G FLOYD.

FIRE-ALARM SIGNAL-BOX.

No. 186,819. Patented Jan. 30, 1877.

FIG. 1.

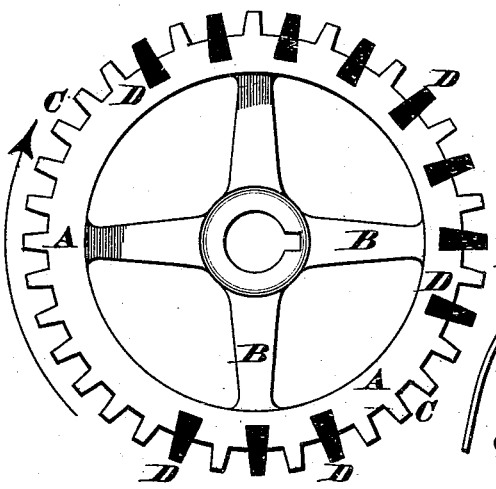


FIG. 2.

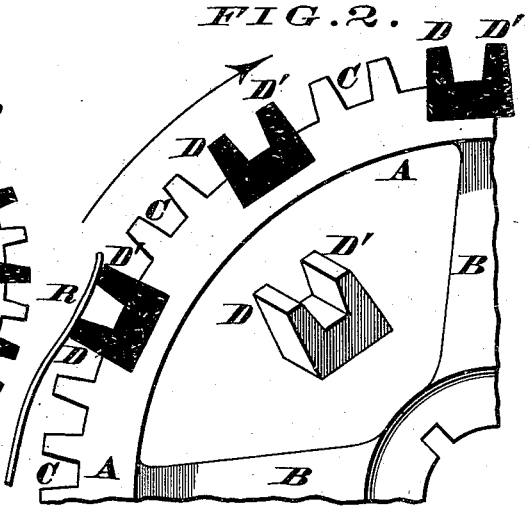


FIG. 3.

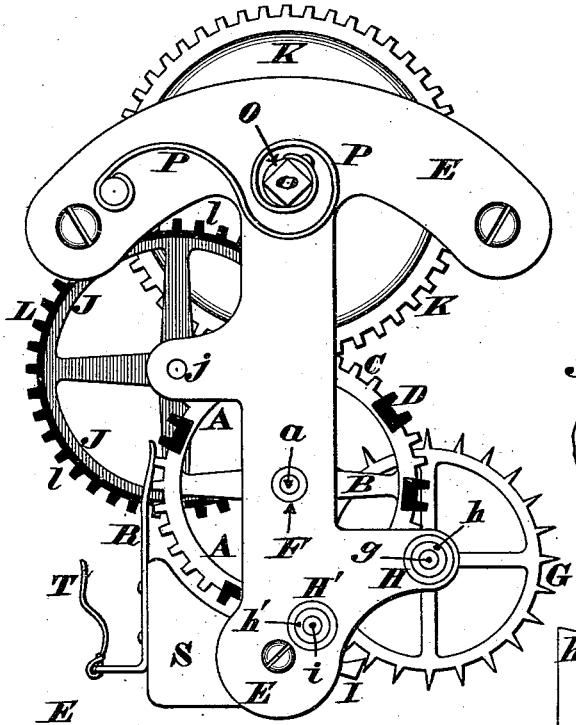


FIG. 4.

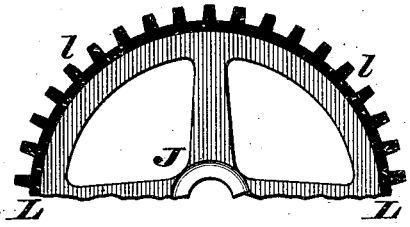


FIG. 5.

FIG. 6.

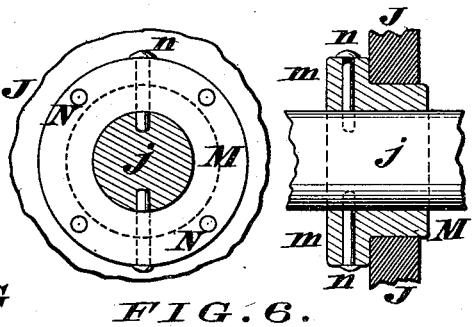
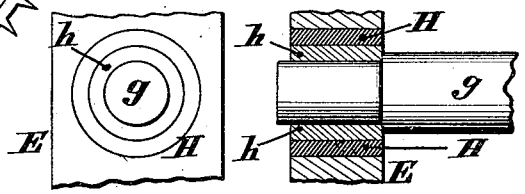


FIG. 7.



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UNITED STATES PATENT OFFICE.

GEORGE FLOYD, OF CINCINNATI, OHIO.

IMPROVEMENT IN FIRE-ALARM SIGNAL-BOXES.

Specification forming part of Letters Patent No. **186,819**, dated January 30, 1877; application filed September 23, 1876.

To all whom it may concern:

Be it known that I, GEORGE FLOYD, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Fire-Alarm Signal-Boxes, of which the following is a specification:

The first part of my improvements consists in a novel construction of the circuit or signal wheel of a fire-alarm signal-box, whereby said device is rendered capable of performing the twofold functions of breaking the current, so as to transmit an alarm, and of acting as one of the gear-wheels composing the train or clock-work. This combined circuit and gear-wheel is composed of any suitable metal—such as brass, for instance—and its periphery is armed with teeth that mesh into the appropriate wheels or pinions of the train. In order that this metallic wheel may break the current at proper intervals, a suitable number of its teeth are composed of glass, or hard rubber, or ivory, or any other material or materials known as non-conductors of electricity. Adapted to bear against the periphery of this combined circuit and gear-wheel are the customary platinum fingers communicating with the wires that connect the box with the battery and with the central station; and it will be apparent that as said wheel is rotated either with a crank or with any approved automatic devices, the current will be broken every time said fingers are brought in contact with said non-conducting teeth, which interruption of the current transmits the alarm in the usual manner.

The second part of my invention consists of an insulated gear-wheel, which prevents the current escaping from the circuit-wheel and flowing through the entire train and its supporting-plates, &c. This wheel is preferably the one that gears with a pinion on the circuit-wheel shaft; and it is insulated either at its periphery or at its hub, the latter construction, however, being considered the most convenient and the least expensive. When insulated at its periphery, said wheel has secured to it an annulus of bone, hard rubber, or other non-conducting medium, which annulus has the gearing cut in it. Or the same results may be accomplished by insulating this wheel with a non-conducting medium interposed between the hub of said wheel and the shaft upon which it is mounted.

The third part of my invention consists in journaling the signal-wheel in glass, ivory, or other non-conducting bearings, to prevent the current escaping through the pillar-plates of the apparatus, the details of these insulated bearings being hereinafter more fully described.

In the annexed drawings, Figure 1 is an elevation of my signal or circuit wheel, and Fig. 2 represents a modification of the same. Fig. 3 represents the wheel applied to an automatic signal-box. Fig. 4 represents the insulated wheel detached from the train. Fig. 5 represents, by front elevation and vertical section, one method of insulating the aforesaid wheel at its hub. Fig. 6 represents, by front elevation and vertical section, one of the insulated journal-bearings of the signal-wheel. Fig. 7 represents, by vertical section, the various members of an insulated journal-bearing detached from each other.

My combined circuit and gear wheel A, which is composed of brass or any other appropriate metal, may be constructed with arms B, or it may be an imperforated disk, of any suitable size; but in either case its periphery must be armed with teeth C, capable of meshing with the other wheels or pinions in the train or clock-work of a fire-alarm signal-box.

Applied to the rim or periphery of this wheel, and maintained therein in any suitable manner, are teeth D, of the same size and shape as the gears C; but the teeth D are composed of glass, hard rubber, bone, ivory, or other non-conductor of electricity. These non-conducting or insulating teeth are arranged around the combined gear and circuit wheel, so as to break the current of electricity at certain predetermined intervals, and thereby transmit an alarm of fire to the central station.

In Fig. 1 these insulating-teeth are disposed in two distinct groups, the first set being composed of three teeth, while the other set contains eight of them. Now, it is evident that when the customary platinum fingers R are brought in contact with the periphery of wheel A C D, and the latter ro-

tated in the direction indicated by arrow in Fig. 1, the current will be broken at such intervals as to indicate box 38, which signal will be repeated regularly and successively as often as said wheel or disk is rotated.

My combined circuit and gear wheel may be arranged to operate with any suitable clock-work mechanism, and one method of applying said wheel to a train is shown in Fig. 3. In this illustration the circuit-wheel A C D is supposed to be keyed fast to the shaft *a*, which latter is journaled in two pillar-plates, of which one is shown at E. The shaft *a* being a metallic one, it is evident the current would pass directly into the supporting-plates E, unless some special provision were made to prevent such dispersion of the electricity; but this difficulty is obviated by simply journaling said shaft in a bearing, F, composed of any appropriate non-conductor. Bone, hard rubber, or glass, may be employed for this purpose; but practical experience has proven that ivory is the most desirable material, as it is comparatively cheap, and it can be turned and drilled as readily as brass.

The various teeth C D of the circuit-wheel gear with a suitable pinion, secured to shaft *g* of escapement-wheel G, which latter necessarily rotates at a much higher speed than said wheel A C D. As this rapid rotation of shaft *g* might, in some cases, wear out the non-conducting bearing H, a brass or other metallic bushing, *h*, is inserted between said shaft *g* and its insulating medium H.

The metallic wheel G being in communication with pallet I, affords another avenue of escape for the current; but by insulating the pallet-shaft *i*, this difficulty is also effectually overcome. Such insulation is effected by journaling said shaft in a bushing, *h'*, inserted in a non-conducting medium, H', precisely similar to the devices employed by shaft *g* of the escapement-wheel.

The circuit-wheel shaft *a* has secured to it a pinion with which meshes a gear-wheel, J, whose shaft *j* carries a pinion that, preferably, engages with the master-wheel or driver K of the train.

In order to prevent the current passing from shaft *j* into wheel K, and thence out through pillar-plates E, it is necessary to insulate wheel J, which result may be accomplished in one of two ways. In the first place, by surrounding said wheel with an ivory or hard-rubber ring, L, and cutting-teeth *l* in the latter, it is evident the current will not enter said wheel from the pinion on circuit-wheel shaft *a*. This expedient, although entirely reliable, is somewhat objectionable, on account of the expense attending the production of an ivory ring of the proper size, and, therefore, I prefer employing the arrangement of devices seen in Fig. 5. Here, the wheel J is represented as mounted upon a hub, M, composed of any non-conducting material, which hub has a collar, *m*, traversed with pins N, that unite the two members J and M securely together. Hub M is attached to shaft *j* with pins or screws *n*, or otherwise.

As the retaining devices N and *n* do not come in contact with each other, it is evident there can be no passage of electricity from shaft *j* into its wheel J.

The master-wheel K, previously alluded to, is mounted upon a shaft, O, which is journaled directly in the pillar-plates E, as said wheel is cut out of the electric circuit, in the manner described. Shaft O is provided at its outer end with a non-circular arbor or shank, *o*, to which may be applied a key or lever or crank, or other convenient appliance, for coiling the volute portion of driving-spring P around said shaft. The lever or arm, the depression of whose free end rotates shaft O, so as to coil the spring thereupon, may be actuated by a slide or other appliance, having a knob or hook projecting through a slot in the cover of the box within which the alarm mechanism is housed.

As no claim is made for the general arrangement of the clock-work or train, or for the devices that set the same in motion, further description of them is unnecessary in this specification.

R represents one of the customary platinum fingers, which finger is maintained in contact with the periphery of the combined circuit and gear wheel A C D. Said finger is secured to an insulating-block, S, and has attached to it one of the wires T.

When the signaling mechanism is in its normal position, as seen in Fig. 3, the finger R is in contact with one or more of the metallic teeth C of wheel A, and, consequently, said wheel, together with the ones J and G *g*, and the pallet appliances I *i*, are all charged with electricity; but the current cannot enter any other part of the apparatus, on account of the perfect insulation of the various members of the train, as previously explained. As soon, however, as the wheel A is rotated, and one of its insulating-teeth D is brought in contact with the finger R, the current is thereby instantly broken, and again immediately closed the moment the finger presses against another metallic tooth, which operations of breaking and closing the circuit are continuously repeated as often as the combined gear and circuit wheel is rotated.

From the above description of the apparatus it will be seen that I employ no special circuit-wheel for breaking the current, but this result is accomplished solely by one of the gear-wheels of the train. By thus dispensing with a separate and independent circuit-breaker I lessen the cost of production, simplify the construction of the box, reduce friction, and render the signaling mechanism more prompt and reliable in action.

It will be noticed that in Fig. 1 each inserted block of non-conducting material is large enough to form only a single tooth; while in Fig. 2 the inserted blocks have two insulated teeth, D D', cut in each of them, and I re-

serve the right to cut two, three, or more contiguous teeth from a single block or piece of inserted non-conducting material. The object of thus arranging two or more insulated teeth in succession is to afford a more extended surface for finger R to bear against, and thereby break the circuit for a greater length of time. This long break at each set of insulated teeth D D′ produces a very clear and legible signal, that cannot possibly be misunderstood by the operator, who receives the alarm, and then strikes it on the various fire-bells.

The pins N may be omitted, and the wheel J can be screwed onto the hub M; or it may be attached thereto in any secure manner.

When a complicated train is fitted in the signal-box the insulated wheel J need not gear directly with the master-wheel K, as it is desirable to locate said insulated wheel near the circuit-wheel A C D, so as to cut out the current as soon as possible, and thereby prevent the electricity being dissipated by flowing through an unnecessary number of pinions, shafts, &c.

I claim as my invention—

1. The rotatable device A, armed at its periphery with conducting-teeth C and insulating-teeth D, which teeth C D are of uniform size and pitch, and have the customary fingers R in contact with them, so as to perform the functions of the circuit-wheel of a fire-alarm signal-box, and at the same time gear with the clock-work or train of said box, substantially as herein described and set forth.

2. In combination with the rotatable device A C D, capable of performing the twofold purposes of a circuit-wheel and one of the gear-wheels of a fire-alarm signal-box, the wheel J, insulated either at its periphery or hub, and located between said circuit-wheel A and the driver K, substantially as herein described and set forth.

3. A fire-alarm signal-box, whose shafts are mounted in insulated journal-bearings, substantially as herein described and set forth.

4. In combination with the shafts and insulated bearings of a fire-alarm signal-box, the metallic bushings, interposed between said shafts and their bearings, substantially as herein described and set forth.

In testimony of which invention I hereunto set my hand.

GEORGE FLOYD.

Witnesses:

JAMES H. LAYMAN,

L. H. BOND.