(No Model.) 4 Sheets—Sheet 1.

G. C. McCULLOUGH.

FIRE OR POLICE TELEGRAPH.

No. 423,487. Patented Mar. 18, 1890.

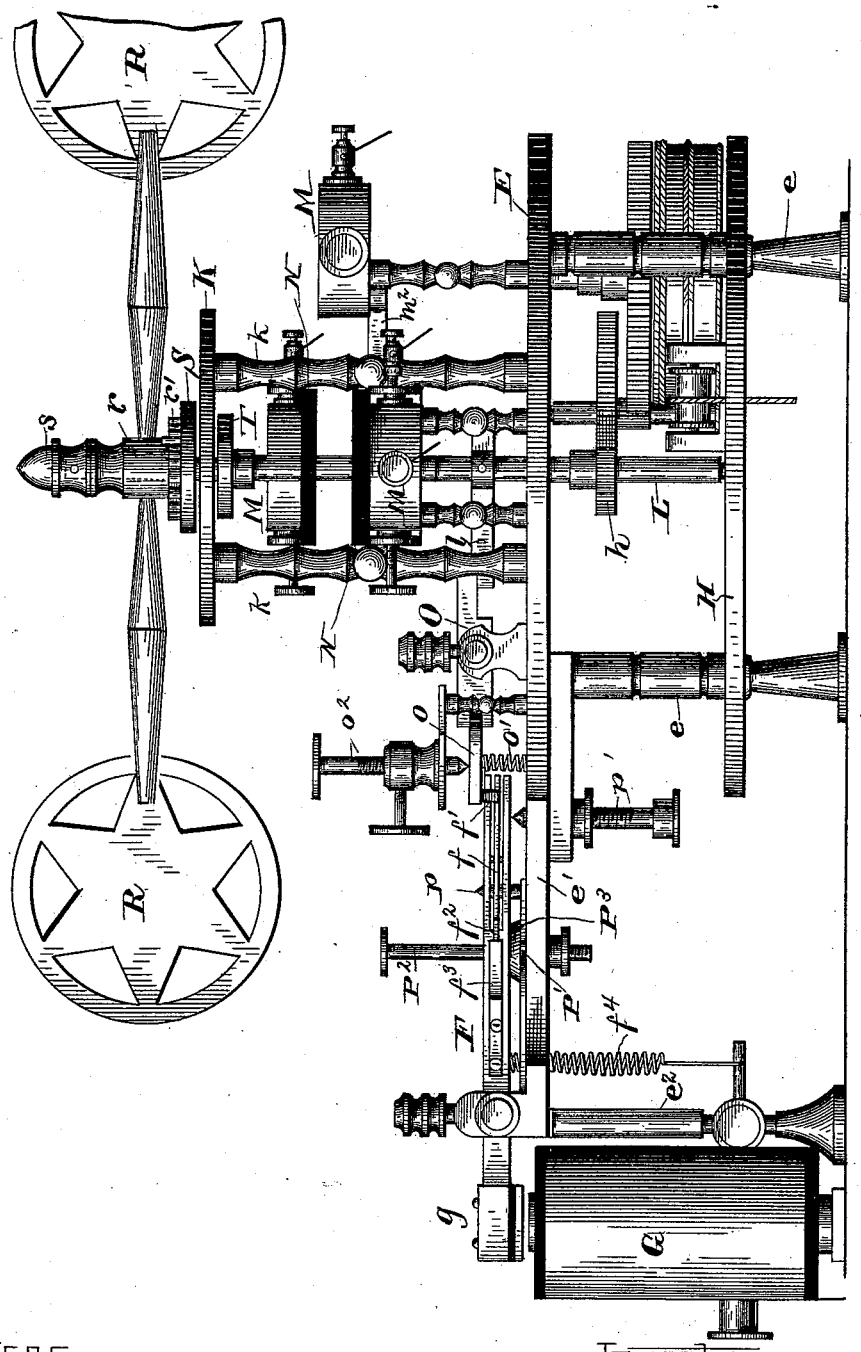

Fig. 1.

Witnesses.
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S. B. Whitaker

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G. C. McCULLOUGH.

FIRE OR POLICE TELEGRAPH.

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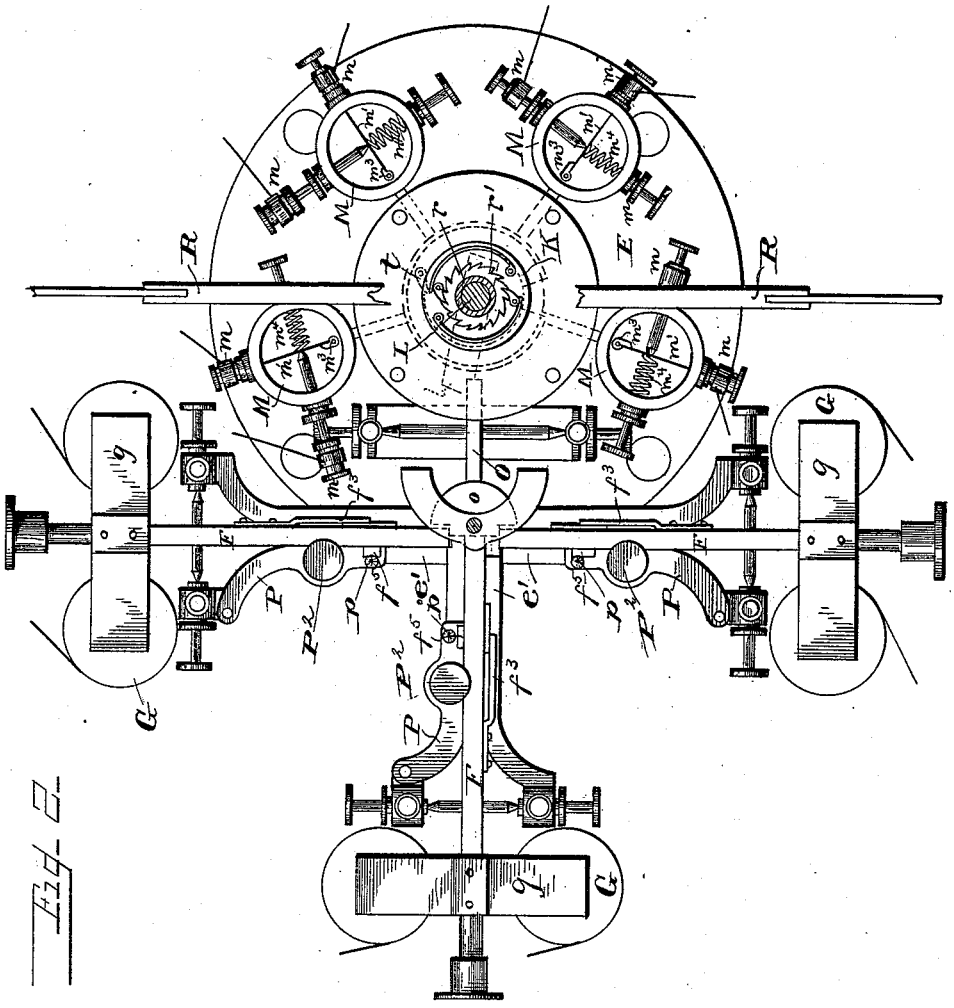

Fig. 2.

Witnesses—

[illegible]berschmidt

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G. C. McCULLOUGH.

FIRE OR POLICE TELEGRAPH.

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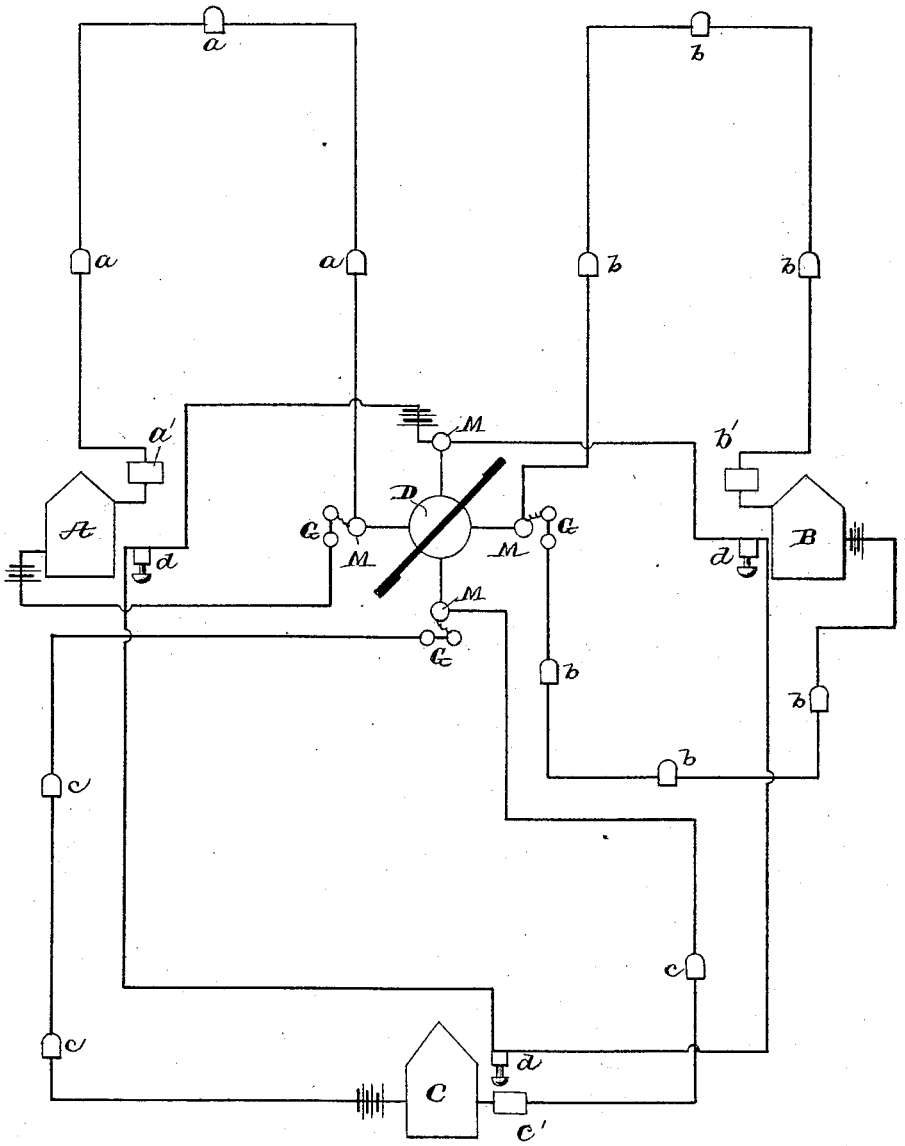
Fig. 3.



Witnesses

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(No Model.) 4 Sheets—Sheet 4.

G. C. McCULLOUGH.

FIRE OR POLICE TELEGRAPH.

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Fig. 4.

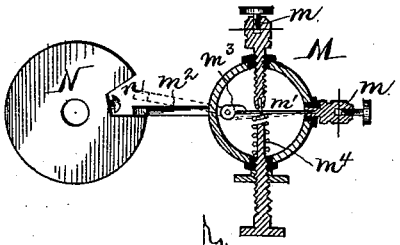


Fig. 9.

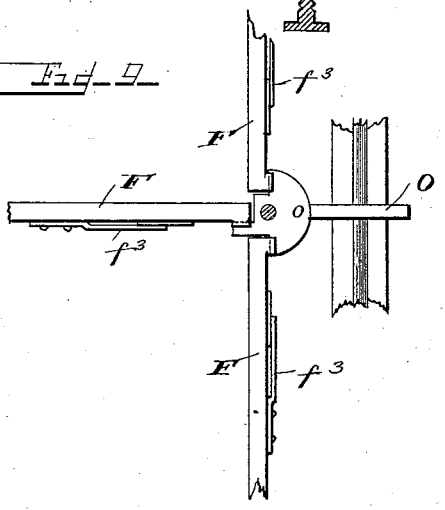


Fig. 5.

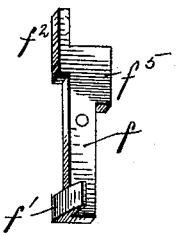


Fig. 6.

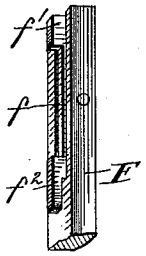


Fig. 7.

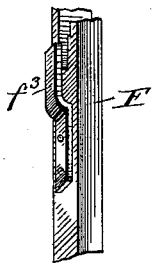


Fig. 8.

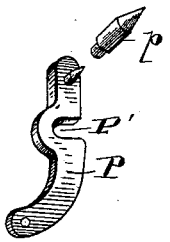
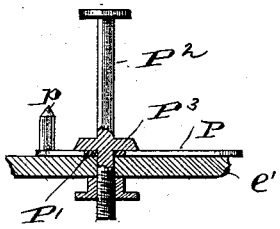


Fig. 10.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE C. McCULLOUGH, OF RICHMOND, INDIANA, ASSIGNOR OF ONE-THIRD TO JOHN B. DOUGAN, OF SAME PLACE.

FIRE OR POLICE TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 423,487, dated March 18, 1890.

Application filed February 5, 1889. Serial No. 298,725. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. McCULLOUGH, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Fire and Police Telegraphs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to fire and police telegraph systems; and it consists of an improved repeater for use in such systems, whereby a break in any circuit connected therewith will be instantly known in the stations of all the circuits, and said repeater also insures the correct transmission of the signals from one circuit to all the other stations, notwithstanding breaks in the same.

In the drawings which form a part of this application I have illustrated one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following specification and claims.

In the drawings, Figure 1 is a side elevation of my improved repeater. Fig. 2 is a plan view of the same. Fig. 3 is a diagrammatic view showing the circuits. Fig. 4 is a detail view of one of the circuit-breakers employed by me in my repeater. Figs. 5 to 8 are detail views of parts of the mechanism. Fig. 9 is a view of a portion of the device, showing the manner in which the tripping-levers overlie the detent; and Fig. 10 is a detail view showing the means for adjusting one of the parts of the mechanism.

In the drawings, E is the bed-plate of the mechanism, which is supported upon suitable posts *e*. This table is illustrated as being of circular form; but any other preferred form might be employed. The front of the table is provided with projections *e'*, which are supported at their outer extremities by posts e^2. Upon the extremity of each of these projections is mounted in a suitable bearing a lever F in a well-known way. The outer end of this lever extends slightly beyond the end of the projection *e'*, and is provided with an armature *g*, below which is an electro-magnet G. I employ as many electro-magnets with my repeater as there are circuits and connect them with said circuits in a manner hereinafter fully described.

The levers F are bifurcated at their inner ends, and a lever *f* is pivoted between the arms of the bifurcated portion, as best seen in Fig. 6. One end of lever *f* extends to the extremity of the arms of lever F, and is provided at one side with a projection *f'*. The other end of the lever *f* is provided with a projection f^2 on the same side to engage the spring f^3, which is attached to lever F in any desired manner, and another projection f^5 extends upon the other side of the lever. The projection *f'* has preferably an inclined side, as illustrated in Fig. 5, for a purpose hereinafter specified.

In Fig. 1 the lever F is shown in its retracted position, or in the position which it occupies when the circuit through magnet G is broken. The normal position is shown in Fig. 9, the levers F there being shown as overlying a detent O.

Beneath the table E, and supported by the posts *e*, is a plate H, and upon suitable posts *k* above table E is mounted a small table K. A central shaft L is mounted in suitable bearings in plate H and table K and passes through table E. This shaft is provided with a pinion *h* below the table E, which engages the pinion of a weight or spring motor of any preferred construction which is capable of imparting motion to the shaft L.

At suitable distances around the shaft L, and at a convenient distance from the same, are the circuit-breakers M, which are mounted upon suitable posts, and in such a manner that each circuit-breaker lies in a different horizontal plane. I employ one more circuit-breaker M than there are magnets G and mount them in any convenient position and relation on the table E. Each of these circuit-breakers consists of a metallic or hard-rubber cup of any preferred form and binding-posts *m*, to one of which is preferably attached a strip of elastic material *m'*. Beneath the circuit-breaker is a lever m^2, which is secured thereto by a pivot passing through the bottom of the cup. To this pivot within the cup is secured the cam m^3, which engages the flexible strip *m'*. The binding-post, which is

not provided with the flexible strip, has a contact-point extending to the said strip, and preferably at right angles to the same, and the cam is so arranged that a movement of the lever m^2 will move the strip m' away from the contact-point and break the circuit. A suitable spring m^4, which may be a spiral spring, as shown, or any preferred form of spring, is employed to retain the elastic strip m' normally in contact with the contact-point and to return it to its normal position after the circuit has been broken.

The shaft L is provided with a number of disks N equal to the number of circuit-breakers. These disks are each provided with a recess n, extending from the periphery toward its center, and I prefer to make these recesses quite deep and provide the inner edge with a set-screw for attaching the disk to the shaft. I may, however, form the disks with a shallower recess and attach them to the shaft in some other manner, as by a key and key-seat. It is obvious that a projecting arm or a partial disk might be employed, if desired. These disks N are mounted above one another, one in the plane of each of the levers m^2 of the circuit-breakers, and are of such diameter that when the shaft is stationary the levers m^2 of all the circuit-breakers will be in the recesses n of the disks. When the shaft is rotated, the levers m^2 will be deflected in such a manner as to break the circuit of all the circuit-breakers and make them again when the shaft has completed one revolution.

Upon some convenient portion of the bed-plate or table E a lever O is pivotally supported in a suitable manner. The shaft L is provided with an arm l in substantially the plane of this lever, the said arm being rigidly secured to the shaft and adapted to engage one end of the lever O. I may, however, employ a disk having a notch or recess to engage lever O, if I prefer. The lever O holds the arm and the shaft from rotation. The opposite end of the lever O is provided with a plate o, which preferably is of a stepped or notched form, as shown in Fig. 2, so as to provide a short portion for each of the projections f' of the armature-levers F to rest upon. These projections need not necessarily rest upon the plate o, as it will be sufficient for them to be immediately above. A spring f^4 is attached to the lever F and to some convenient projection from the post e^2, so as to permit of an adjustment of its tension. This spring will tend to draw down the inner end of the lever F when the circuit through the tripping-magnet G is broken and the armature g released. Upon the portion e' of the bed plate or frame at the side of lever F, opposite the projections f' and f^2, is a plate P, which is pivoted at one end to some portion of the frame. The other end is provided with a projection p, having a sharp tapering point. The central portion of this plate P is provided with a slot P', which engages a thumb-screw P^2, having a shoulder P^3, by which the position of the point p may be regulated. When the lever F is released and is drawn down by spring f^4, the projection f' will depress the plate o, which will elevate the opposite end of the lever O and release the arm l, permitting the shaft L to revolve by means of its actuating devices. As soon as the lever F has descended far enough to cause the arm l to be disengaged, the tapering point of the projection p on plate P engages the projection f^5 on lever f, which forces the projection f^2 forward against the spring f^3 and retracts the projection f', thereby releasing the plate o. A spring o' restores plate o to its normal position, which depresses the opposite end of the lever O in time to engage the arm l and prevent the shaft L from making more than one rotation. An adjustable stop o^2, of any preferred construction, is employed to limit the upward movement of plate o, and a similar stop p' is provided to limit the downward movement of lever F. When the circuit through tripping-magnet G is again made, the magnet will draw the armature g down, thereby raising the other end of the lever F. As soon as the lever is disengaged from the point p, the lever f will be forced to resume its normal position, with its projection f' extending above the plate o, by the spring f^3. This upward movement is so instantaneous that the projection f' will not be thrown out before it will have passed above the plate o; but to insure accuracy the projection f' may be provided with an inclined face, as before described, and shown in Fig. 5.

The shaft L extends above the table K and is provided with fans R R, which serve to prevent too quick a rotation of the shaft. Above the table K is a disk S, which is rigidly secured to the shaft L. The fans R R are secured to a sleeve r, which is provided at its lower extremity with a flange r', having peripheral ratchet-teeth. A cap s is attached to the shaft above the sleeve r by means of a pin or any other preferred construction. The plate or disk S is provided with spring-pawls engaging the teeth r', as shown in Fig. 2. Beneath the table K is a disk T, rigidly secured to the shaft L in any desired manner, and provided with a notch adapted to be engaged by a spring-pawl t when the shaft L is held in position by the arm l and lever O. When the shaft has made a revolution by means of the devices just described, it will be stopped by the lever O and held from rebounding by the pawl t. The fans will, however, be permitted to rotate further until they are stopped by the resistance of the air, the ratchet merely slipping past the pawls, and the injurious strain which would result from stopping the fans suddenly is thus avoided.

From the foregoing description it will be seen that when the circuit through any of the magnets G is broken the repeater will be op-

erated and the circuits passing through each of the circuit-breakers will be broken and again made.

In employing my improved repeater in a fire or police telegraph system I station the instrument at a central point, which may be a separate station or it may be in an engine-house or police-station. I provide as many magnets G as there are stations or engine-houses in the district in which the system is used. Each engine-house is located in an alarm-circuit provided with call-boxes, and at the engine-houses I preferably locate a recorder of any preferred construction to register the alarm or signal in any of the well-known ways.

In Fig. 3 I have illustrated the circuits employed in connection with the system in which my improved repeater is to be used. A, B, and C are engine-houses or police-stations, at which are located suitable recorders a' b' c', which are connected at the central station with the repeater D by a circuit in which are located call-boxes a a, b b, c c, &c, of the usual or any preferred construction. One wire of each circuit is connected with the tripping-magnet G, which is used with that circuit, the other wire being attached to one of the circuit-breakers M, which is in turn connected with the magnet G. As before stated, I employ an additional circuit-breaker, which is independent of the circuits through the call-boxes. Through this circuit-breaker passes a circuit in which are located gongs d, one at each engine-house or police-station.

It will be obvious that from the previous description if a signal or an alarm be turned in from one of the call-boxes in the circuit in which engine-house C is located the alarm will be recorded by the register in engine-house C. When the circuit is broken in the call-box to make the first stroke of the alarm, the magnet G will release its armature and the shaft L will make one rotation, thereby breaking the circuits through engine-houses A and B and causing the registers therein to record the first stroke of the alarm. At the same time the gong in engine-houses A, B, and C will each strike one—the first stroke of the alarm. This operation will be repeated until the complete signal or alarm has been received at each of the engine-houses on register and gong simultaneously.

If a break should occur in the circuit through station C the magnet G would release its armature, the shaft L would make one revolution, and the gong in each station sound a single strike, thus notifying the stations that a break had occurred, and at the central station it can be readily determined which circuit is broken, as the magnet G, connected with the broken circuit, will not attract its armature.

If any alarm should be turned in on circuit A or B while the circuit C was broken the register at station C would not record the alarm, but it would be received on the gong. Thus it will be seen that by placing the gong in an independent circuit the alarm will always be received, even though the circuit through the register should be broken.

I have shown and described a system containing three engine-houses and one repeater. It is obvious, however, that a greater number of stations might be connected to the repeater by increasing the number of magnets G and circuit-breakers; or a number of stations might be connected with one repeater and another number connected with another repeater, as preferred or found desirable.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a fire and police telegraph system, the combination, with a central station, of independent outlying main-line circuits, a station provided with a signal-receiver in each of said circuits, a repeater at the central station connected with each of said outlying circuits, and an independent circuit connecting said repeater with a gong at each of said outlying stations, whereby a signal will be repeated at each station, notwithstanding a break in the main-line circuit thereof, substantially as described.

2. In a fire and police telegraph system, the combination, with a central station, of independent outlying main-line circuits, call-boxes and a station provided with a signal-receiver in each of said circuits, a repeater at the central station connected with each of said outlying circuits, and an independent circuit connecting said repeater with a gong at each of said outlying stations, whereby a signal will be repeated at each station, notwithstanding a break in the main-line circuit thereof, substantially as described.

3. In a fire or police telegraph system, the combination, with central station, of outlying circuits having a station and call-boxes in each, and an independent circuit connected with a gong at each of said outlying stations, a circuit-breaker in the gong-circuit, and a circuit-breaker and tripping-magnet in each of the outlying circuits, substantially as described.

4. A repeater for a central fire or police telegraph station having circuit-breakers for independent outlying call and station circuits, and a circuit-breaker for a common circuit, an actuating device for said circuit-breakers under tension, a detent for said actuating device, and tripping-magnets in each of said call and station circuits for operating said detent, substantially as described.

5. A repeater for a central fire or police telegraph station having circuit-breakers for independent circuits, an actuating device under tension for said circuit-breakers, a detent for said actuating device, and tripping-magnets for releasing said detent, there being one more circuit-breaker than tripping-magnets, substantially as described.

6. In a repeater for a central station, the

combination, with a revolving shaft under tension, of circuit-breakers arranged concentrically to said shaft including pivoted levers having one end in operative engagement with the movable contact of said circuit-breakers, and projections on the said shaft for engaging the free ends of said levers, substantially as described.

7. In a repeater for a central station, the combination, with a revolving shaft under tension, of circuit-breakers arranged concentrically to said shaft including pivoted levers having one end engaging the movable contact of said circuit-breakers, projections on said shaft for engaging the free ends of said levers, a detent engaging a projection from said shaft, and a tripping-magnet provided with an armature-lever for releasing said detent, substantially as described.

8. The combination, with the revoluble shaft, a detent-lever, and a tripping-magnet, of an armature-lever having the lever *f* pivoted therein, having a projection engaging said detent-lever, and another projection extending beyond the edge of the armature-lever, and the pin *p*, substantially as described.

9. A circuit-breaker consisting of an annular main body, two binding-posts set at right angles to each other and having extensions meeting within the hollow body, one of said extensions being elastic and bearing against the other, and a lever having one end engaging said elastic extension and the other end extending outside of the annular body, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE C. McCULLOUGH.

Witnesses:
JOHN L. YARYAN,
WILLIAM A. BAUMER.