J. L. HELLER.

APPARATUS FOR FILLING DRY BATTERIES.

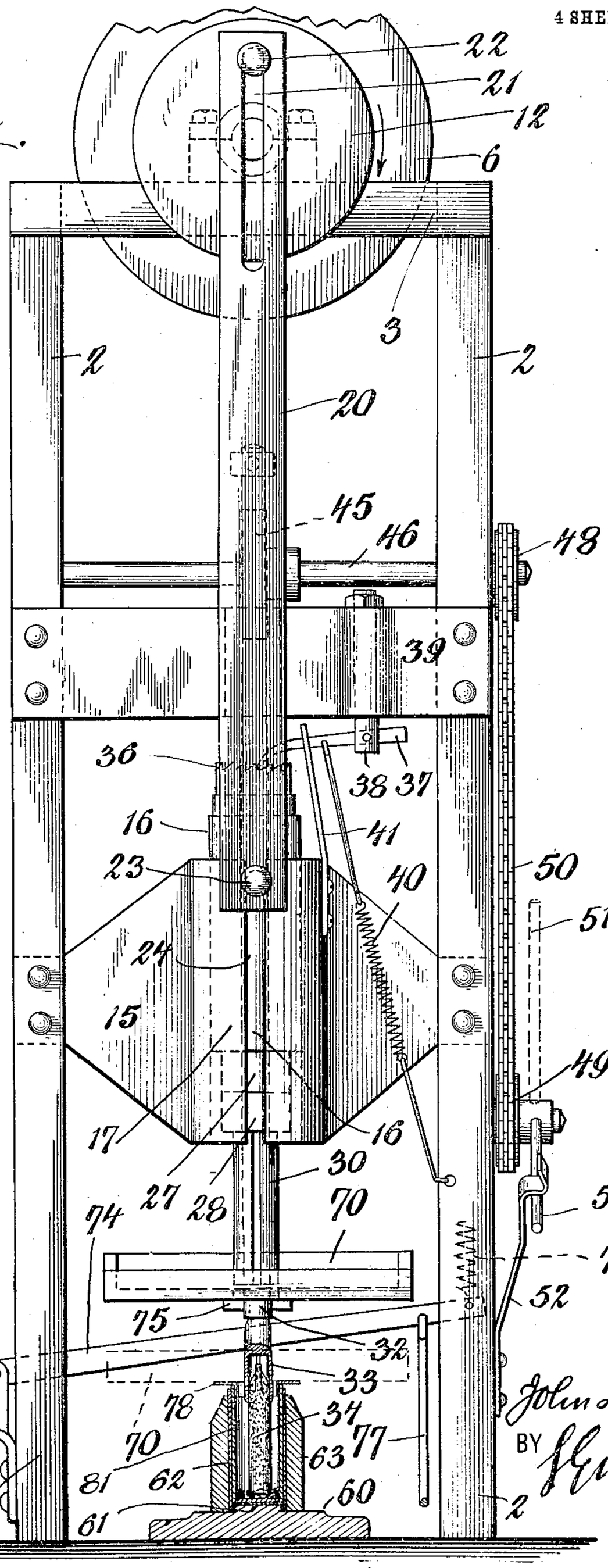
APPLICATION FILED AUG. 5, 1908.

958,394.

Patented May 17, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



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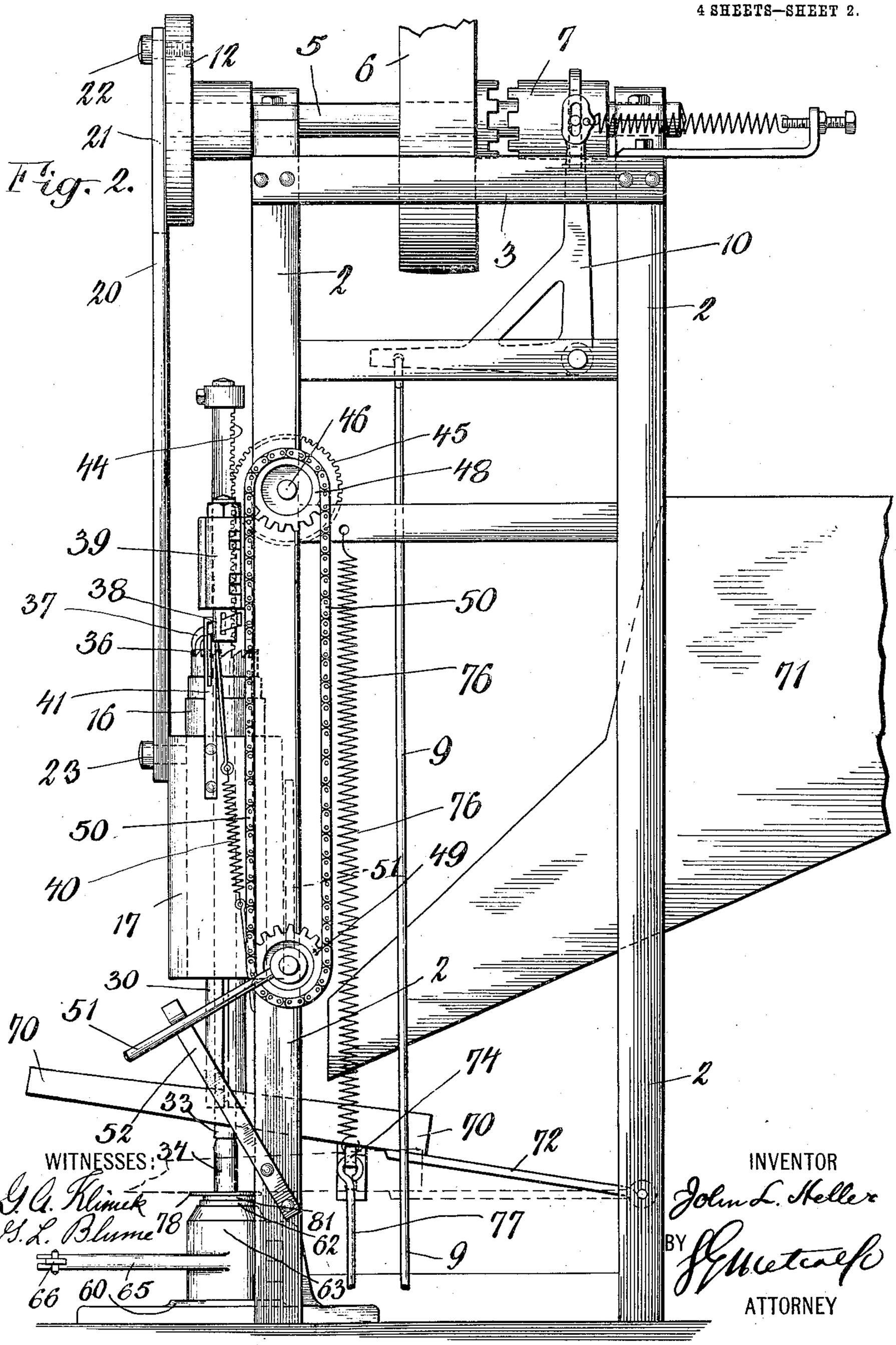
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

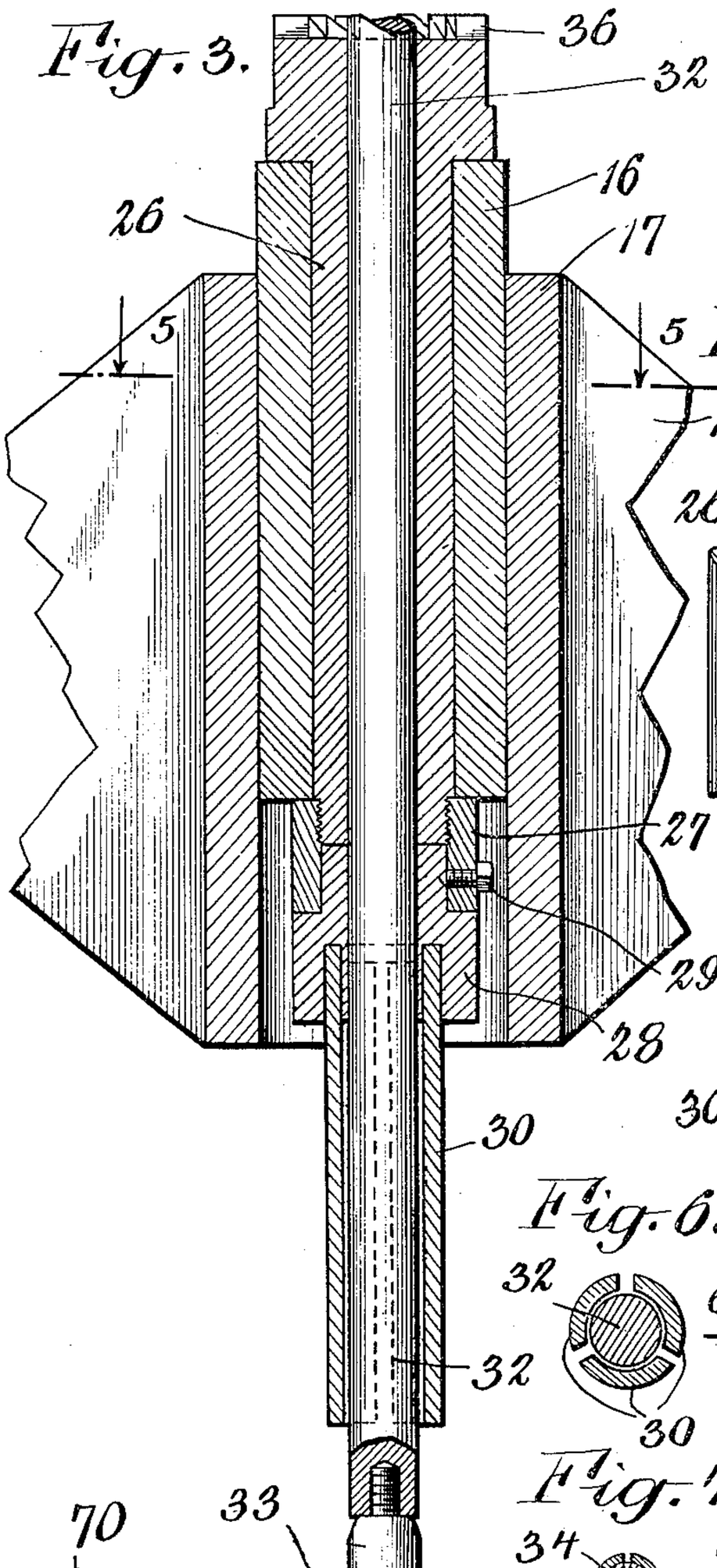


Fig. 5.

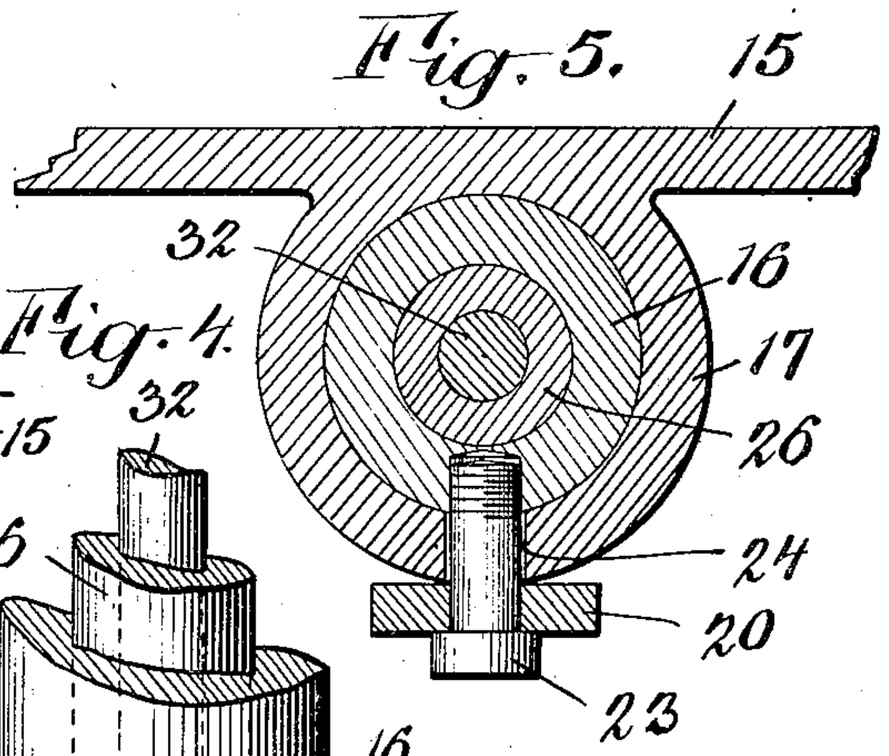


Fig. 4.

Fig. 8.

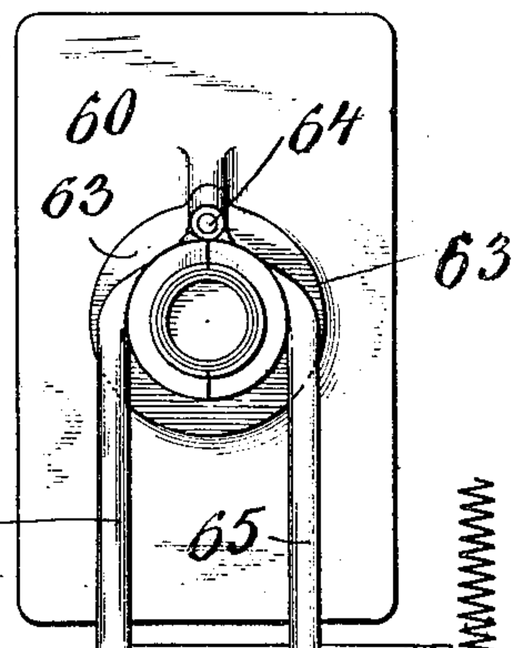
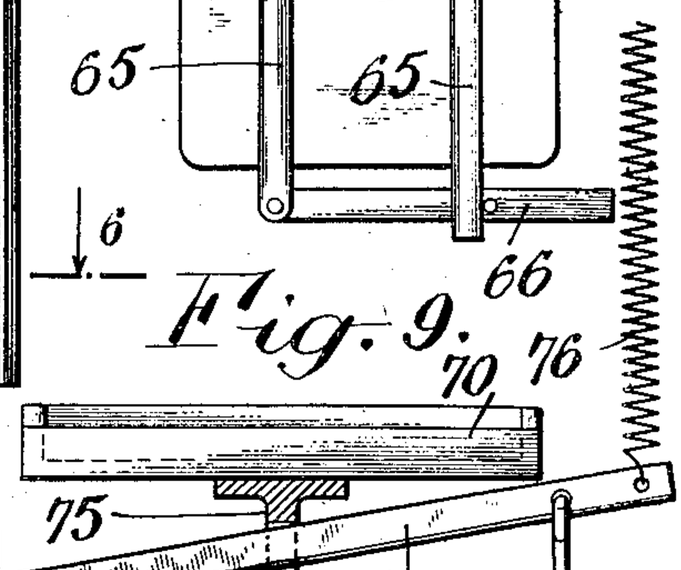


Fig. 9.



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4 SHEETS—SHEET 4.

Fig. 10.

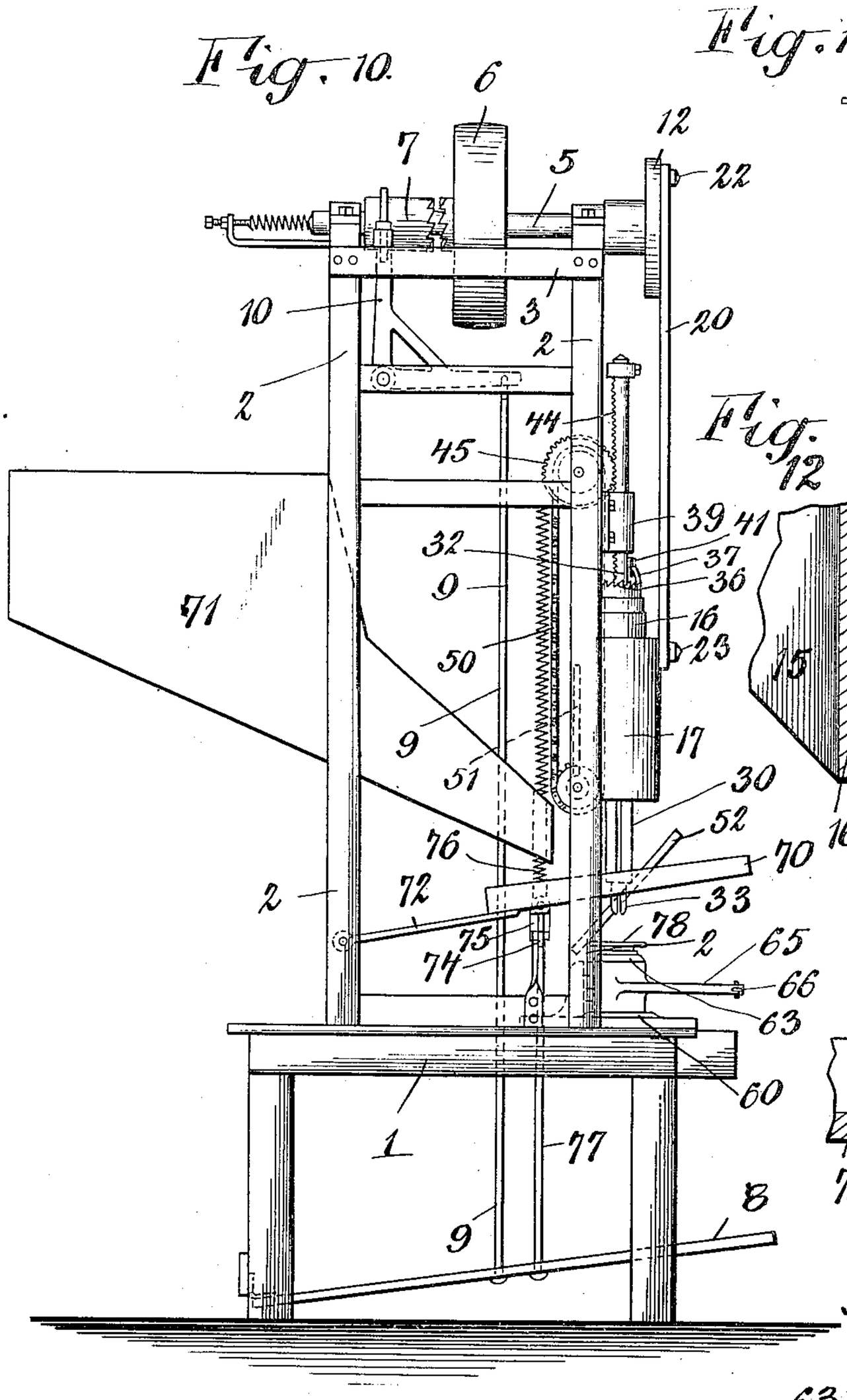


Fig. 11.

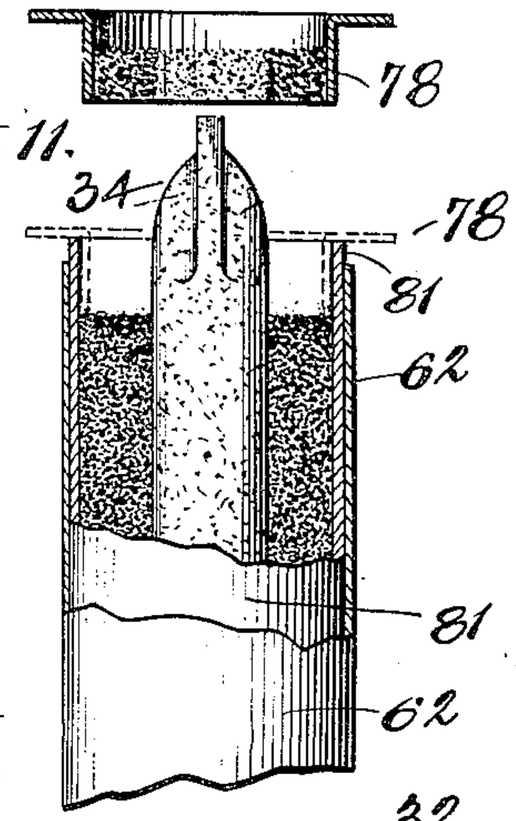
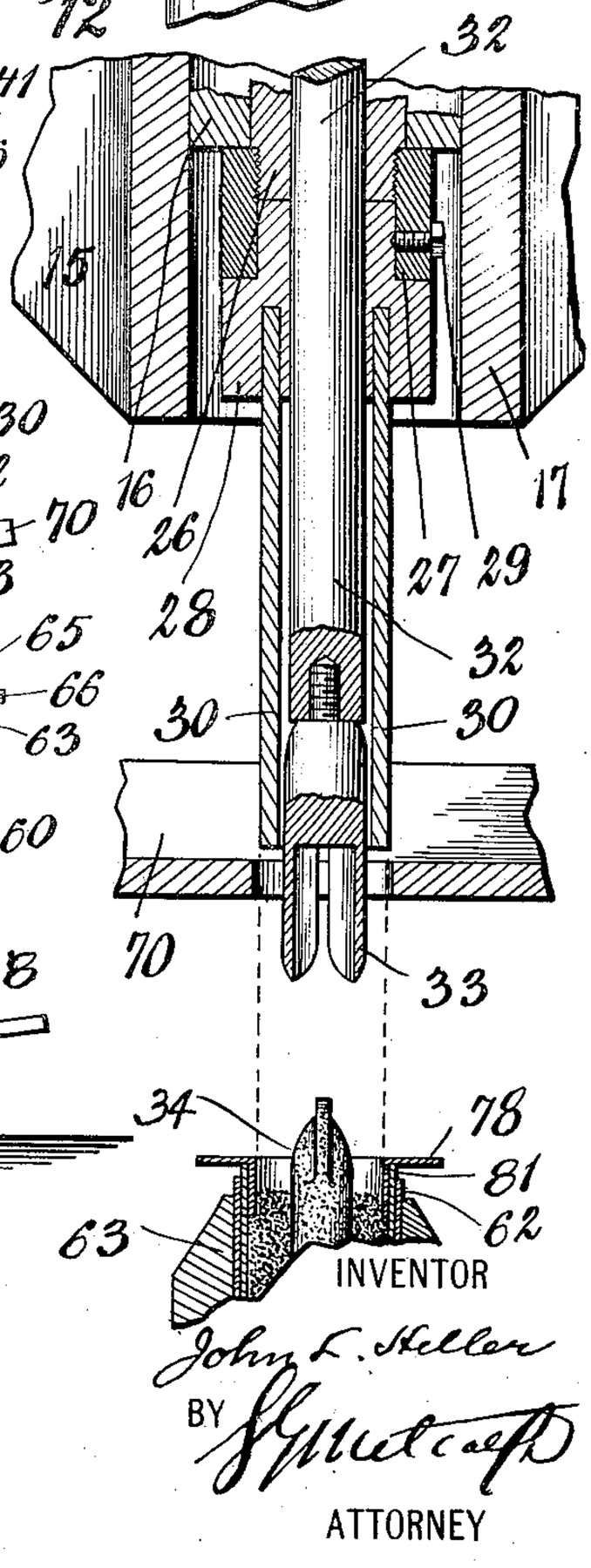


Fig. 12.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FILLING DRY BATTERIES.

958,394. Specification of Letters Patent. Patented May 17, 1910.

Application filed August 5, 1908. Serial No. 447,058.

To all whom it may concern:

Be it known that I, JOHN L. HELLER, a citizen of the United States, and a resident of Ravenna, Portage county, Ohio, have invented certain new and useful Improvements in Apparatus for Filling Dry Batteries, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is the provision of a power-driven apparatus or machine by which the cups of dry batteries may be expeditiously and properly filled with the exciting and depolarizing material employed in such batteries and by which the carbon electrode, which is surrounded by such material, may be inserted and held in place during the operation.

The invention is illustrated in the accompanying drawings which illustrate a preferred form of apparatus embodying the invention, and the novel features of the invention are hereinafter described and specifically pointed out in the claims.

In the drawings, Figure 1 is a front elevation of the apparatus; Fig. 2 is a side elevation thereof; Fig. 3 is a vertical section, on a larger scale, of a portion of the apparatus; Fig. 4 is an elevation of some of the parts shown in Fig. 3; Fig. 5 is a horizontal section on the line 5—5, (Fig. 3); Fig. 6 is a horizontal section on the line 6—6, (Fig. 4); Fig. 7 is a horizontal section on the line 7—7, (Fig. 4); Fig. 8 is a plan of the battery holder; Fig. 9 is a detail of the movable tray for the filling material; Fig. 10, is a side elevation of the complete machine; Fig. 11 is a view partly in section showing a portion of battery and the removable collar used in filling the same and Fig. 12 is a sectional elevation, showing the carbon-centering and holding means in a raised position.

Similar reference characters are employed to designate like parts in all the views.

The apparatus comprises a bench or table 1, (Fig. 10), of the proper height for the convenient operation of the apparatus. From the bench 1 rise uprights 2 connected by cross-pieces 3 to form a rectangular supporting frame for the moving parts of the apparatus.

A shaft 5 is journaled in suitable bearings at the top of the frame, and upon the shaft is loosely mounted a driving pulley 6. A clutch sleeve 7 is splined to the shaft 5. Clutch teeth on the sleeve 7, by means of suitable connections such as a treadle 8, rod 9 and bell crank lever 10, may be thrown into engagement with clutch teeth on the pulley, thus locking the shaft to the pulley to rotate therewith. The pulley 6 is driven by means of a belt, (not shown), from any suitable source of power. A crank or disk 12 is secured to the shaft 5.

A bearing plate 15 is secured to the front uprights of the machine and a tubular plunger 16 is arranged to reciprocate in a bearing 17 formed in the plate 15.

The plunger 16 is connected with the crank disk 12 by a connecting bar 20. The upper end of the connecting bar is provided with a slot 21 which fits over a stud 22 carried by the disk 12, and at its lower end the connecting bar 20 is connected with the plunger 16 by a stud 23 which projects through a slot 24 formed in the bearing 17. A sleeve 26 is rotatably mounted in the plunger 16. The upper end of the sleeve 26 is provided with a bearing which rests on the top of the plunger 16, and to the lower end of the sleeve is secured a collar 27 which bears against the bottom of the plunger. Thus the reciprocating movement of the plunger will be imparted to the sleeve 26 which, however, will be free to turn in the plunger. A removable head 28 is secured in the sleeve 27 by a set-screw 29. In the head 28 are secured tamping bars 30 surrounding a shaft 32 which passes through the sleeve 26 and carries at its lower end spring fingers 33 for holding the carbon electrode 34 of the battery.

The upper end of the sleeve 26 is provided with a ratchet 36, and a pawl 37 is pivoted to a stud 38 carried by a cross bar 39 of the machine. A spring 40 tends to restrain the upward movement of the pawl which works in a slotted guide 41.

The shaft 32 is, at its upper end, provided with a rack 44 which meshes with a pinion 45 on a shaft 46. A sprocket-wheel 48 is secured to the shaft 46 and is operatively connected to a sprocket 49 by a chain 50. The sprocket 49 is provided with a lever 51 which is engaged by a spring-arm 52 to lock the lever in position.

Upon the table 1, is mounted a battery holder, comprising a base 60, having a centering boss 61, upon which the battery cup or shell 62 rests, and clamp sections 63, which are pivoted at 64 to the base, and inclose the battery cup. Each clamp section 63, is provided with an arm 65, and to one of said arms is pivoted a latch 66 which engages with the arm of the other section to lock the sections, when closed, around the battery cup.

A tray 70, for receiving the filling material for the batteries from a hopper 71, is carried by arms 72 which are pivoted to the rear uprights 2 of the machine. The tray 70 is supported by a lever 74 which is pivoted at one side of the machine and passes loosely through a lug 75 on the under side of the tray, and a spring 76 tends to hold the tray 70 and the lever 74, in an elevated position. The lever 74 is connected with the treadle 8 by a rod 77. Thus, when the treadle 8 is depressed, the tray 70 will be brought down into contact with a flanged collar 78, which guides the filling material into the battery and also serves as a gage to determine the height of the material in the battery as will be presently described.

The operation of this preferred form of apparatus embodying my invention is as follows: The parts of the apparatus, being in the position shown in Fig. 10, a carbon electrode 34 is inserted between the spring fingers 33, as shown in Fig. 4. The battery cup 62, in which has been inserted a non-conducting lining 81 and the collar 78, is then filled to the height of about one inch with the filling material, and the cup is placed in position on the base 60 of the battery holder and the clamping sections 63 are closed around it and locked by the latch 66. The carbon is then lowered into the battery cup by depressing the handle 58, which then is locked in position by the lever 52 as shown in Fig. 1. The operator then depresses the treadle 8, which throws the clutch 7 into gear with the driving pulley and bring the tray 70 down so that it rests on the top of the collar 78. The throwing in of the clutch starts the rotation of the crank disk 12, whereby a reciprocatory movement is imparted to the plunger 16 and tamping bars 30, causing the latter to enter the battery cup on their downward stroke at each revolution and pack the filling material firmly between the lining of the cup and the carbon. On the downward stroke of the plunger, the tooth of the pawl 37 will descend with it, (under the action of spring 40), and will gain one or more teeth on the ratchet 36, and on the upward stroke of the plunger, the ratchet, moving therewith, will be rotated by the pawl so as to rotate the tamping bars correspondingly. As the tamping bars 30 rise above the tray 70 on each upward stroke, the operator feeds a proper amount of filling material into the cup through the opening in the bottom of the tray.

Since, during the filling operation, the height of the material in the cup increases, it is essential that the downward stroke of the rotating tamping bars should vary accordingly, and I accomplish that result automatically without interrupting the continuous operation of the apparatus by the slotted connection of the connecting bar 20 with the crank disk 12; so that when the downward movement of the tamping bars and their connected parts is arrested, by engagement with the material in the battery cup, before the stud 22 reaches its lowest position, the stud, working in the slot 21, will permit the continued movement of the cam disk on the down stroke and on the up stroke until the stud, moving up in the slot, engages the top thereof, and lifts the tamping bars and their connected parts to the upper limit of their movement. It is of course to be understood that in carrying out my invention, other equivalent mechanism may be employed in place of the cam disk and slotted connecting bar, to effect what I term, for brevity of description, a variable connection between the tamping bars and the driving mechanism, so that when the tamping bars are arrested in their downward movement as described, the movement of the driving mechanism will not be interrupted. The filling operation is continued as described, until the material reaches the proper height in the cup, when the operator releases the treadle 8 which throws out the driving clutch, stopping the machine, and permitting the tray 70 to ascend. The shaft 32 is then lifted by operating the handle 51, which frees the carbon from the engagement of the spring fingers 33, and the clamping sections 63 are then opened, the battery is removed, another cup put in place, and the operation repeated. After removal from the machine the lining 81, which is flexible, is turned inwardly over the top of the filling material, the binding posts are attached, and the battery sealed.

In order to furnish sufficient space for the turned over end of the lining 81, and for the hermetic seal, the cups must not be entirely filled with the filling material; and it is important that the space left at the top of the cups should be substantially uniform. For the purpose of securing such uniformity, without the necessity of examining each battery separately to determine whether it has been filled to the proper height, I have provided means for securing a uniform height of the material in each cup. This result is obtained by the employment of the collar 78. When this is inserted in the cup it rests on the top of the lining 81, which extends a predetermined distance above the

top of the cup 62, and the bottom of the collar marks the proper height for the filling material. In the operation of filling the batteries, all that is required of the operator is to be certain that the filling is continued until it extends above the bottom of the collar. When a battery, thus filled, has been removed from the machine, the moist material is packed firmly against the walls of the collar, and by giving the collar a slight twisting movement in removing it, the material therein is separated from that below it in the cup, on an even line at a uniform distance below the top of the cup, and the material which is removed with the collar, is removed therefrom and returned to the tray 70.

I claim:

1. In a battery filling machine, the combination with a fixed battery support, vertically reciprocating tamping bars, rotating operating means therefor, and a connection between the latter and the tamping bars which permits the downward movement of the tamping bars to be arrested at intermediate points while the rotating movement of the operating means is continued, and mechanism for imparting an intermittent rotatory movement to the tamping bars.

2. In a battery filling machine, the combination of a fixed battery support, reciprocating tamping bars, operating means therefor comprising a rotating member and a connecting bar, and a slotted connection between the rotating member and the connecting bar.

3. In a battery filling machine, a removable collar adapted to fit within the battery cup to determine the height of the filling material therein and means carried by the collar for supporting said collar in position.

4. In a battery filling machine, a removable collar adapted to fit within the cup, to determine the height of the filling material therein, said collar being provided with a flange which projects outwardly beyond the top of the cup.

5. In a battery filling machine, the combination of a reciprocating plunger carrying tamping fingers, a shaft extending through the plunger and provided with carbon engaging devices at its lower end and means for raising and lowering said shaft independently of the plunger.

6. In a battery filling machine, the combination of releasable driving connections, a movable tray for holding the filling material and a device, common to the driving connection and tray, for starting the machine and moving the tray into operative position.

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