

**THE MACKAY AUTOMATIC FIRE EXTINGUISHER.**

The use of automatic sprinklers to prevent damage by fire, in factories and manufacturing establishments generally, began to command general favor only about ten years ago, but the amount of property probably saved from destruction by their use is already figured by one insurance company (the 'Boston Manufacturers' Mutual) at several millions of dollars. The proved advantages of the sprinkler system have been so decided that no one who has hazardous property to protect can afford to neglect an examination of it. An illustration of such a system, operated in connection with an electric thermostat and fire alarm, and which may be used as either a wet or dry pipe system, is shown herewith, embodying the improvements of The J. C. Mackey Company, of Syracuse, N. Y. In the dry pipe system, as is obvious, there is no freezing of water in the pipes, and the whole arrangement is entirely simple.

The system consists of pipes running along the ceiling of each story of a building, at suitable distances from each other, into which are screwed the automatic sprinklers or heads, at such points and distances apart as required under the rules of the different insurance underwriters' associations of the various States. These heads are so constructed that, in discharging water under pressure, they will throw the water up against the ceiling as well as over anything in the immediate locality on the floor below, covering with each sprinkler a space of from 25 to 40 feet in diameter, according to water pressure. Each head is fitted with a device held in place by a fusible solder, the solder melting at 155° F. When the temperature in a room in the vicinity of one of these heads passes this point (or a still higher point may be fixed if desired), the melting of the solder opens the valve, and the sprinkler throws the water.

Our illustration shows the system operated by a thermostat electrically connected, the overhead pipes not being filled with water. The thermostat is connected by suitable conductors with a battery, an alarm bell, and a magnet, whose armature is adapted to release a small weighted lever, arranged to open a valve in the water supply pipe, the position of the levers when the valve is opened being shown in dotted lines. The water supply may be connected, as most convenient, with a tank or reservoir on the roof of the building, with a city main, or with a force pump: or, if all these sources of supply are in communication with the system, a special form of valve is employed, by which the supply will be taken only from the source giving the greatest pressure. Only one thermostat is shown in our illustration, as explaining the principle of the system, but in practice there are generally as many of these as there are sprinklers, each thermostat having a soldered piece of metal, the fusing of the solder allowing the piece of metal to drop off and a plunger to fall, which makes a continuous circuit to the magnet operating the valve by which the water is let into the pipes. By suitable connections, alarms are also given at any desired points outside the building. Any one can turn off the water if desired, to prevent unnecessary damage from such cause after fire has been extinguished.

This system of protection against fire has received high commendation from users, who testify, in many cases, to having saved valuable properties by its prompt and efficient operation. The saving in insurance alone is said to more than pay all the expense of equipping any building in from one to five years, rates being reduced from 25 to 75 per cent in different instances. The company will make surveys of buildings and furnish estimates of cost of putting in the sprinklers complete, or furnish any further information which may be desired relative thereto.

GRAINING is so far out of style in St. Louis that there are no highly paid grainers in any of the shops, and a grainer is very willing to fill in his unemployed time at plain journeyman's work and wages. The city is growing out of the era of imitations into that of real wood and real workmen.

**AN IMPROVED MECHANICAL MOVEMENT.**

A compound rotary motion device which, with one vibrating lever, directs a continuous double application of power to the cranks, causing a complete revolution with but a short swing of the lever. is illustrated here with, and has been patented by Mr. James F. Hanley, of No. 15 State Street, New York City. The shaft has two cranks set diametrically opposite each other in a yoke-shaped frame, the journals of the shaft passing through circular hubs or bosses on both inner sides of the frame, and upon these hubs or bosses are hung the forked ends of a hand lever, A. This lever is connected by a fulcrum pin at *a* to the middle of a pair of link bars, which at their outer ends are jointed to the ends of two le-



HANLEY'S CRANK APPLIED TO A BICYCLE.

lever, A, is oscillated, its forked ends turn on the hubs or bosses in the yoke-shaped frame, and, through the link bars, to which it is pivoted at *a*, it transmits motion to the two curved levers, which causes the pitman rods, C C, to act on the oppositely set cranks of the crank shaft. one pitman pulling in one direction, while the other is pushing in the opposite direction, thus giving a continuous rotary motion. A modification of this invention is shown in Fig. 2, in which the hand lever, A, is formed in one piece with one of the semicircular levers, which are fulcrumed at B B, and connected at their outer ends with the two pitman rods, C C, the principle of the device being unchanged. In another illustration this compound rotary motion device is shown as applied to a bicycle. When two levers are to be used, the dead center is readily overcome without any change of the position of the crank, and the device will work equally well in making either backward or forward motion, its parts being evenly balanced and compactly arranged to facilitate its ready application.

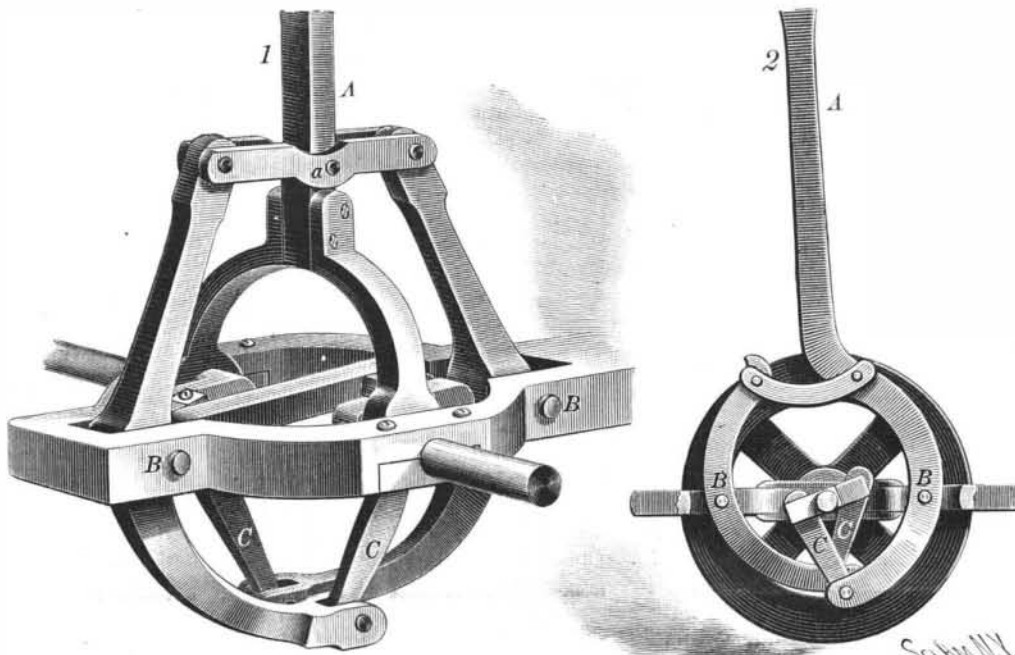
**Dynamo Telegraphy.**

Although, as was recently pointed out by Prof. S. P. Thompson, the early telegraphs of Gauss, Weber, Steinheil, and others were operated by means of magneto-electric apparatus, it is only of late years that dynamo-electric machines have been regularly employed for the purpose of generating current on telegraph circuits. Perhaps the most notable instances at the present time are the plants in this city at the headquarters of the Western Union and Postal Telegraph companies, both of which have been described in our columns during the present year. In this issue, however, we call attention to another plant of the same character, and one which embraces several features of novelty. Not only are the circuits supplied with current from these dynamos, but the dynamos themselves are driven by electric motors, which, in turn, are operated from the motor circuits of the local electric light company. Another feature is that the current is used on a large scale for the "local" circuits, and, as Mr. Maver has said in his article, this is the first time that dynamos have been used to replace "local" batteries. The plant has been installed under the supervision of Mr. S. A. Duncan, who, as an old telegrapher, as well as a leading electric light engineer of the modern school, is thoroughly familiar with all the difficulties of the problem, and who, in co-operation with Mr. Gerritt Smith and others, appears to have made a distinct and brilliant success of the experiment.

The number of cells displaced in Pittsburg by the main line machine is placed at about 12,000, and by the local machine at about 1,100, and the office at Pittsburg is probably the first in the world at which there is no chemical cell or battery employed. It is noteworthy that all the other machinery in the office is driven by dynamo current, and that, as the article mentions, in the telephone office in the same city the generators for the telephone company are also driven by motor. If our electric light readers cannot see a very direct "pointer" in this plant, as to the manner in which they also can supply current from their stations for telegraph purposes, we are afraid that they are not quite abreast of the times or equal to their opportunities. We think, however, that many of them will be doing considerable work in this field at no very distant date.—*Electrical World.*

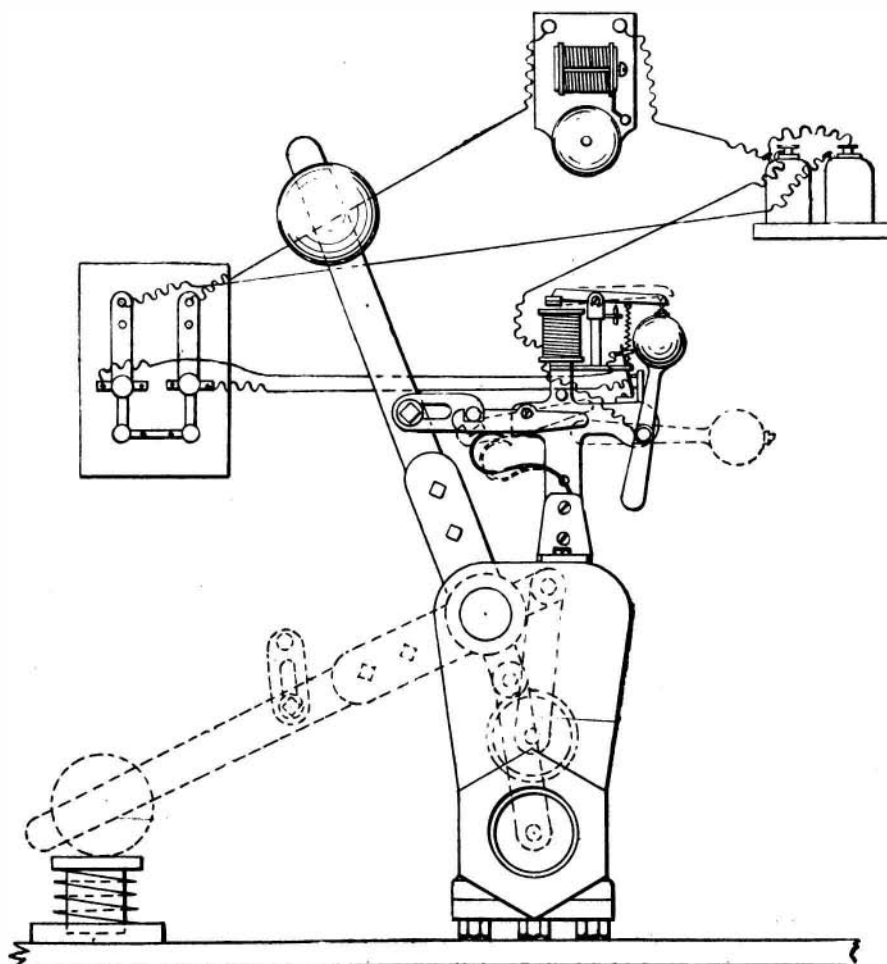
**Conduit for Electric Wires.**

A Pittsburg man has invented a glass conduit which looks as if it might answer the purpose, and which the inventor is sure solves the problem of underground electric wires. Plates of glass are grooved on the upper surface, and the wires are laid in the grooves and cemented there with pitch. Then other plates of glass are laid over the first, and wires put upon them in the same way. When all the wires are laid, the whole is inclosed in a wooden box and embedded in cement.



HANLEY'S COMPOUND DOUBLE CRANK ROTARY MOTION DEVICE.

ers pivoted in the yoke-shaped frame at B B, on opposite sides of the crank shaft. These levers, at their outer ends, curve partly around the shaft, and are separately connected by pitman rods, C C, to the two cranks of the crank shaft. When the hand



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