

E. J. GRENIER.
 COMBINED JACK AND RESTORING TRIP.
 APPLICATION FILED NOV. 9, 1907.

954,624.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

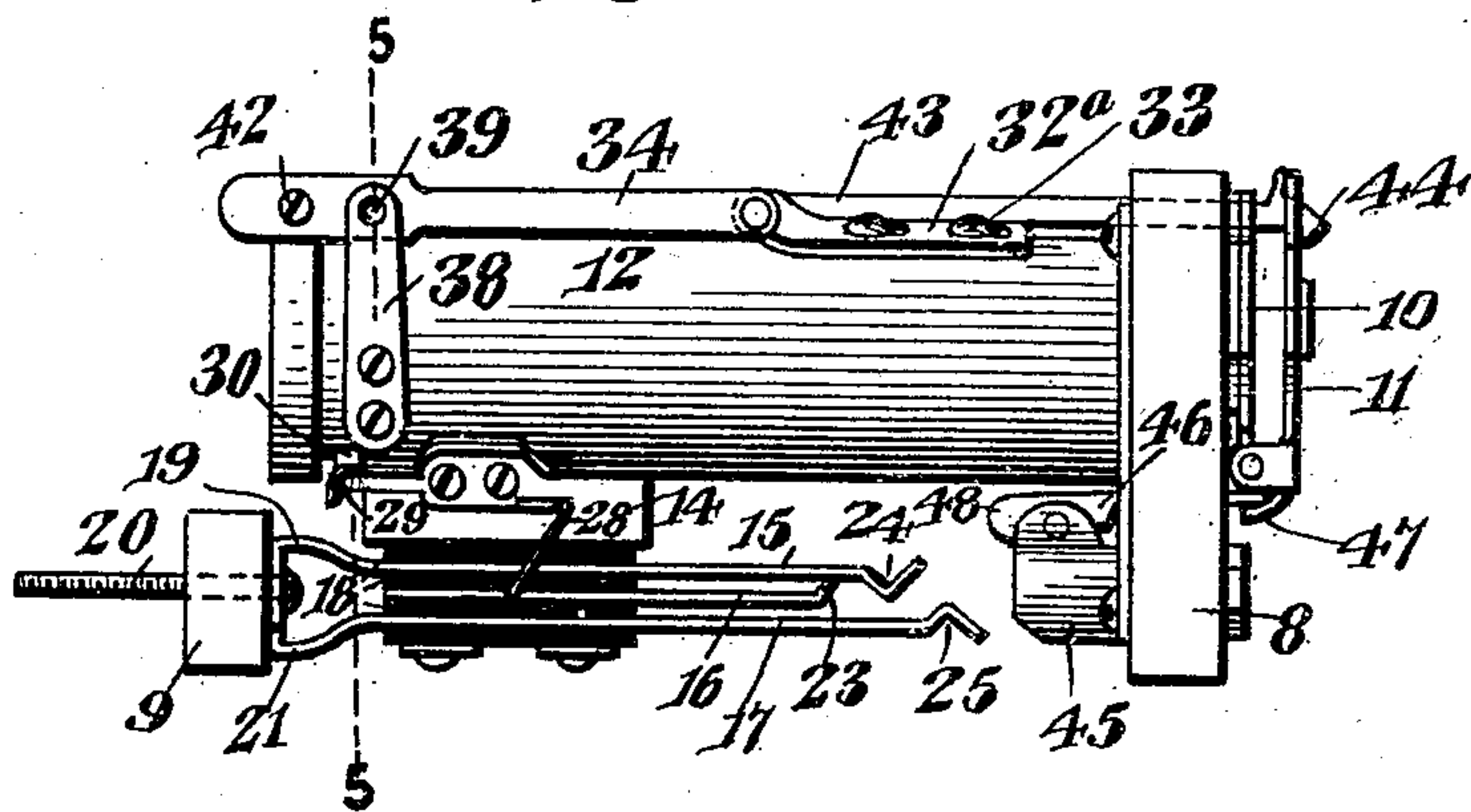


Fig. 2.

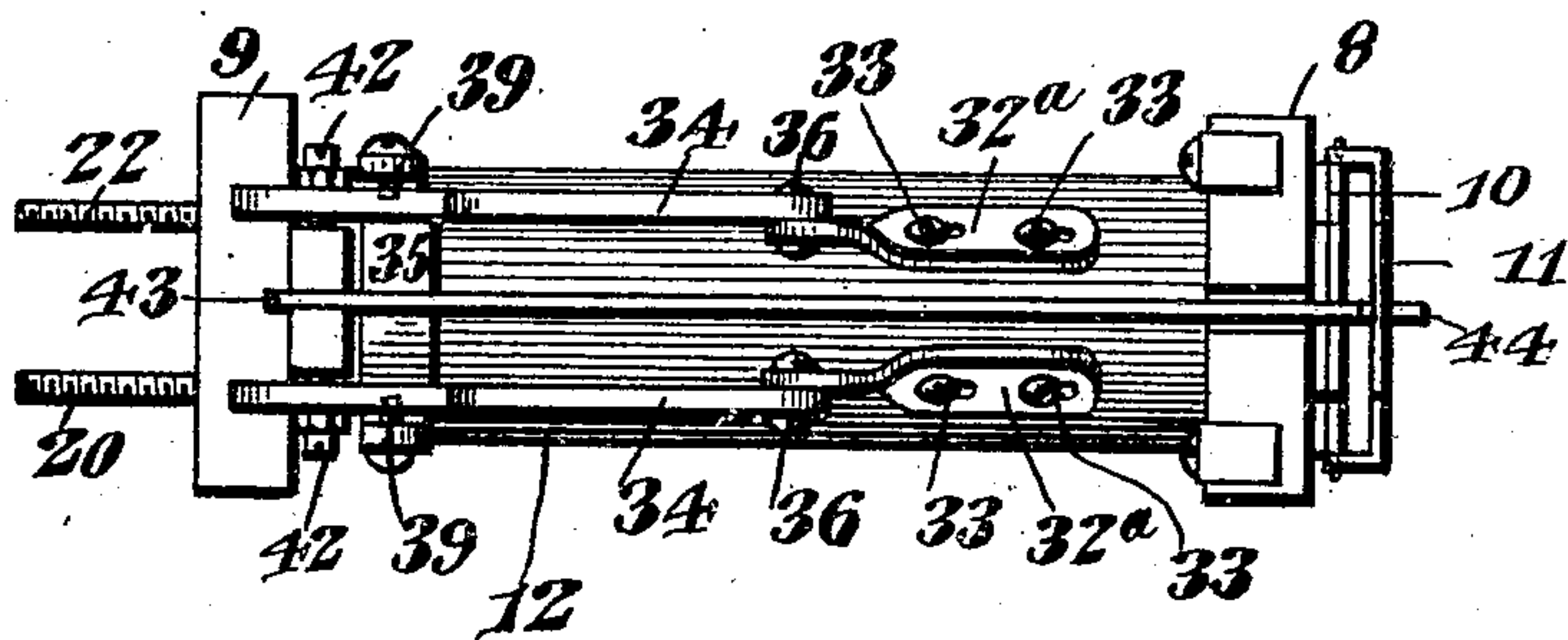


Fig. 6.

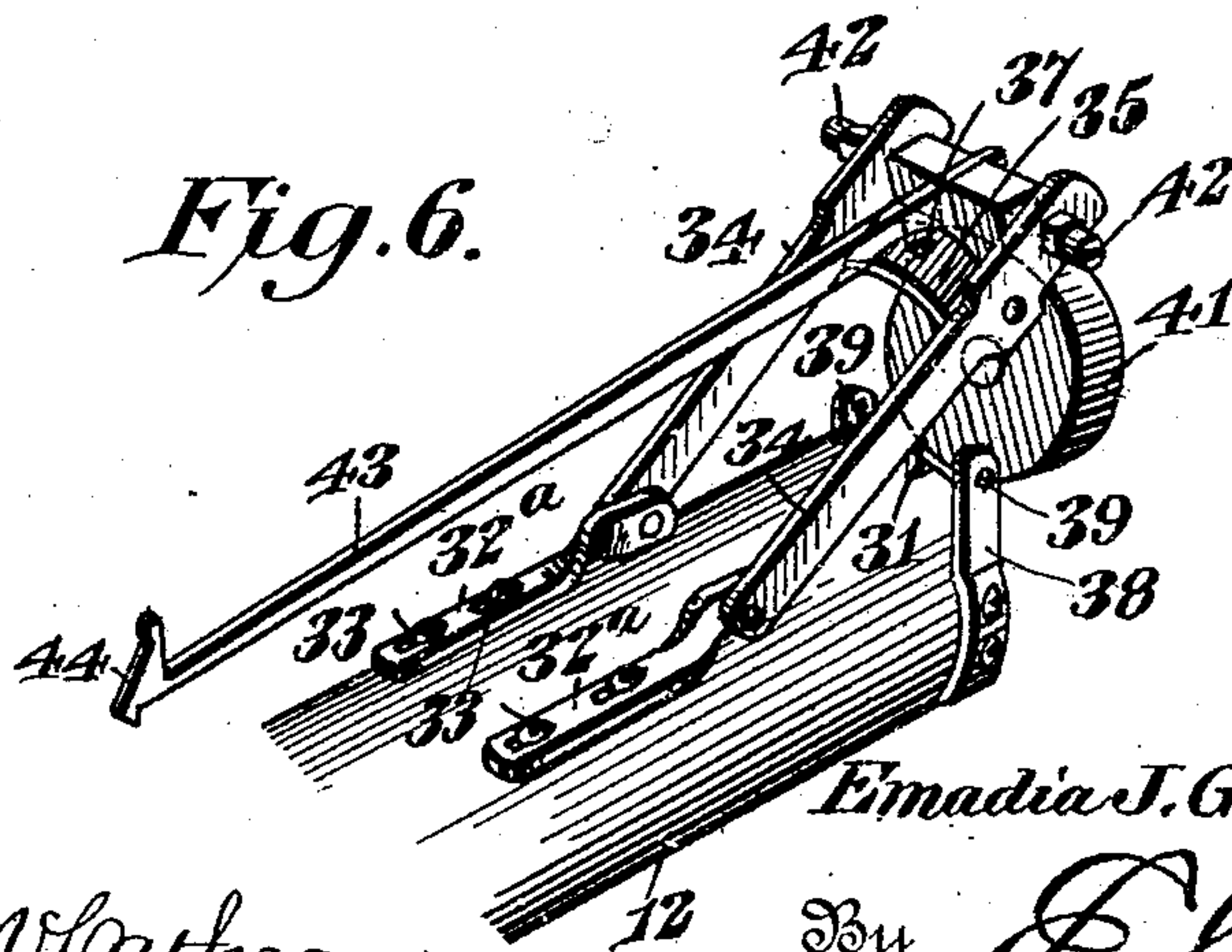
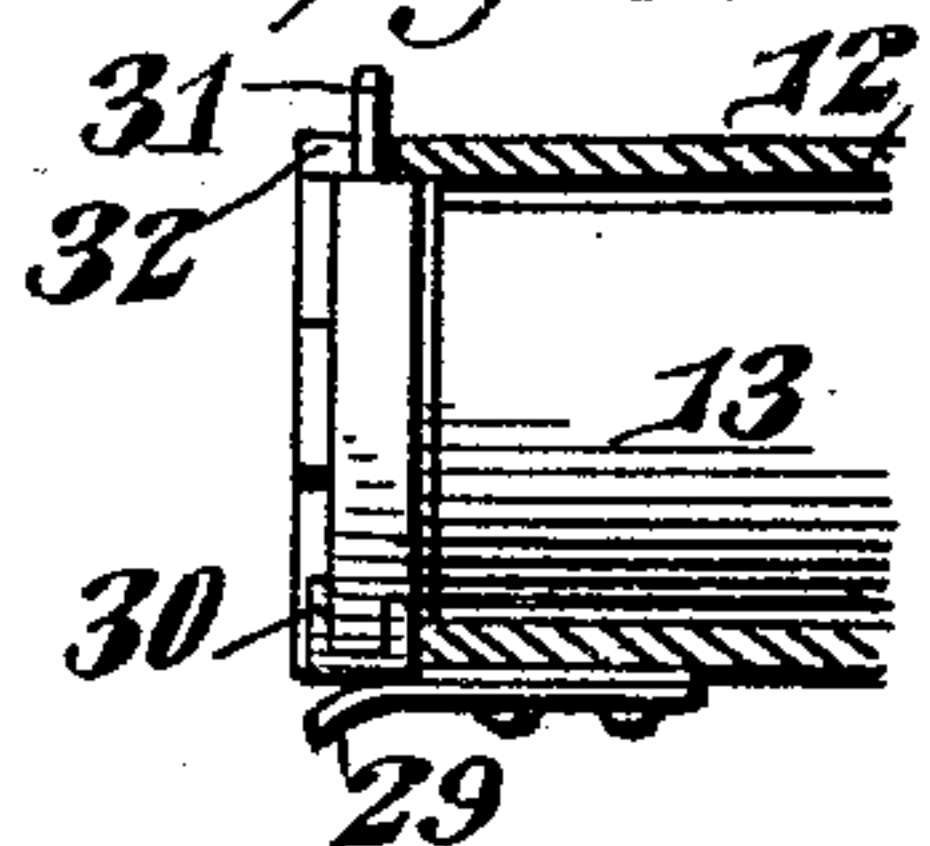


Fig. 7.



Witnesses
 Jas. E. McArthur
[Signature]

Emadia J. Grenier, Inventor

By *[Signature]*

Attorney

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2 SHEETS—SHEET 2.

Fig. 3.

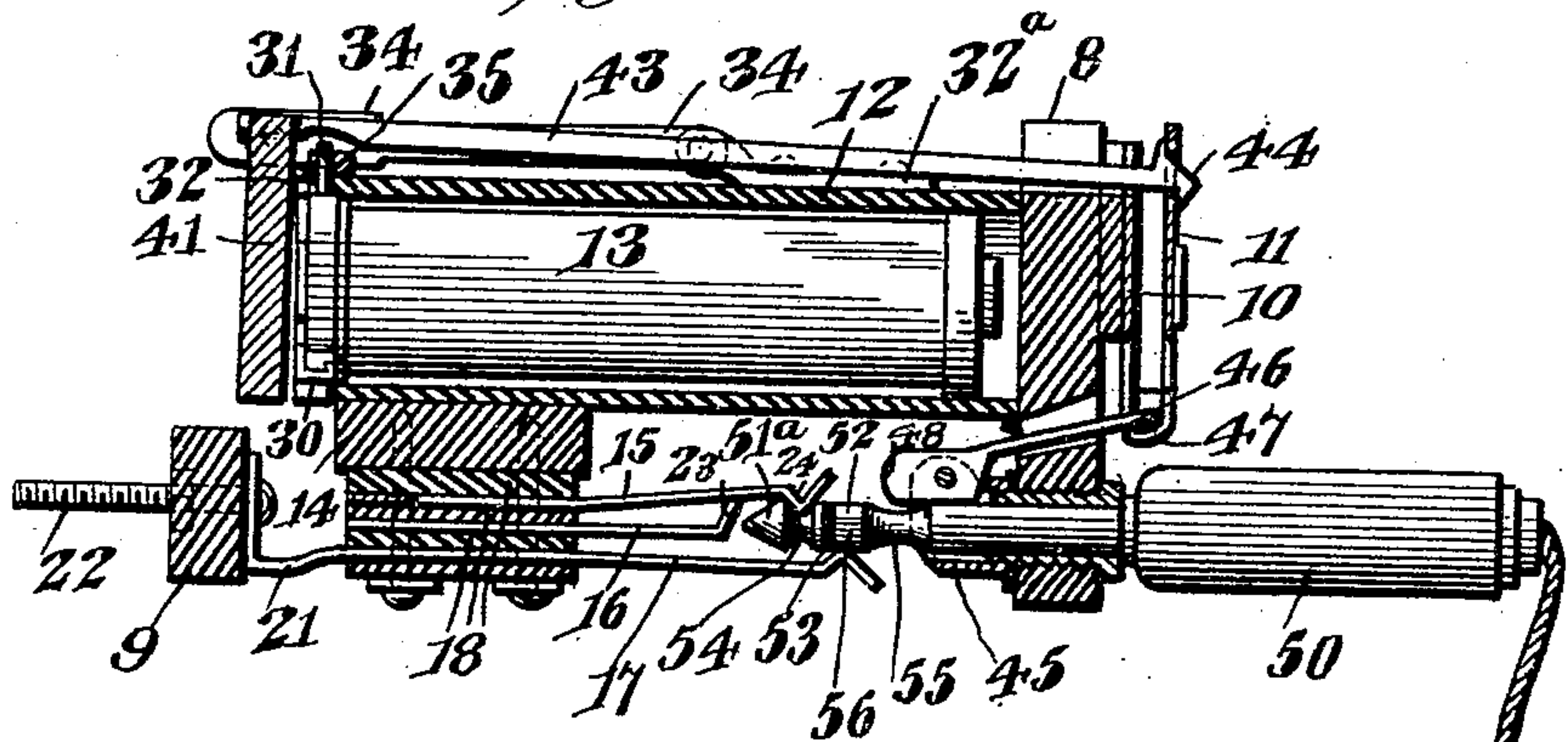


Fig. 4.

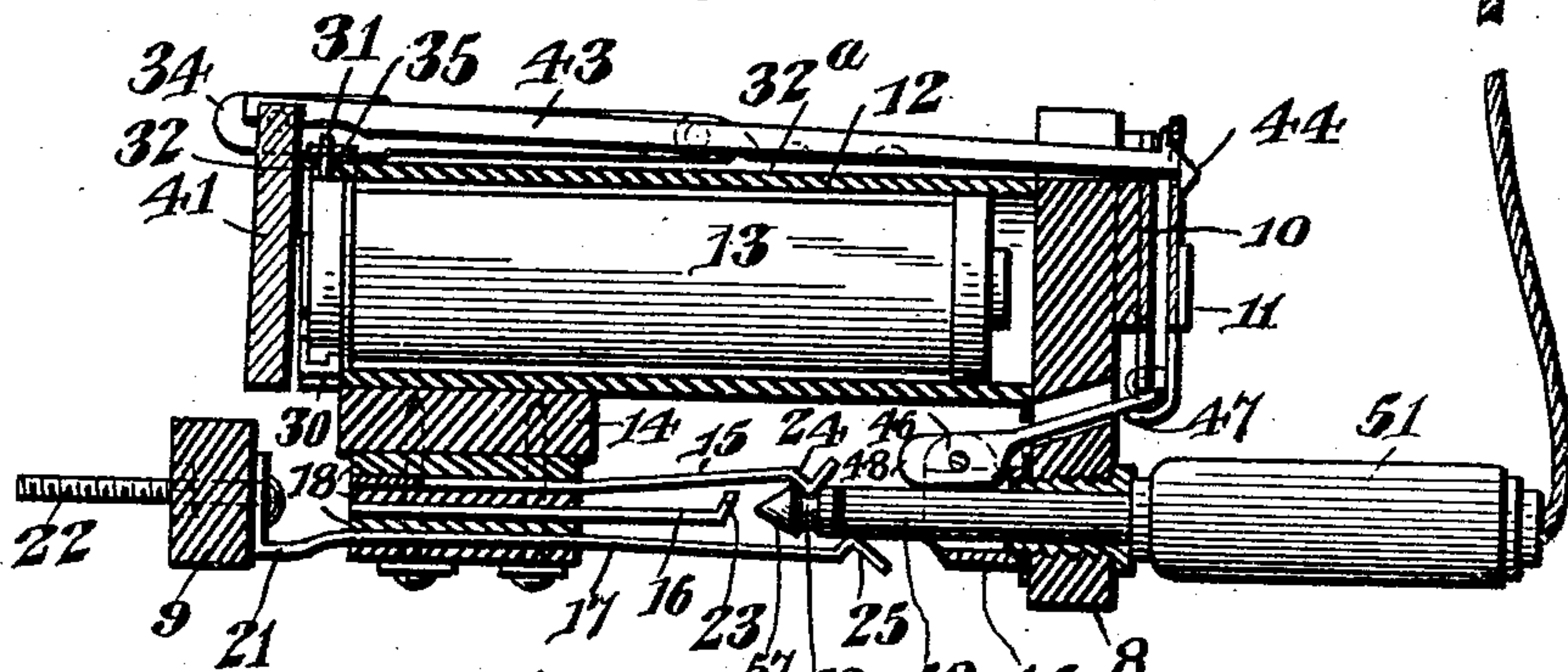
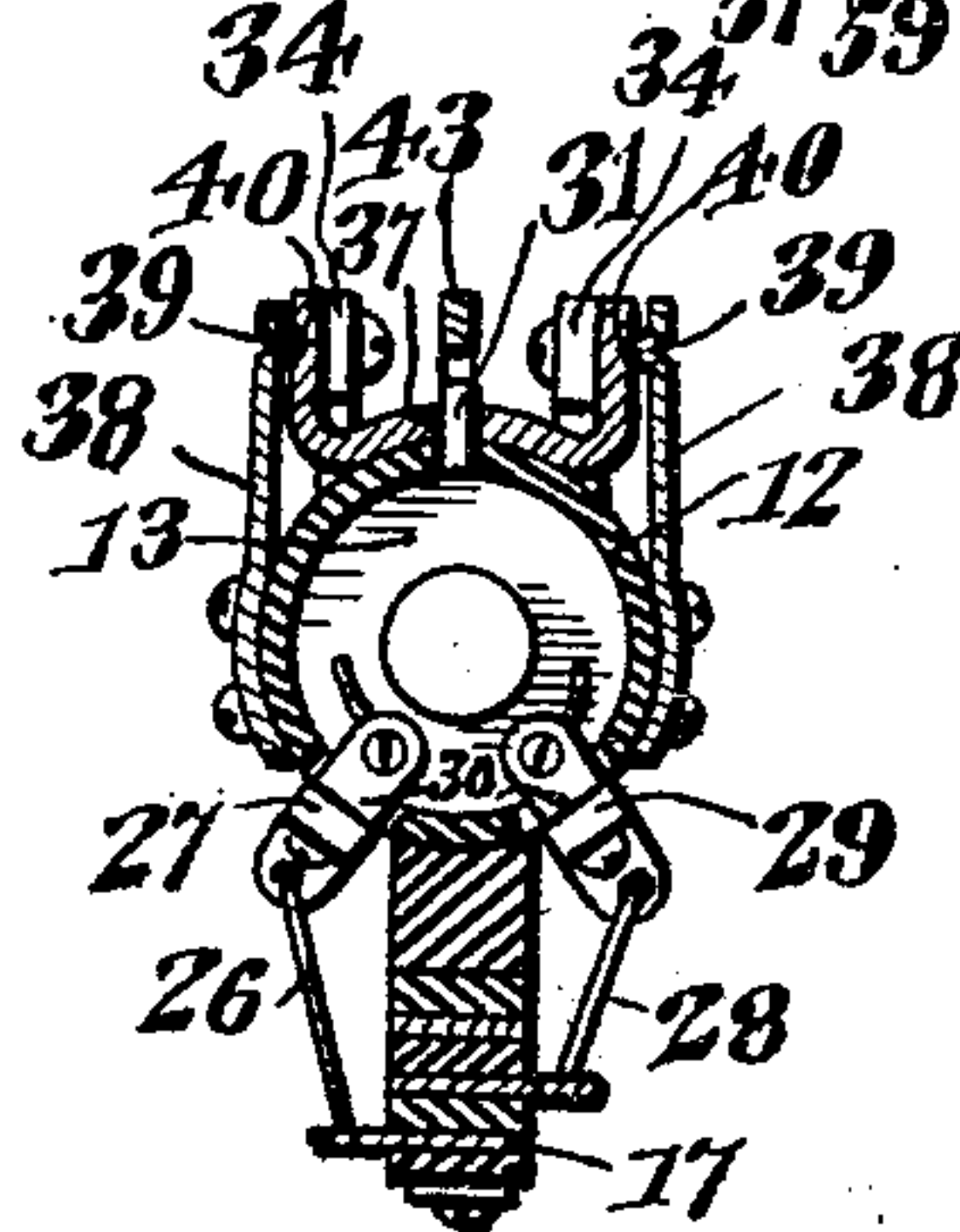


Fig. 5.



Witnesses
Jas. E. McLaughlin
B. L. Fortin

Emad J. Grenier, Inventor

By *E. J. Siggers*
Attorney

UNITED STATES PATENT OFFICE.

EMADIA J. GRENIER, OF MENOMINEE, MICHIGAN.

COMBINED JACK AND RESTORING-TRIP.

954,624.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed November 9, 1907. Serial No. 401,463.

To all whom it may concern:

Be it known that I, EMADIA J. GRENIER, a citizen of the United States, residing at Menominee, in the county of Menominee and State of Michigan, have invented a new and useful Combined Jack and Restoring-Trip, of which the following is a specification.

This invention relates to improvements in combined trips and restoring jacks, and while particularly designed as an improvement in the structure disclosed in a patent granted to me on September 10, 1907, No. 865,379, there are features not necessarily limited to the same, but useful in trips and jacks of other types.

One of the primary objects of the present invention is to provide a novel structure in which the electro-magnet controlling the operation of the shutter or indicator is readily removable and replaceable without the necessity of dismembering the device.

Another and important object of this invention is to provide a novel device in which the drops constitute both line and clearing-out drops.

An embodiment that is at present considered the preferable one is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of one of the combined jacks and drops. Fig. 2 is a top plan view of the same. Fig. 3 is a longitudinal sectional view showing the answering plug in place. Fig. 4 is a similar view showing the calling plug in place. Fig. 5 is a detail sectional view substantially on the line 5—5 of Fig. 1. Fig. 6 is a detail perspective view showing the armature support swung to a position to permit the removal of the electro-magnet. Fig. 7 is a detail sectional view illustrating a pair of the co-operating contact elements.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the structure disclosed, a front supporting block 8 and a rear supporting block 9 are employed. The front supporting block has secured to its front face a signal plate 10, to which is pivoted a shutter 11. Fastened to the rear face of said block is a tubular casing 12 having an open rear end and forming a support and housing for an electro-magnet 13 removably located within said tubular casing.

Fastened to the under side of the casing is

a spring jack comprising a block 14 with a series of springs 15, 16 and 17 fastened thereto and insulated from each other, as illustrated at 18. On the uppermost spring 15 is a rearwardly extending ear 19 connected to a binding post 20 that passes through the rear block 9, while the lowermost spring 17 in like manner has a rearwardly extending ear 21 connected to another binding post 22 that also passes through the rear block. The spring 16 has an upturned terminal 23 normally engaged by the spring 15, the latter projecting beyond said upturned terminal and having a downward projection 24 formed thereon. The spring 17 projects beyond the spring 24, and has an upturned projection 25 on its free end. The lowermost spring 17 furthermore has an electrical connection 26 with a yielding contact element 27 that is secured to the rear end of the casing 12, while the central spring 16 in like manner has an electrical connection 28 with another yielding contact element 29 in like manner secured to the rear end of the casing 12.

The rear end of the removable electro-magnet 13 is as shown in Figs. 5 and 7 provided with contact elements 30 that are connected to the ends of the coil, and detachably engage the contact elements 27 and 29 when the electro-magnet is in place. Consequently it will be observed that the electro-magnet is electrically connected to the jack, but that it may be readily removed from the casing, and when so removed, the contact elements 30 of course disengage from the elements 27 and 29. The electro-magnet furthermore has at its rear end an upstanding pin 31, which engages in a notch or seat 32 formed in the rear end of the casing, said pin positioning the electro-magnet so that the contact elements 30 and 27 and 29 will be in proper coaction. This pin, as clearly illustrated in Figs. 4 and 5 projects above the casing 12.

A pair of spaced ears 32^a are adjustably mounted by screws 33 upon the top of the casing, and a supporting frame comprising spaced arms 34 connected by a cross piece 35, has said arms pivotally connected to the ears 32^a, as shown at 36. The frame normally rests upon the casing, and the cross piece 35 thereof has an opening 37 that receives the projecting end of the pin 31. Thus said frame constitutes a latch for holding the electro-magnet in place. The frame is held against its swinging movement by a pair of

upstanding spring fingers 38 having inset projections or lugs 39 engaging in sockets 40 formed in the outer sides of the arms 34. The frame constitutes a support for a swinging armature 41, pivoted, as shown at 42 to the rear end of the arms 34, and normally hanging across the open end of the casing 12 in coöperative relation to the core of the electro-magnet 13. It will thus be evident that while the parts are securely maintained in coöperative relation, if it becomes desirable or necessary to remove the electro-magnet, it is only necessary to swing the supporting frame upwardly, thus carrying the armature out of the path of movement of the magnet and disengaging said frame from the pin 31. The magnet can thereupon be readily removed and replaced by a new one, after which the frame is swung back to its normal position, and the parts are again in operative relation. The armature 41, as usual in this class of instruments, carries a forwardly extending arm 43, the front end of which is provided with a latch 44 that engages the shutter 11 to hold the same in place. This latch is fully disclosed in the patent to which reference has already been made, and it will be evident that when the electro-magnet is energized, the armature 11 being drawn toward the same, will raise the arm 43, thus releasing the shutter 11, and allowing it to drop.

A plug receiving socket piece 45 is secured in the lower portion of the front block 8, and pivoted to its inner end is a restoring drop in the form of a lever 46 fulcrumed between its ends, the front end of said lever bearing upon an intumed lip 47 formed upon the lower end of the shutter 11. The rear end 48 of the lever is located in the path of movement of a plug introduced into the socket, when the shutter is in its lowermost position.

The means for connecting the different drops and jacks is preferably constructed as follows. The connection includes a suitable cord 49 having terminal plugs 50 and 51. The plug 50 may be designated as the answering plug, and has an inwardly extending stem constructed as usual with the different sections 51^a and 52 insulated, as shown at 53. The inner end 51^a is pointed, and has an annular seat 54. Spaced from this seat is another annular seat 55. Thus there is formed between the seats 54 and 55, an enlarged portion 56. The other plug 51 which may be designated the calling plug, likewise has a stem composed of sections 57 and 58 that are insulated from each other. The inner section 57 has an annular seat 59, while the outer section 58 is of substantially the same diameter throughout its extent.

The operation of the structure is substantially as follows. Assuming the drops in the condition shown in Fig. 1 and connected

to their respective lines, it will be evident that the electro-magnets will be bridged on said lines. Therefore if a call comes in over one of the lines, the electro-magnet will be energized, thus actuating the armature and operating the latch to release the shutter. The operator thereupon introduces the answering plug 50, and it will be noted by reference to Fig. 3 that when so introduced, the inner end of said plug while engaged with the upper spring 15 has not moved said spring out of coaction with the spring 16 so that the electro-magnet will remain bridged to the line. It will also be clear that when the plug is introduced, the enlarged portion 52 of the stem will engage the inner end 48 of the lever and swing the shutter to its original position. When the plug is in place, the annular seat 55 is alined with the inner end 48 of the lever and therefore if the shutter is again released, it can drop. Upon learning the number of the party desired, the operator introduces the calling plug 51 into the proper drop, and calls the party. The calling plug 51, as illustrated in Fig. 4, separates the springs 15 and 16, thus cutting out the electro-magnet of the called subscriber, while the lever 46 is locked against movement so that the shutter 11 cannot drop. At the close of the conversation, the parties ordinarily move their respective generators sufficiently to produce a current in the line, and as the electro-magnet of the calling subscriber is still bridged to the line, it will be energized so that the shutter will drop, the restoring trip being free as already explained. The operator on seeing the signal thus displayed, withdraws the plugs and upon the withdrawal of the plug 50, the enlarged portion 52 thereof striking the inner end of the lever will cause the shutter to be again restored ready for another call. It will thus be seen that the combination is such that the drops constitute both line and clearing out drops, this combination moreover being effected without any change in structure of the drops themselves.

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In mechanism of the character set forth, the combination with a support, of an electro-magnet detachably mounted on the support, an armature coöperating with the mag-

net and disposed in its path of detaching movement and normally preventing its detachment, a movable support for the armature preventing the armature itself from moving away from the path of movement of the magnet, said support when moved carrying the armature out of said path of movement of the magnet to permit the removal of said magnet from its support, and signal controlling means actuated by the armature.

2. In mechanism of the character set forth, the combination with a support, of an electro-magnet mounted on the support, another support movably mounted on the first support, an armature movably mounted on the second support and cooperating with the magnet, said second support when moved carrying the armature out of cooperation with the magnet to permit the removal of said magnet from its support, and signal controlling means actuated by the armature.

3. In mechanism of the character set forth, the combination with a casing, of an electro-magnet removably mounted in the casing, a support movably mounted on the casing, an armature for the magnet movably mounted on the support and being carried thereby out of the path of movement of the magnet when the support is moved, and signal controlling means actuated by the armature.

4. In mechanism of the character set forth, the combination with a tubular casing having an open portion, of an electro-magnet detachably mounted in the casing and removable through the open portion, a support pivotally mounted on the casing, an armature for the magnet mounted on the support and normally disposed across the open portion to prevent the withdrawal of the magnet through the open portion but removable therefrom on the movement of the support to permit the magnet to be withdrawn, and signal controlling means actuated by the armature.

5. In mechanism of the character set forth, the combination with a tubular casing having an open end, of a support comprising arms pivotally mounted on the casing, a shutter, an armature pivotally mounted on the arms and cooperating with the magnet, said armature extending across the open end of the casing, and a latch for the shutter connected to the armature.

6. In mechanism of the character set forth, the combination with an electro-magnet, of a pivotally mounted support, an armature pivoted on the support, means for locking the support with the armature in coacting relation with the magnet, and signal controlling means actuated by the armature.

7. In mechanism of the character set forth, the combination with a tubular casing, of an electro-magnet, detachably mounted

ed therein, a support comprising arms pivoted on the casing, an armature pivoted on the arms and coacting with the electro-magnet, spring fingers secured to the casing and detachably engaging the support to maintain said support against its pivotal movement, and signal controlling means actuated by the armature.

8. In mechanism of the character set forth, the combination with a tubular casing having an open end, of an electro-magnet entirely inclosed within the casing, and removable through the open end, contact terminals carried by the outer end of the magnet, outwardly yielding contact terminals mounted on and projecting beyond the open end of the casing and detachably engaging the terminals of the magnet but permitting the withdrawal of the said magnet from the casing through its open end, and signal controlling means actuated by the electro-magnet.

9. In mechanism of the character set forth, the combination with a tubular casing having an open end, of an electro-magnet detachably located in the casing and removable through its open end, an armature normally located across the open end, coacting with the magnet located therein and normally preventing the withdrawal of said magnet through the open end, means for supporting the armature across the open end but permitting its movement entirely away from the open end to permit the removal of the electro-magnet, and signal controlling means actuated by the armature.

10. The combination with a casing, of an electro-magnet removably mounted therein, a device movably mounted on the casing and detachably engaging the magnet to hold the same in place, and a signal-controlling means actuated by the electro-magnet and carried by the said device.

11. The combination with a casing, of an electro-magnet removably mounted therein, a latch pivoted on the casing and detachably engaging the electro-magnet for holding the same in place, and a signal-controlling means actuated by the electro-magnet and carried solely by the latch.

12. In mechanism of the character set forth, the combination with a casing, of an electro-magnet detachably located therein, an armature cooperating with the magnet, a movable support for the armature constituting means for holding the magnet in place, and signal controlling means actuated by the armature.

13. In mechanism of the character set forth, the combination with a casing, of an electro-magnet detachably located in the casing, an armature cooperating with the magnet, a swinging support for the armature pivoted on the casing and constituting a latch that detachably engages the magnet

to hold it in the casing, and signal controlling means actuated by the armature.

14. In mechanism of the character set forth, the combination with a tubular casing having an open rear end, of a removable electro-magnet located in the casing, said magnet having spaced terminals on its rear end, and an upstanding pin, terminals carried by the casing and detachably engaged by the terminals of the magnet, a swinging support pivoted on the casing and detachably engaging with the pin of the magnet, an armature pivoted on the swinging support and normally disposed across the open end of the casing, said armature cooperating with the electro-magnet, means for holding the support against its swinging movement, a shutter, and a latch for the shutter connected to the armature.

15. In mechanism of the character set forth, the combination with a support, of an electro-magnet removably mounted on the support, a shutter, holding means for the shutter actuated by the electro-magnet, and an outwardly swinging support on which the holding means is movably mounted, said support when swung in one direction carrying said holding means out of cooperation with the magnet to permit the removal of said magnet from its support.

16. In mechanism of the character set forth, the combination with a tubular casing having an open end, of an electro-magnet located in the casing and removable through said open end, a shutter, holding means for the shutter actuated by the electro-magnet and extending across the open end of the casing, and a movable support on which the holding means is pivoted, said support when moved carrying the holding means away from the open end of the casing to permit the removal of the magnet there-through.

17. The combination of a support, an

electro-magnet removably mounted thereon and including an armature, a latch device supporting the armature and mounted to be held by its weight combined with that of the armature in locking relation to the electro-magnet, and a signal-controlling means operated by the electro-magnet.

18. The combination of a support, an electro-magnet removably mounted thereon, a movable latch device disposed over the electro-magnet and held by its own weight in locking relation to the electro-magnet, an armature pivoted on and bodily movable with the latch device, and a signal-controlling means carried by the device and connected with the armature to be operated by the electro-magnet.

19. The combination of a support, an electro-magnet removably mounted thereon, an upwardly-extending pin on the electro-magnet, a latch pivotally mounted on the support and held by its own weight in engagement with the pin to retain the electro-magnet in place, an armature on the latch and a signal-controlling means connected with the armature and operated by the electro-magnet, said latch forming means for securing the armature and controlling means to the support.

20. The combination of a support, a removable electro-magnet thereon, a latch device movably mounted on the support, means on the electro-magnet with which the latch device engages, and a signal-controlling means actuated by the electro-magnet and mounted solely on the latch device.

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

EMADIA J. GRENIER.

Witnesses:

ROBERT H. TAYLOR,
WM. VAN DEN BERG.