner's jury in the case having censured the chief engineer employed in the construction of the Pemberton Mill (Capt. C. H. Bigelow), he has published a defense of himself in the Boston Journal. He lays the blame of the calamity upon the person who furnished the cast iron pillars. He considers that the building was regarded "as a model of excellence in the adaptation of all its parts to the accomplishment of its object," and that it was "overwhelmed in such a total defeat through the most unlooked-for carelessness or dishonesty of a subordinate agent."

The general opinion prevailing among architects, en-

gineers and builders, regarding the cast iron pillars used in the Pemberton Mill, is that, even allowing them to have been inferior castings, the building could not have been properly constructed, when its standing depended upon the breaking of one or even several of those pillars. It appears strange to us that those who have been



**ROSS'S IMPROVED WATER WHEEL.**

chiefly blamed for this disaster, have not been put upon their defense.

**IMPROVED MOLE PLOW.**

There is no subject attracting more attention at the present time among agriculturists than underground

drainage. There are thousands of acres of land at present worthless which may by this process be made arable, when they will probably prove to be of inexhaustible fertility. There are two principal modes of subterranean drainage. One consists in digging trenches and laying pervious pipes of a peculiar kind of pottery through which the water leaches, the gravel being prevented by the nature of the material from accompanying it to choke up the drain. But where the consistence of the soil is

such as to keep open the drain without any pipe, a far cheaper process is adopted. This consists in drawing a solid body through the ground at a proper distance beneath the surface, by which means a channel is opened with comparatively great rapidity. The implement for doing this work has received the appropriate name of the mole plow, and a large number of varieties have been patented. On page 140, Vol. I (new series) SCIENTIFIC AMERICAN, we noticed one invented by Mr. Hammond, and we now illustrate it, with an improvement which has just been invented.

In the cut, A is the beam to which the team is attached, B the standard, with a knife edge in front, and C the shoe which opens the drain. This shoe has a projection, d, with a groove narrowing backward to close the opening made by the standard. Heretofore it has been necessary to dig a hole either to introduce a mole plow into the ground, or to take it out when the work was done, and the object of this invention is to obviate this necessity. The plan adopted is to connect the standard with the beam in such a manner that it may be inclined either forward or backward from the perpendicular which causes the shoe to run either in or out simply by the forward motion of the plow. For this purpose the slot in the beam through which the standard passes is elongated in its upper part, and the plate, D, has a sliding motion back and forth. This motion is effected by means of the screw on the rod, e, so that the inclination of the standard is varied by turning the crank, f, it being inclined as represented in the cut to remove the plow from the ground, and on the other side of the perpendicular to enter the plow into the earth.

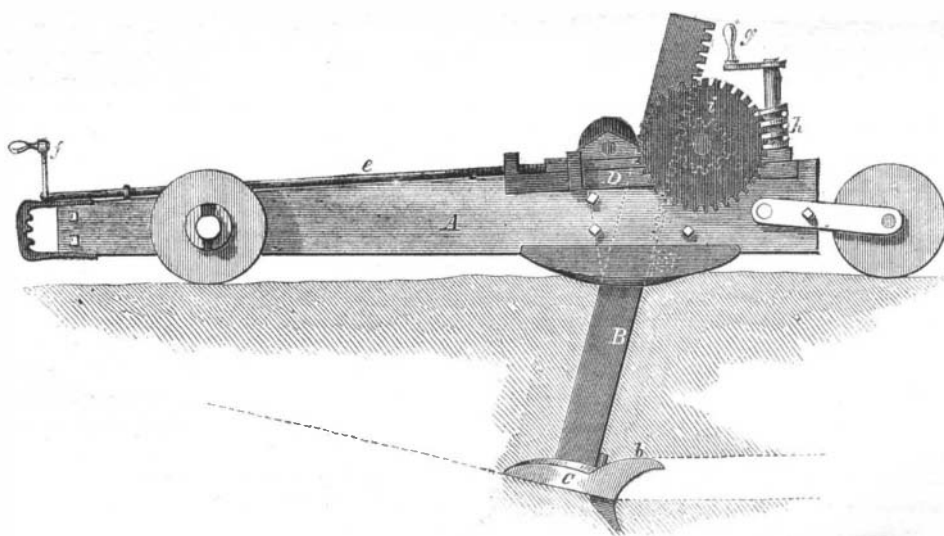
The depth of the ditch is adjusted by raising or lowering the shoe by means of the crank, g, which acts through the worm, h, and the wheel, i, upon a pinion meshing into the rack upon the standard, so that by turning the crank the standard is drawn a greater or less distance through the beam. This adjustment should of course be made before the operation of plowing is commenced.

These inventions were secured by Letters Patent through the Scientific American Patent Agency. For further particulars, address A. Hammond, Jacksonville, Ill.

**DEATH OF INVENTORS.**

We regret to notice the death of an ingenious inventor and good mechanic, C. A. Schultz, of this city. He recently went to West Covington, Conn., to put up some machinery in a paper mill; and while thus employed, his limbs became entangled in a belt, and he was so seriously injured that his death speedily ensued. An improvement in the steam engine, patented by the deceased, was illustrated and described on page 201, Vol. I, (new series) of the SCIENTIFIC AMERICAN.

While about going to press, we were informed that



**HAMMOND'S IMPROVED MOLE PLOW.**

Professor John C. Fr. Saloman had died suddenly of apoplexy, in this city, on the 11th inst, and that very few persons were aware of the fact. His name, as an inventor, has been before the American public for quite a number of years, especially in connection with an engine operated by carbonic gas. He was a native of Prussia, a very good chemist, and quite an enthusiast in all he undertook. At the time of his death he was about 65 years of age.