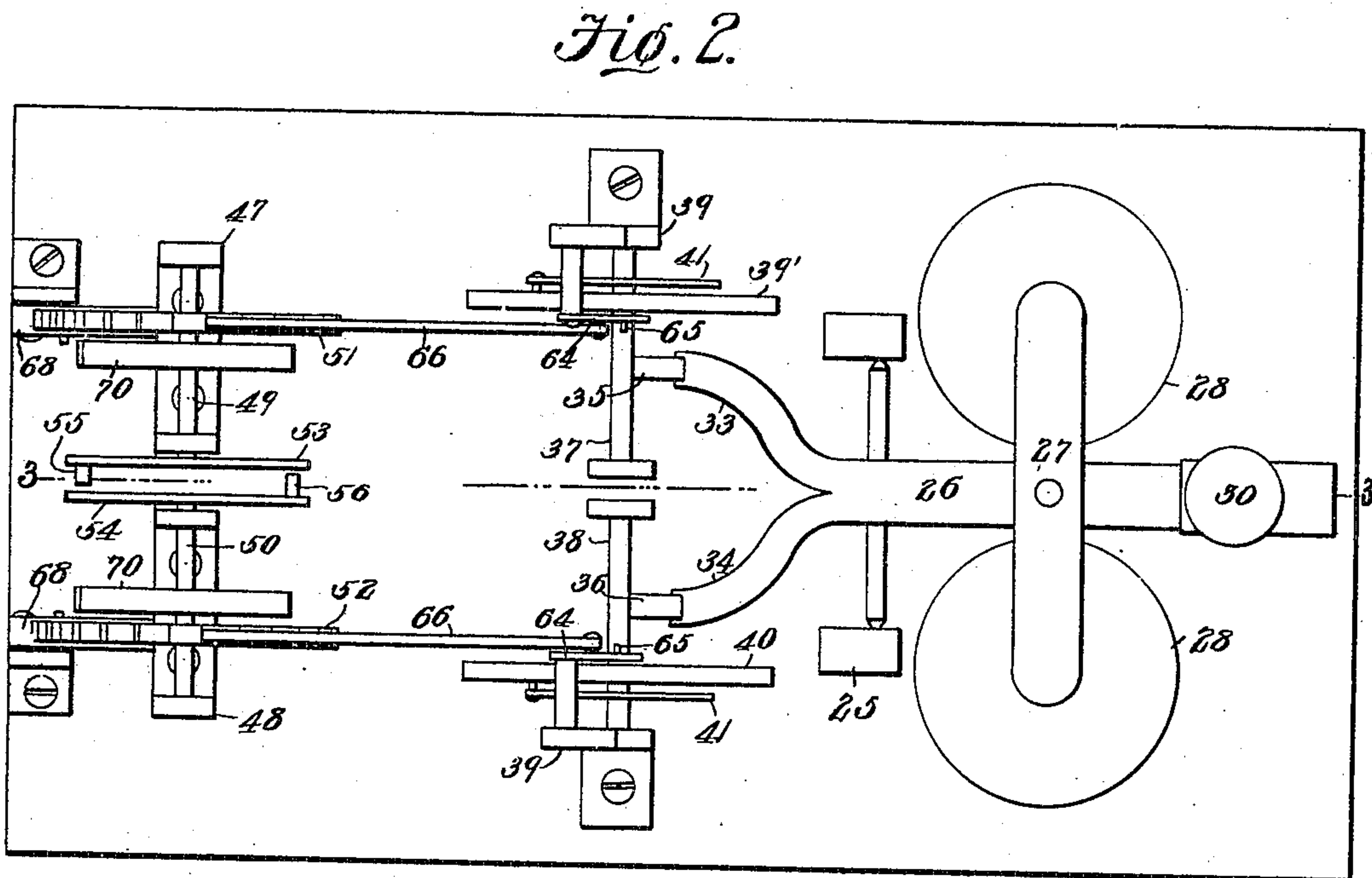
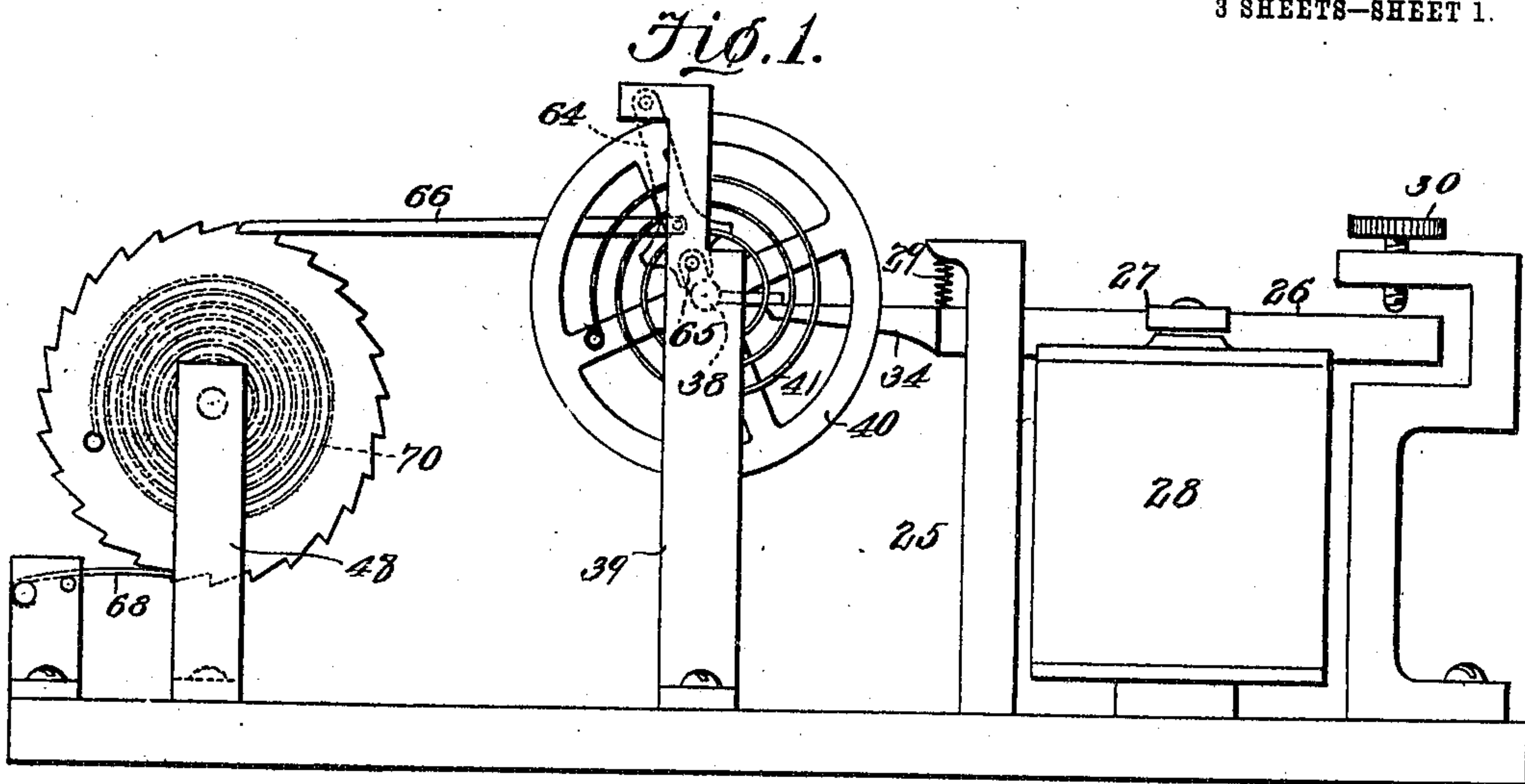


No. 837,178.

PATENTED NOV. 27, 1906.

T. W. BENSON.
AUTOMATIC CIRCUIT CLOSER.
APPLICATION FILED JAN. 4, 1906.

3 SHEETS—SHEET 1.



WITNESSES:
E. J. Stewart
Jno. E. Parker

Tully W. Benson,
INVENTOR.
By *C. A. Snow & Co.*
ATTORNEYS

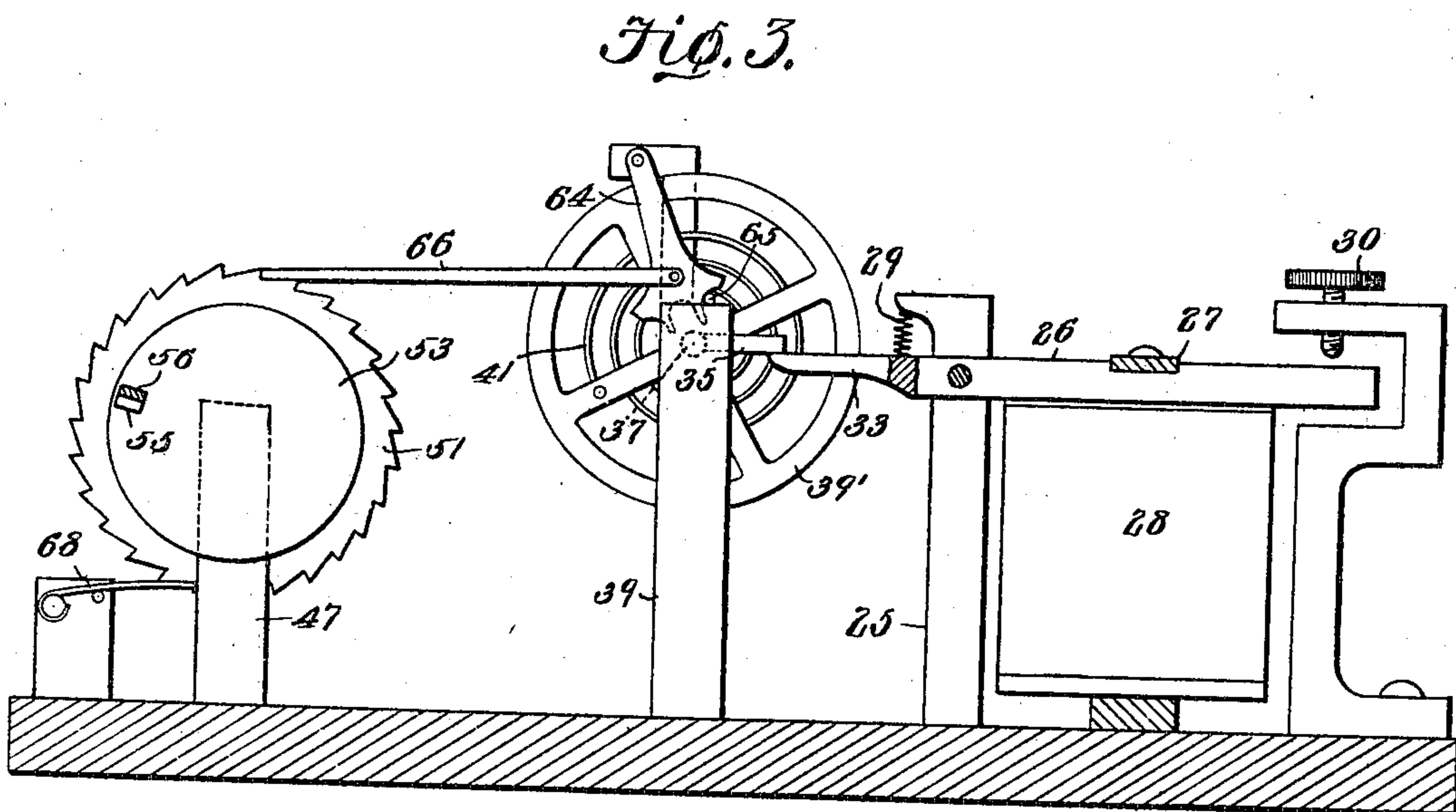
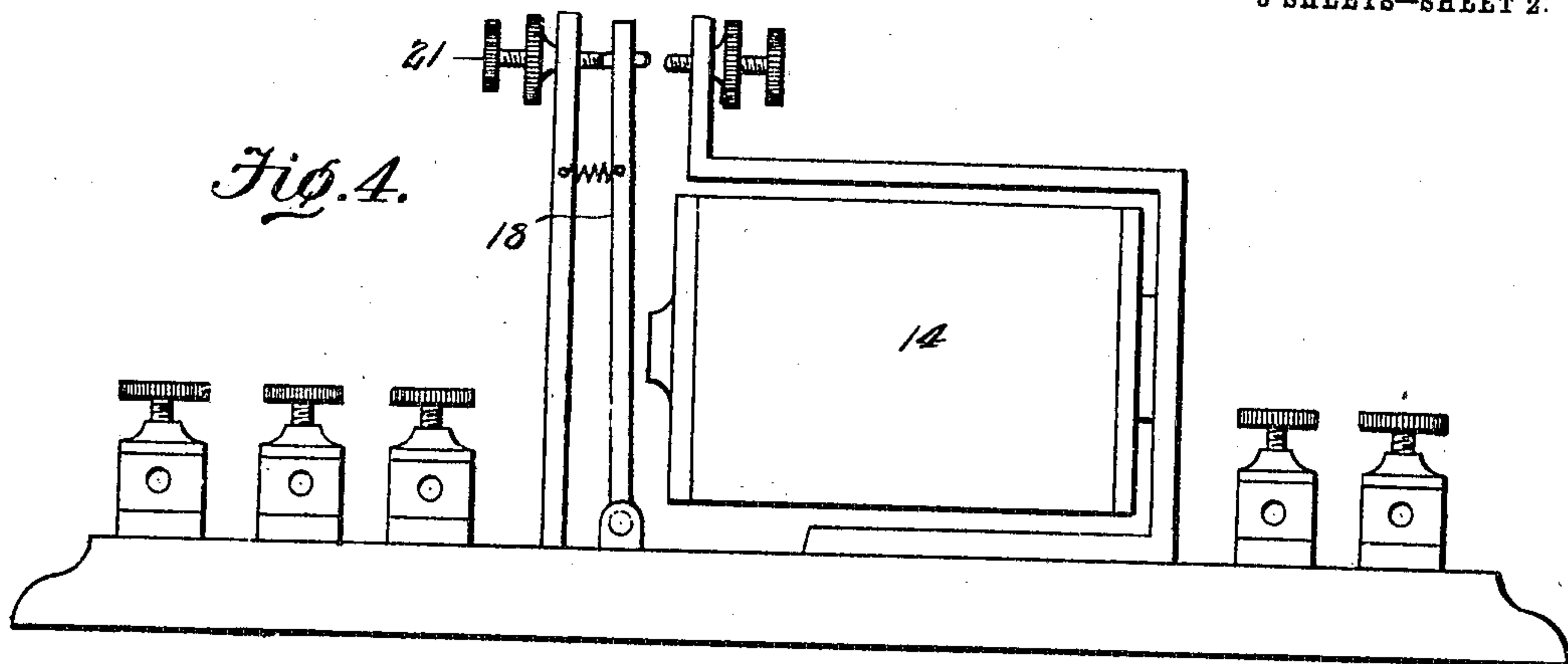
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3 SHEETS—SHEET 3.

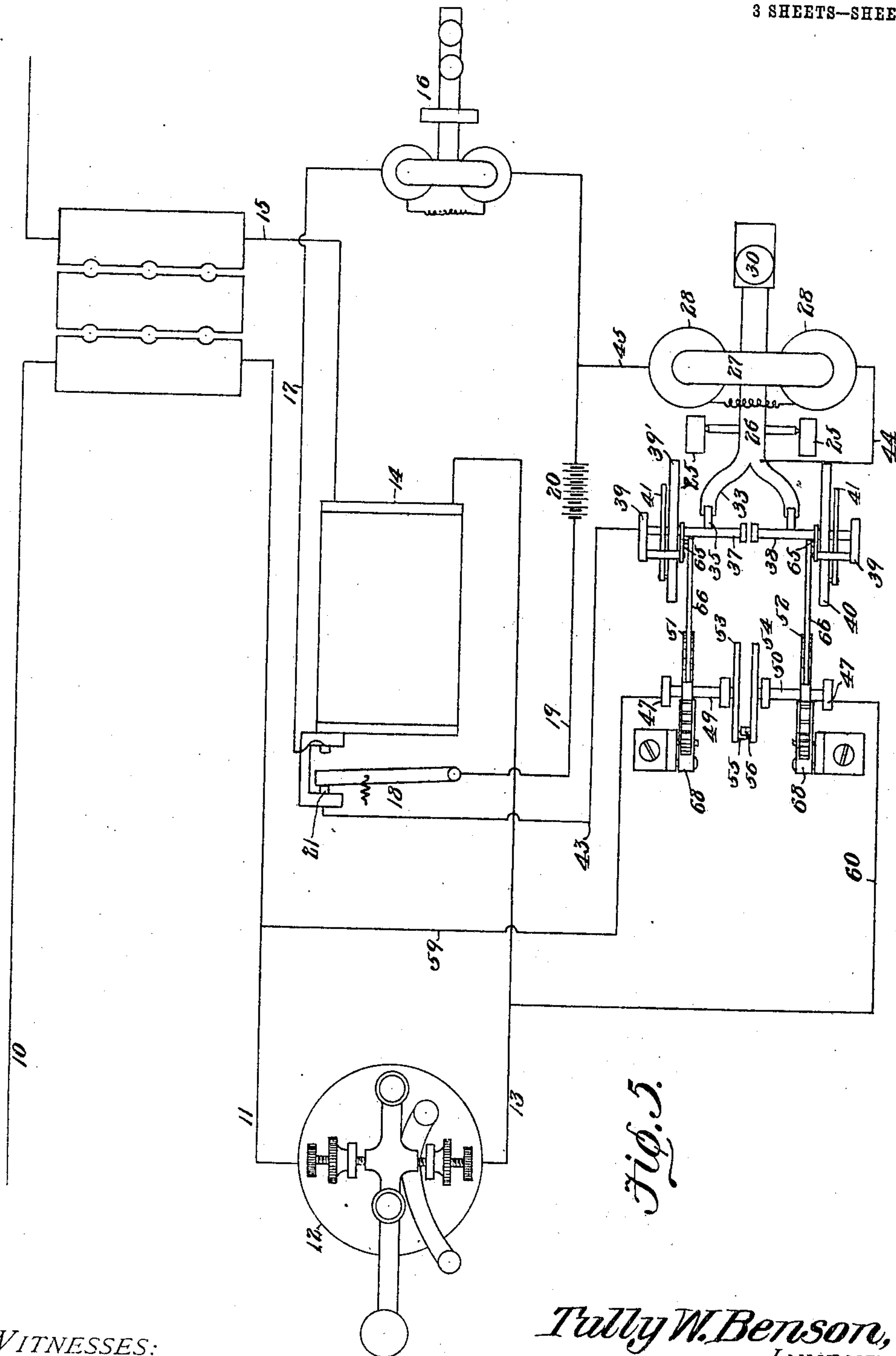


Fig. 5.

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UNITED STATES PATENT OFFICE.

TULLY WILFRED BENSON, OF WEWOKA, INDIAN TERRITORY.

AUTOMATIC CIRCUIT-CLOSER.

No. 837,178.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed January 4, 1906. Serial No. 294,588.

To all whom it may concern:

Be it known that I, TULLY WILFRED BENSON, a citizen of the United States, residing at Wewoka, in the Seminole Nation, Indian Territory, have invented a new and useful Automatic Circuit-Closer, of which the following is a specification.

This invention relates to automatic circuit-closers, and has for its principal object to provide a mechanism of simple construction which may be employed for automatically closing the main-line wire of a telegraph system in case the operator through carelessness leaves his key open.

A further object of the invention is to provide a relay-actuated device of such nature that when the armature-lever of the relay is against the back stop, which occurs only when the line is open, it will close a circuit through the device which forms the subject of the present invention, and the latter will then commence to operate and in a short time will bridge the main line around the operator's key, thus effectually closing the line and permitting the operation of all of the sounders, including that of the office, where the key remains open.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts herein-after fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a side elevation of an automatic circuit-closing device constructed in accordance with the invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section on the line 3 3 of Fig. 2. Fig. 4 is a detail elevation of the main form of relay. Fig. 5 is a diagram showing the electrical connections.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

Referring first to the diagram, Fig. 5, 10 designates the main line, which enters the station at the usual grounding-plates and is connected by a wire 11 to the key 12 and from thence passes by wire 13 to the electro-

magnet 14 of the relay and out by way of wire 15. The sounder 16 is of the usual construction and is shown as connected by a wire 17 to the relay-frame, a circuit being completed when the relay-magnet is energized through the armature-lever 18, wire 19, and local battery 20. This mechanism constitutes the ordinary equipment of a local station, and when the operator wishes to send a message he opens the line at his key-switch, as usual, and operates in the usual manner. When the main line is open and the electromagnet of the relay is not energized, the relay-armature rests against the back stop 21 of the relay, this being usually a small block of insulating material; but in the present instance the stop 21 forms a contact for closing a circuit through the automatic mechanism that forms the subject of the invention.

At any suitable point adjacent the instrument is placed a frame 25, to which is pivoted a lever 26, carrying an armature 27, that is disposed above and within the field of force of a pair of electromagnets 28, the lever being normally held away from the poles of the magnet by a spring 29 and the frame being provided with a stop-screw 30 of ordinary construction for limiting such movement of the lever.

One end of the lever projects beyond the frame and is bifurcated, forming a pair of arms 33 and 34, which are arranged to be engaged by arms 35 and 36, that project, respectively, from a pair of shafts 37 and 38. These shafts are mounted in suitable bearings carried by brackets or frame members 39, and to each shaft is secured a balance-wheel, the two wheels 39 and 40 being provided with hair-springs 41, that are placed, respectively, under different tensions, and these springs rotate the shafts until the arms 35 and 36, carried thereby, engage with the arms 33 and 34 at the end of the lever.

Leading from the contact 21 of the relay is a wire 43, that is connected to one of the brackets 39, so that a circuit is closed from the contact 21, through wire 43, bracket 39, shaft 37, arm 35, arm 33, the armature-lever, and wire 44, the electromagnets 28, wire 45, and back through the battery 20 and wire 19 to the armature-carrying lever 18 of the relay, so that if said armature-lever is in engagement with the contact 21 a circuit will be closed and the electromagnets 28 will be energized. This occurs only when the main line is open,

and when the electromagnets 28 attract the armature 27 the lever 26 is pulled down, and the rapid upward movement imparted through the arms 33 and 34 to the arms 35 and 36 will rotate the two balance-wheel shafts 37 and 38, the force of the blow being sufficient to cause the arms 35 and 36 to move from engagement with the arms 33 and 34, and thus momentarily breaking the circuit, which, however, is reestablished when the springs of the balance-wheels again restore the arms 35 and 36 into engagement with the arms 33 and 34, whereupon a second impulse takes place and the movement is continued and is transmitted through the remaining portion of the mechanism for the purpose of closing the main-line circuit.

At a point adjacent to the brackets 39 are arranged bracket or arm members 47 and 48, which carry shafts 49 and 50, respectively. These shafts carry ratchet-wheels 51 and 52 and are further provided with disks 53 54, said disks having pins 55 56, that are arranged at precisely the same distance from the center of rotation of the shafts.

Leading from the wire 11 of the main line is a wire 59, that is connected to the bracket 47, and leading from the wire 13 is a wire 60, that is connected to the bracket 48, and the shafts and disks are arranged to form part of the circuit, so that if the two pins 55 and 56 come into engagement with each other the main-line circuit will be closed through this mechanism, and the key will be placed in shunt. Pivoted to the frame at a point adjacent the balance-wheel is a lever 64, the inner end of said lever being arranged to be engaged by a pin or pins 65 on the balance-wheel, and leading from the lever is a pawl 66, said pawls being designed to engage with the teeth of the ratchet-wheels 51 and 53 and to impart a step-by-step rotative movement thereto, rearward movement of the ratchet-wheels being prevented by locking-pawls 68.

It has been previously stated that the springs of the balance-wheels 39 and 40 are of a different tension, so that the same movement imparted to both through the descent of the armature-carrying lever 26 will result in different movement of the wheels, the one of the lightest tension moving the greatest distance, and as a result the two pawls will receive different movement and the two ratchet-wheels 51 and 52 will be moved to different extents, respectively, so that after a time the pins 55 and 56 must come into engagement and close the circuit around the open key. It is obvious that some time must elapse between the beginning and the ending of the circuit-closing operation, so that the device will not interfere with the sending of a message and will not cut out the key while the latter is in operation.

A device of this type may be readily applied to existing lines and will not cut out the

local sounder, so that the operator can receive all messages sent along the line. When he attempts to send a message after leaving the key open, he is immediately informed of the cutting out of his key by the failure of the relay and sounder to respond, and he may then move the pawls 68 from engagement with the ratchet-wheels 51 and 52 and allow the parts to resume initial position, the ratchet-wheels being provided with suitable springs 70 to assist in restoring them to initial position after the release of the pawls.

I claim—

1. In telegraphy, a key an automatic circuit-closer for bridging the main line around the key, comprising a pair of electromagnetically-actuated step-by-step mechanisms, contacts carried thereby and movable into engagement with each other after a number of actuations to effect the closing of said circuit, and means operable on the opening of the key for effecting the closing of an energized circuit through said electromagnet.

2. In telegraphy, a key, a step-by-step circuit-closing device arranged to bridge the main line around the key, an electromagnet for actuating said device, a relay, and an energized circuit leading through the electromagnet and having contacts of which one is formed by the back stop of the relay.

3. In telegraphy, a key, an automatic circuit-closer for bridging the main line around the key, and including a step-by-step mechanism, an electromagnet for actuating said mechanism, a relay having a contact member forming a back stop and arranged to be engaged by the relay armature-lever when the main line is open, and a circuit extending through such electromagnet, said contacts forming a part of said circuit.

4. In telegraphy, a key, an automatic circuit-closing mechanism including a ratchet-wheel, a contact movable thereby, a pawl for actuating said ratchet-wheel, a balance-wheel, a pawl-carrying lever receiving movement from the balance-wheel, a shaft or arbor carrying said balance-wheel, an arm projecting from said shaft or arbor, an electromagnet, an armature-lever arranged adjacent thereto, and adapted to engage said arm, and means for establishing a circuit through said electromagnet when the sending-key is open.

5. In telegraphy, a key, an automatic circuit-closer including a ratchet-wheel, a contact receiving motion therefrom, a pawl engaging said ratchet-wheel, a spring-returned balance-wheel for transmitting movement to said pawl, a shaft or arbor carrying the balance-wheel, an arm projecting therefrom, an electromagnetically-operated lever for imparting movement to said arm, and means for closing a circuit through said electromagnet when the sending-key is open.

6. In telegraphy, a key, an automatic cir-

cuit-closer including an electromagnet, means for closing a circuit therethrough when the sending-key is open, an armature-carrying lever adjacent to the magnet and
5 having one end bifurcated to form a pair of arms, a pair of balance-wheels having return-springs under different tensions, respectively, means for transmitting movement from the lever-arms to said balance-wheel, and a pair
10 of contacts connected in the main line, and to which differential movement is imparted through said balance-wheels.

7. In telegraphy, a key, an automatic circuit-closer for bridging the main line around
15 the key, and including an electromagnet, means for closing a circuit through said electromagnet when the sending-key is open, an armature-lever adjacent to said electromagnet and having one of its ends bifurcated to
20 form a pair of arms, a pair of balance-wheels having return-springs under different tension, respectively, shafts or arbors carrying said balance-wheels, arms projecting from the shafts and arranged to engage with the
25 bifurcated arms, contacting arms forming part of the electromagnetic circuit, pins carried by the balance-wheels, pivoted levers arranged to be engaged by said pins, pawls carried by the levers, ratchet-wheels engaged
30 by the pawls, and a pair of contacts receiving differential movement from the ratchet-

wheels, said contacts being connected in the main line.

8. In telegraphy, a key, an automatic circuit-closer for bridging the main line around
35 the key, and including an electromagnet, means for closing an energized circuit through said magnet when the key is opened, an armature-carrying lever arranged adjacent to the electromagnet and having one of
40 its ends bifurcated to form a pair of arms, a pair of balance-wheels having return-springs under different tension, respectively, shafts or arbors carrying said balance-wheels, arms projecting from the shafts or arbors and arranged
45 to engage the bifurcated arms of the lever, the contacting arms forming parts of the magnetic circuit, pins carried by the balance-wheels, levers arranged to be engaged by the pins, pawls carried by said levers,
50 ratchet-wheels with which said pawls engage, shafts carrying the ratchet-wheels, disks mounted on said shafts, and main-line circuit-closing pins carried by said disks.

In testimony that I claim the foregoing as
55 my own I have hereto affixed my signature in the presence of two witnesses.

TULLY WILFRED BENSON.

Witnesses:

EMMA TOMLIN BENSON,
ORLANDO FREEMAN McCONNELL.