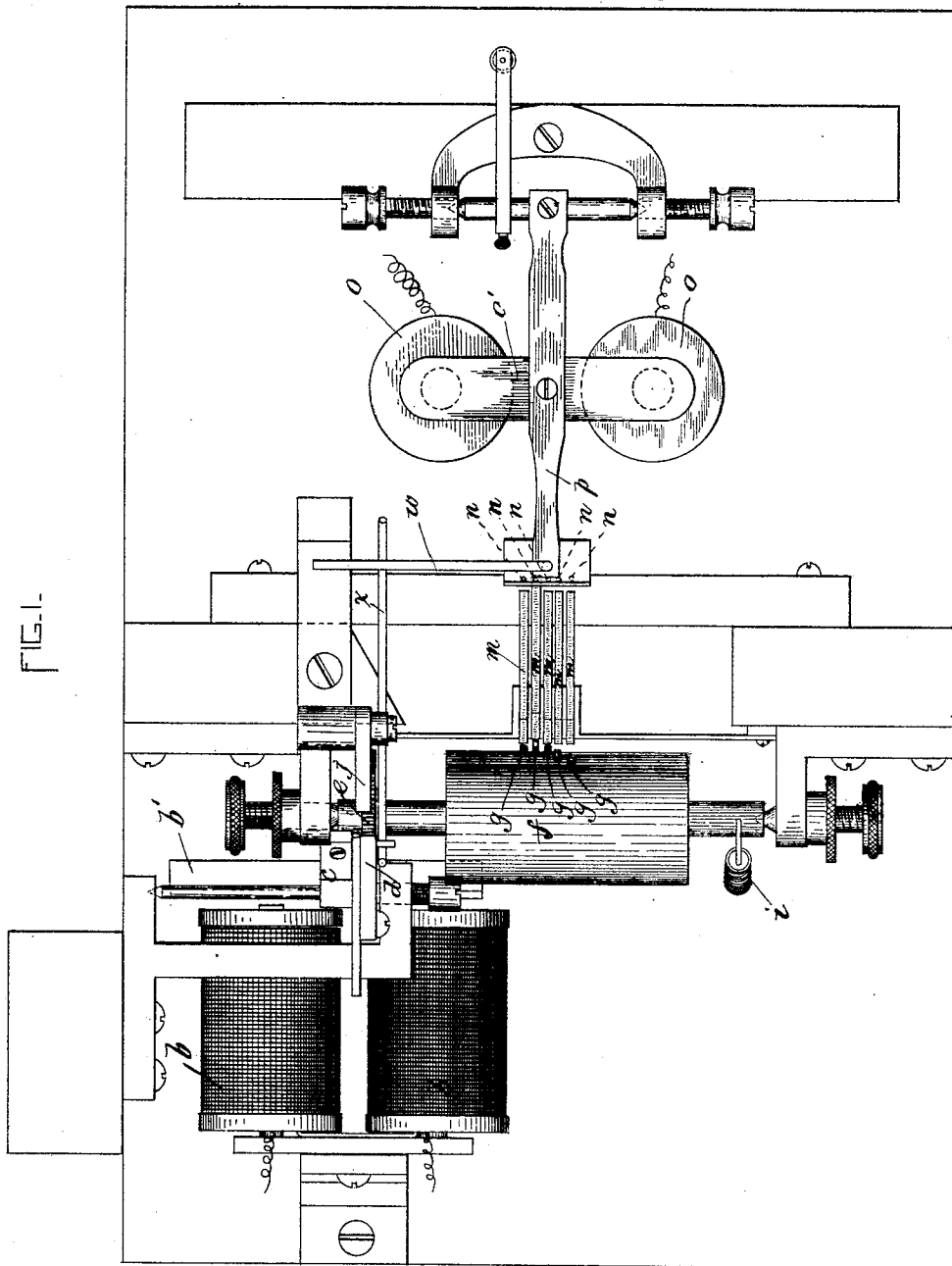


H. REDDING.
WATCHMAN'S ELECTRIC RECORDER.

No. 464,256.

Patented Dec. 1, 1891.

FIG. 1.



WITNESSES.

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W. C. Ramsay

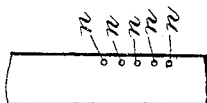


FIG. 7.

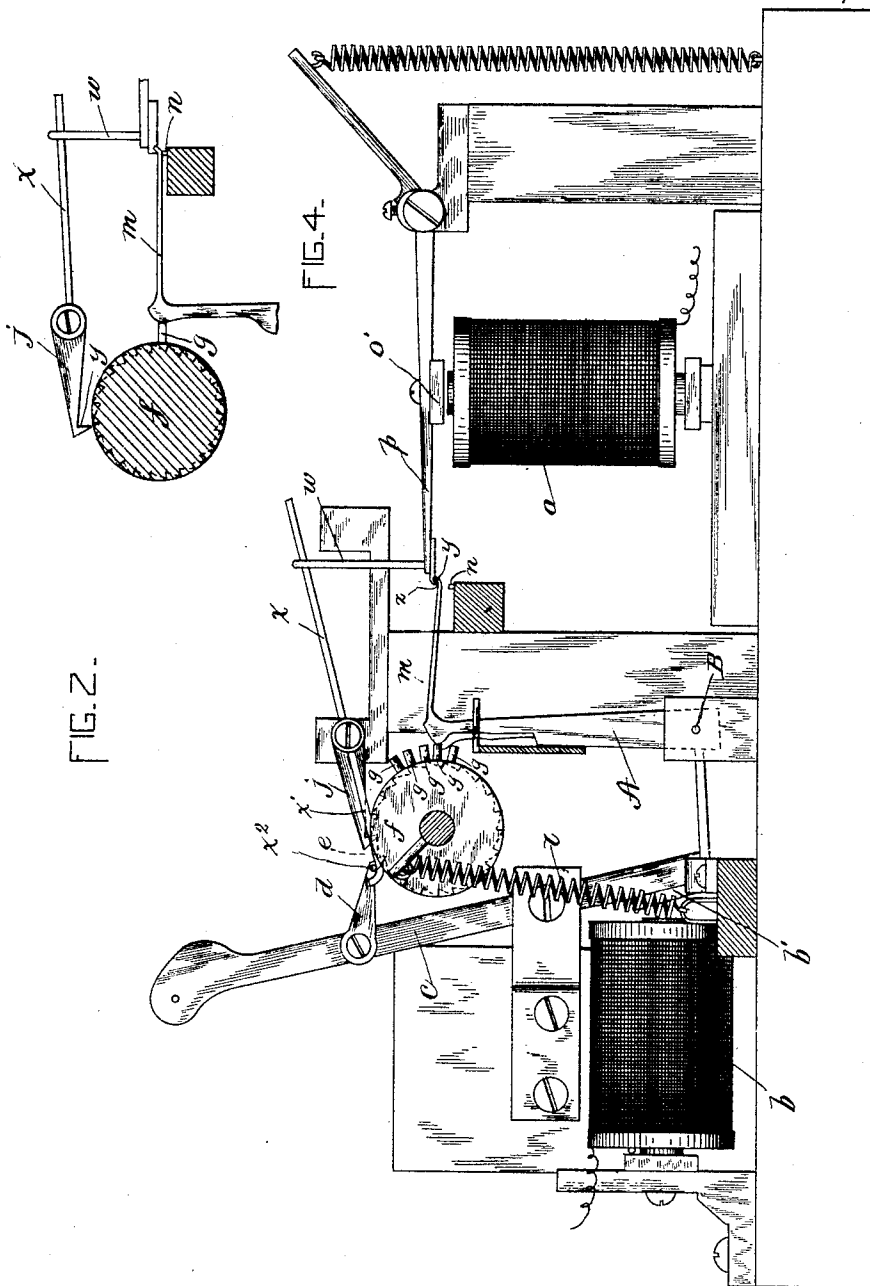
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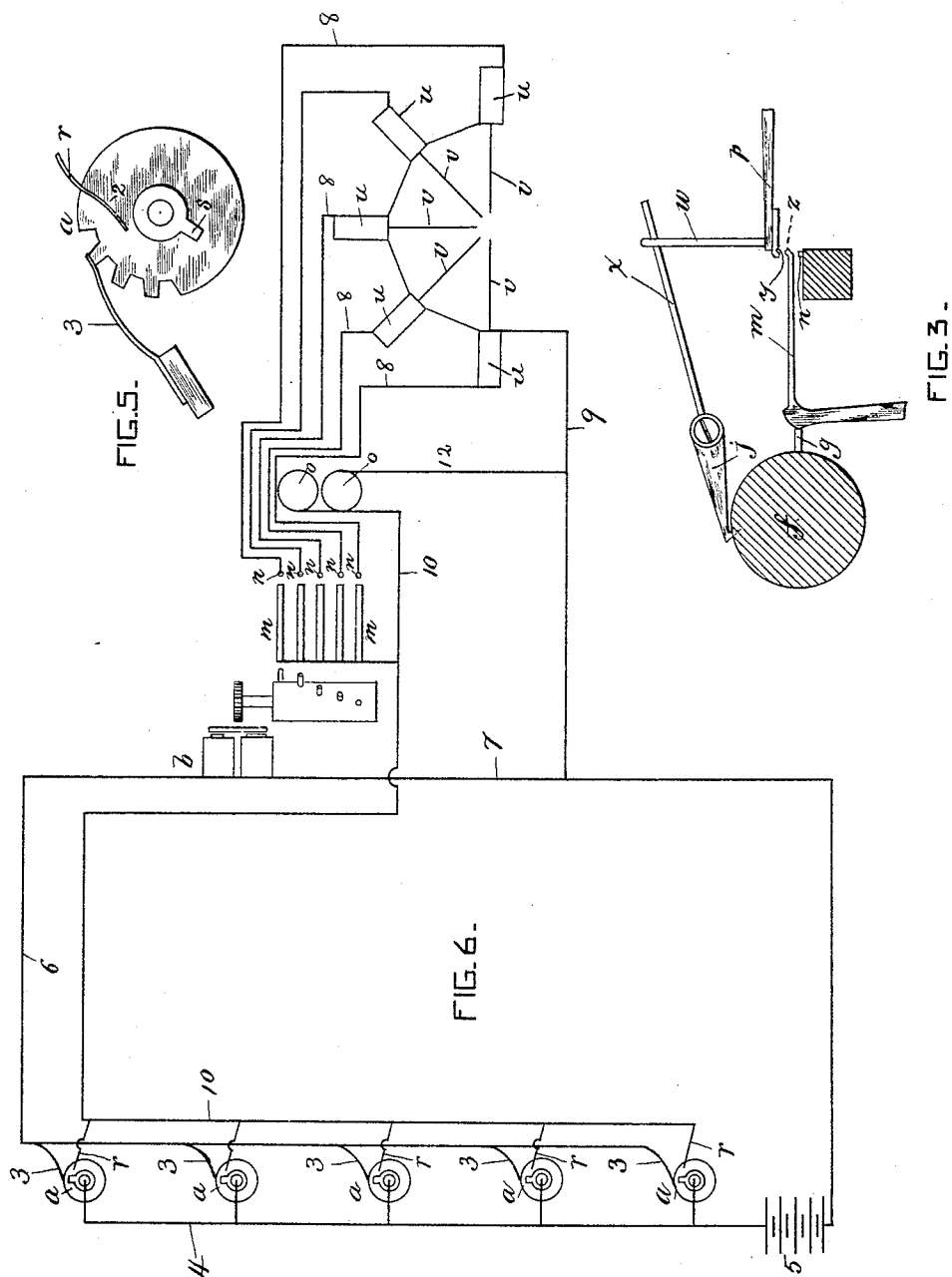
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UNITED STATES PATENT OFFICE.

HARVEY REDDING, OF EVERETT, ASSIGNOR TO THE REDDING ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

WATCHMAN'S ELECTRIC RECORDER.

SPECIFICATION forming part of Letters Patent No. 464,256, dated December 1, 1891.

Application filed April 16, 1889. Serial No. 307,489. (No model.)

To all whom it may concern:

Be it known that I, HARVEY REDDING, of Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Recording or Signaling Apparatus, of which the following is a specification.

This invention relates to electric signals, and particularly to that class of signals known as "watchmen's time-indicators," in which the closing of an electric circuit by a watchman at a given locality causes a printing or marking device to make an impression on a record sheet or strip of paper which is moved by a time mechanism, and so that the time when the circuit was closed by the watchman is indicated by the location of the mark or impression caused thereby on the record-sheet.

Heretofore each printing or marking device has been in a separate and independent circuit, so that two wires have been required between each station or location from which signals were to be sent by the watchman and the clock or apparatus which has the record-sheet. In large establishments, where there are several stations at considerable distances apart, this system involves much expense in wiring, and the multiplicity of wires thus involved is often a source of inconvenience and difficulty.

My invention has for its object to reduce to the minimum the number of wires required to connect a series of stations with the central office or recording apparatus; and to this end the invention consists in the improved system and apparatus which I will now proceed to describe.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a plan view of the improved mechanism embodying my invention. Fig. 2 represents a side elevation of the same. Figs. 3, 4, and 5 represent detailed views. Fig. 6 represents a diagram of the connections. Fig. 7 represents a detail.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *a a a* represent signaling devices at the stations from which signals are to be sent to the recording apparatus at the central station or office. Each signaling de-

vice *a* is constructed so that by the act of a watchman at that station an electric circuit including said signaling device and recording apparatus will be closed and broken a predetermined number of times. I prefer to employ as the signaling device an ordinary signal-box, like those used for fire-alarm and district telegraph service, each box having a circuit-closing wheel (see Fig. 5) with a number of teeth or projections. The wheel is rotated by the person sending the signal by means of a crank, and when the crank is released a spring returns it to its normal position, its return movement being regulated by a suitable escapement. During the return movement of the wheel the teeth thereof make contact successively with a contact-spring 3 in the circuit, so that the circuit is closed and broken as many times as there are teeth on the wheel. The wheel of each signaling device has a different number of teeth from the other wheels, so that the operation of each signaling device closes the circuit a number of times peculiar to that particular device.

b represents an electro-magnet, which is included in the same circuit with the signaling devices.

c represents a pivoted lever to which the armature *b'* of the electro-magnet *b* is attached. Said lever is provided with a retracting-spring and is vibrated by the action of the electro-magnet in attracting the armature *b'* when the circuit is closed and of the spring in retracting the armature and lever when the circuit is broken. The lever *c* carries a pivoted pawl *d*, which engages a ratchet *e* on the shaft of a drum *f*. Said drum is journaled in suitable bearings and is provided on its periphery with radial pins *g*, arranged spirally and corresponding in number with the signaling devices *a*. The drum is provided with a spring *i*, which is arranged to normally rotate the drum backwardly or in the opposite direction to the rotation imparted by the pawl to its normal or starting position.

j represents an arresting-dog, which is formed to normally engage the teeth of the ratchet *e* and hold the ratchet against the force of the spring *i*, thus preventing backward rotation of said drum, the dog *j* holding

the drum at every position to which it is rotated by the pawl *d*.

It will be seen that each operation of one of the circuit-closing devices or signal-boxes *a* causes a definite number of movements of the lever *c* and its pawl *d* and gives the drum *f* a corresponding number of steps or partial rotations, the dog *j* arresting the drum after each step. The movement thus imparted to the drum brings a pin *g*, which corresponds to the operated signal-box, into position for operation, or, in other words, makes one of the pins operative as a part of the recording apparatus, as hereinafter described, each pin being brought to its operative position by the operation of the particular signal-box with which it corresponds. For example, the signal-box which is constructed to close and break the circuit once at each operation gives the drum one movement and brings the first pin of the series to its operative position. The signal-box that closes the circuit twice gives the drum two movements and brings the second pin of the series to its operative position, and so on, the spiral arrangement of the pins enabling but one pin to be in operative position at a time.

The means whereby a record is effected on a sheet or dial by or through the agency of a pin *g*, brought into operative position as above described, may be variously modified.

The apparatus next described comprises the best means at present known to me for effecting said result. Said apparatus is composed of the electric recorder or register described in Letters Patent No. 299,011, dated May 20, 1884, issued to Jerome Redding and myself, a series of contact strips or pieces *m*, arranged to be moved endwise by the pins *g*, a series of anvils or contact-points *n*, electrically connected with the electro-magnets which operate the markers or printing-characters of said recorder, an electro-magnet *o*, an armature *o'* for said magnet, and a pivoted lever *p*, to which said armature is attached. The contact strips or pieces *m* correspond in number and position to the pins *g*, and are so arranged that when a pin *g* is in its operative position the corresponding strip or piece *m* is moved endwise and held with its outer end over the corresponding anvil or contact-point *n*. One pole of the electro-magnet *o* is connected with contact-springs *r* at the several signal-boxes *a*, each spring being arranged to make contact with a tooth *s*, Fig. 5, on the shaft of the wheel 2, the arrangement of the tooth *s* being such that the circuit is closed through the magnet *o* by contact of said tooth with the spring *r* after the series of closures of the circuit through the magnet *b* has been effected by the wheel 2 of the same box, and therefore after the pin *g* corresponding to that box has reached its operative position and has moved the corresponding contact-strip *m* outwardly. The armature-lever *p* is depressed by the closure of the circuit through magnet *o*, and is so ar-

ranged that in being depressed its free end will strike the displaced contact-strip *m* and force the latter into contact with the corresponding anvil or contact-point *n*, thereby closing the circuit through the marker-operating electro-magnet *u* and causing the marker *v*, operated thereby, to imprint the record-sheet. (For a full description of said magnets *u*, markers *v*, and other parts of the recording apparatus see Patent No. 299,011, above referred to.) The armature-lever *p* is provided with an arm *w*, which is arranged to strike an arm *x*, attached to the arresting-dog *j*, during the depression of the lever *p*, and thereby raise said dog out of engagement with the ratchet-wheel *e* and permit the spring *i* to return the drum *f* to its starting position. An arm *x'*, attached to the dog *j*, is raised with the dog and strikes a pin *x''* on the pawl *d*, thereby raising said pawl with the dog *j*. It will be seen, therefore, that the closure of the circuit through the magnet *o*, as described, not only operates one of the markers *v*, but also releases the drum *f* and allows it to return to its normal or starting position.

By the automatic resetting of the drum in the manner described I am enabled to include any desired number of signal-boxes *a* in one circuit, as indicated by the diagram in Fig. 6.

To prevent the contact-strips *m* from slipping out of engagement with the armature-lever *p* while the latter is being depressed and after the release of the drum *f*, (the projected strip *m* being then unsupported by the pin *g* that projected it,) I provide the lever *p* with a groove *y* in its under side adapted to engage a slightly-upturned lip *t* on the end of the contact-strip, and thereby prevent endwise movement of the latter.

The contact-strips *m* are here shown as formed on the ends of levers *A*, which are pivoted at *B*, and are weighted, so that their upper ends will normally stand in position to be moved by the pins *g* of the cylinder *f*.

I do not limit myself to the described apparatus through which the pins *g* act to produce marks or impressions on a sheet, but may use any other suitable apparatus or means for effecting said marking through the agency of the pins *g* when the same are brought into operative position, and the magnet *o* and the devices operated thereby to automatically release the drum after each pin *g* has reached its operative position may be used for this purpose alone instead of being made to serve, as herein described, as a part of the means through which the pins act to produce the impressions or marks.

The best arrangement of electrical connections and circuits which I have devised up to the present time is shown in diagram in Fig. 6, from which it will appear that the shafts of the circuit making and breaking wheels are connected by wires 4 with one pole of the battery 5, and that the contact-springs 3 of said boxes are connected with the electro-magnet *b* by wires 6, said magnet being connected

with the other pole of the battery by wire 7. Said wires 4 6 7 constitute a main circuit. The contact-anvils *n* are connected by wires 8 each with one pole of the corresponding marker operating electro-magnet *u*, and the other poles of said magnet are connected by wire 9 with the main circuit. One pole of the magnet *o* and the several contact strips or slides *m* are connected with the contact-springs *r* of the signal-boxes by wire 10, and the other pole of said magnet *o* is connected by wire 12 with the main circuit.

I claim—

1. In an electric signaling or registering system, the combination of a series of signal-boxes, an electric circuit including said boxes, a drum having a series of pins spirally arranged, electrically-operated mechanism included in said circuit, whereby said drum is rotated step by step by the operation of either signal-box, a spring whereby said drum is returned to its starting position when released, an arresting device whereby the drum is normally held against the force of said spring, an electro-magnet and devices operated thereby whereby said arresting device may be made inoperative, and electrical connections whereby said magnet is energized after the operation of each signal-box, as set forth.

2. In an electric signaling or registering system, the combination of a drum having a series of pins spirally arranged, an electric circuit having circuit-closing and breaking devices, electrically-operated mechanism included in said circuit, whereby the drum is rotated step by step a definite distance by the operation of each circuit-closing device, a series of contact-strips arranged to be moved outwardly by said pins, contact points or anvils arranged to make contact with the displaced strips, a series of marking devices each having an operating electro-magnet electrically connected with one of said contact-points, an electro-magnet *o*, an armature therefor, and a lever attached to said armature, said lever being arranged to force either of the outwardly-moved contact-strips into contact with the corresponding point or anvil, and electrical connections whereby said armature is energized after the operation of each circuit-closing device, as set forth.

3. The armature-lever *p*, having a groove *y*, combined with the contact-strips formed to engage said grooves, whereby endwise movement of said strips while in contact with said lever is prevented, and means for carrying or supporting said strips, as set forth.

4. The combination of a series of signal-boxes, and an electro-magnet *b*, a main electric circuit including said boxes and magnet, a drum having a series of pins *g*, devices operated by the magnet *b*, whereby said drum may be rotated step by step, a series of signal-receiving devices corresponding in number to the pins *g*, an electro-magnet *o*, a lever operated by the armature of said magnet, a series of movable contact-strips arranged to be moved by the pins *g*, a series of wires or conductors adapted to connect said contact-strips with the respective signal-receiving devices, a branch circuit which includes said signal-receiving devices, contact-strips, conductors, and electro-magnet, and circuit-closers for said branch circuit located at and operated by the said signal-boxes, as set forth.

5. The combination of a drum or rotary device having a series of pins, electrically-operated mechanism whereby said drum may be rotated step by step to bring either of its pins into operative position, a main electric circuit which includes said operating mechanism, and suitable main-circuit-closing device whereby any desired extent of step-by-step rotation may be imparted through said circuit to said drum, an arresting device which retains the drum at any point to which it may be rotated, a branch of the main circuit, an electro-magnet included in said branch, and devices operated by said magnet to make the arresting device inoperative and thereby release the drum upon the closure of the branch circuit.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 6th day of April, A. D. 1889.

HARVEY REDDING.

Witnesses:

C. F. BROWN,
A. D. HARRISON.