

No. 765,386.

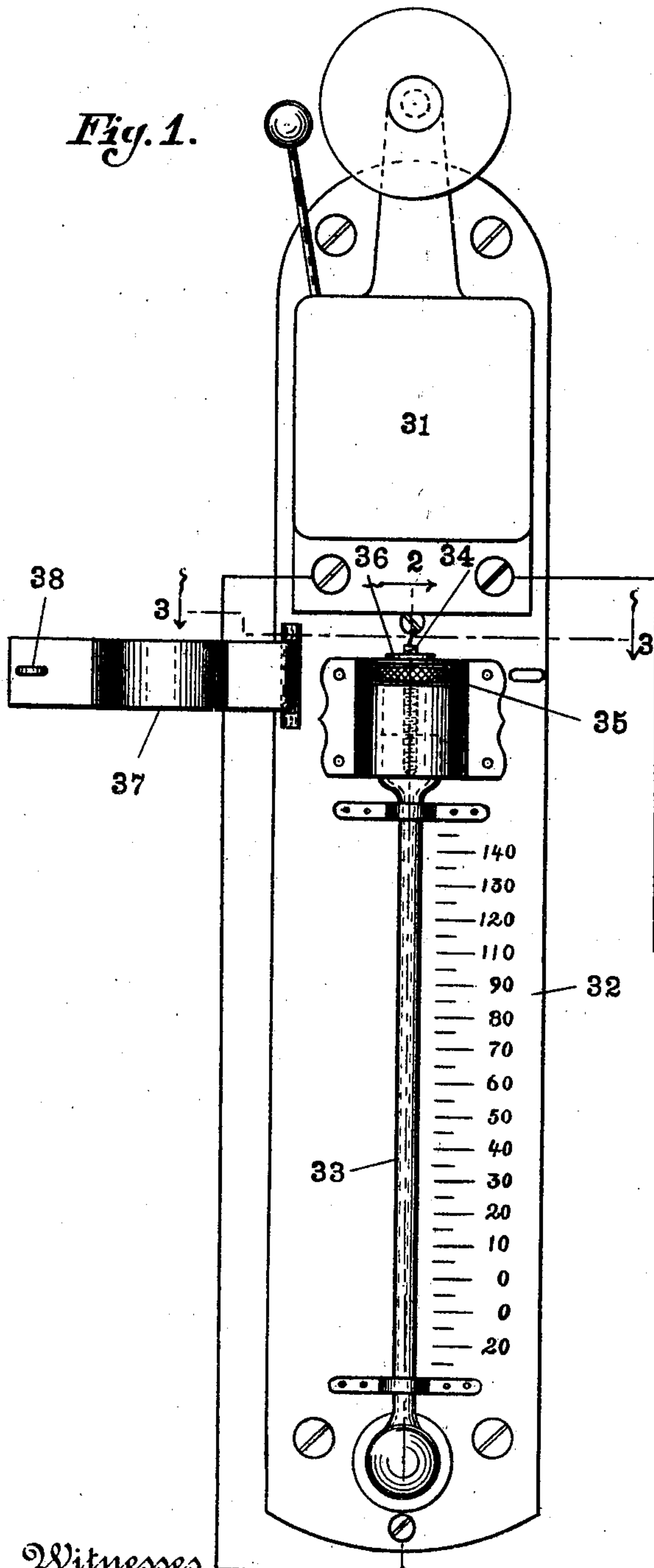
PATENTED JULY 19, 1904.

J. C. HOWE.
AUTOMATIC FIRE ALARM SYSTEM.
APPLICATION FILED APR. 13, 1903.

NO MODEL.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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Fig. 2.

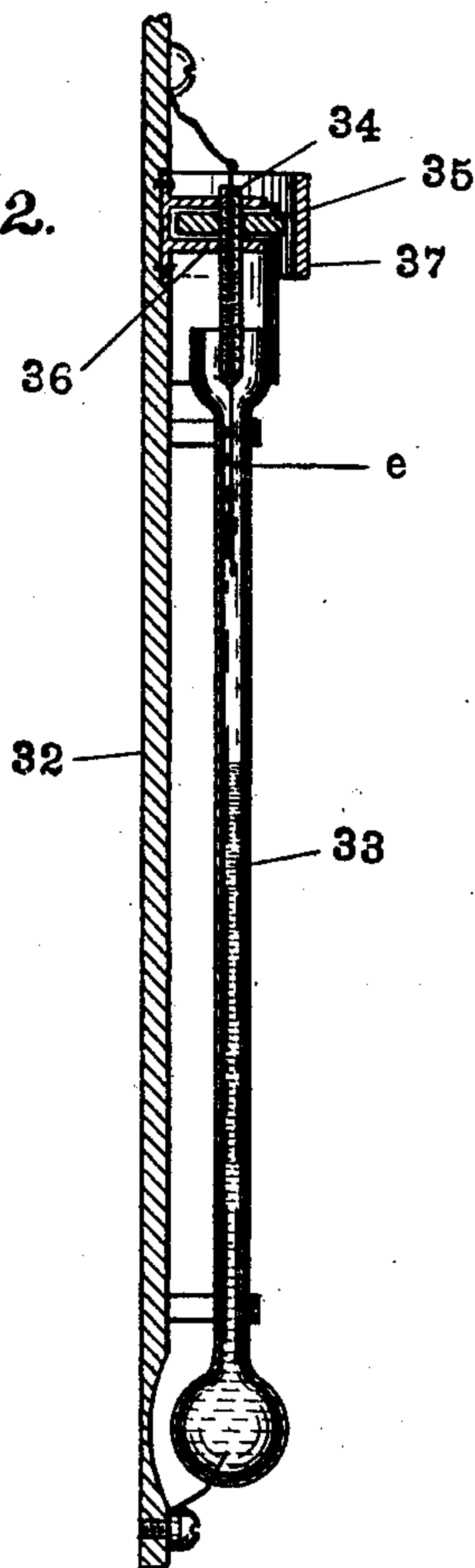
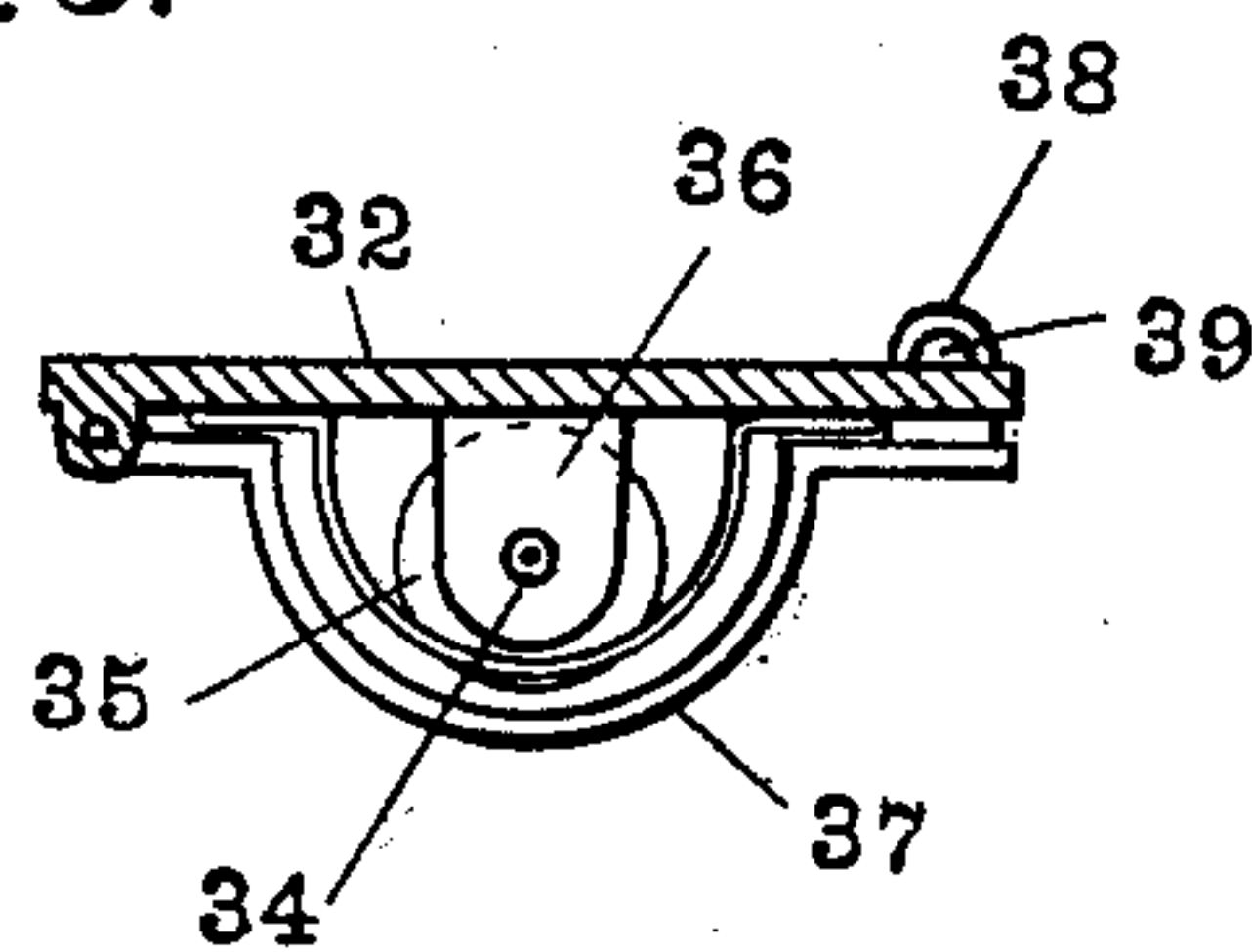


Fig. 3.



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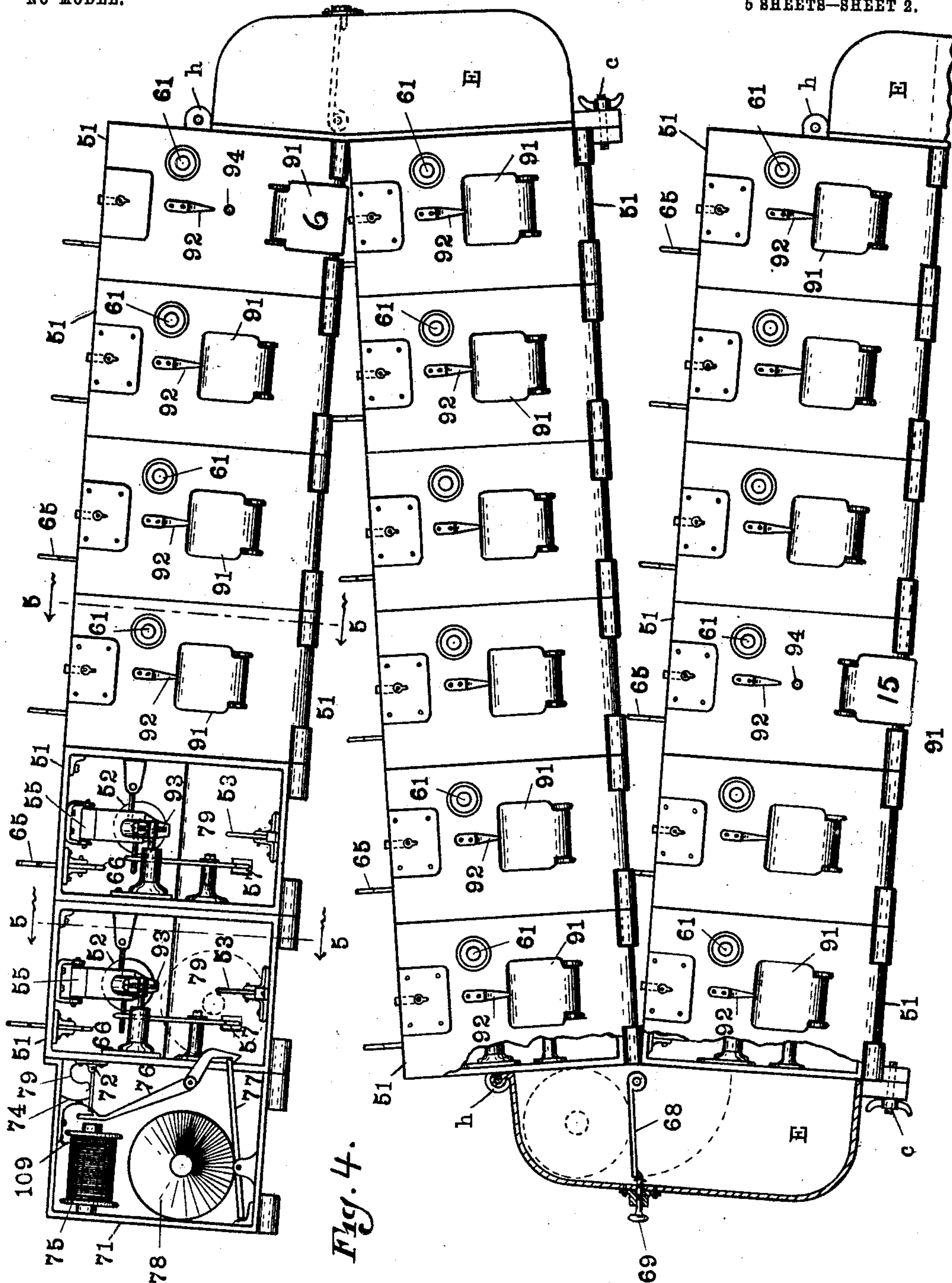
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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 4.

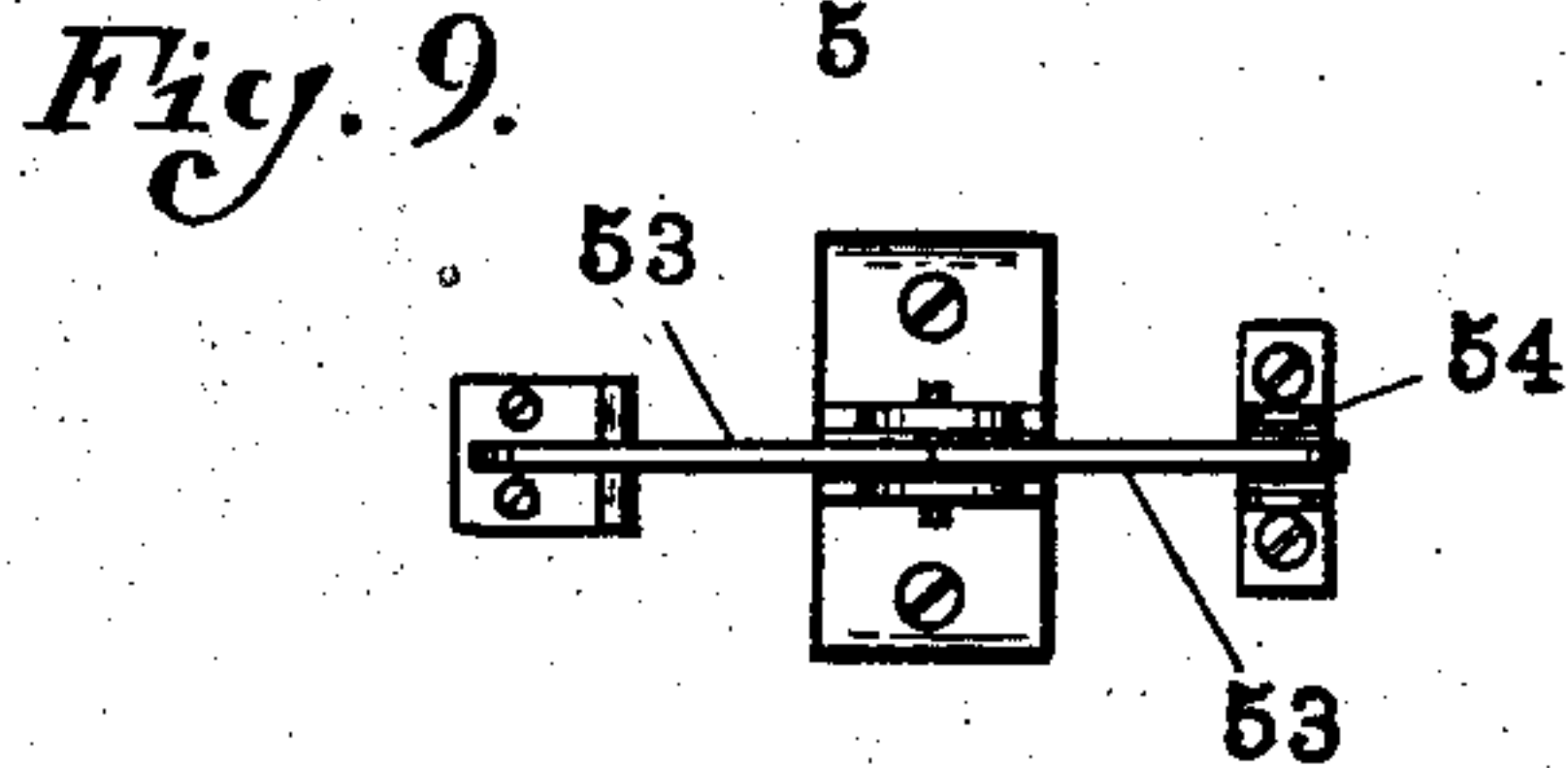
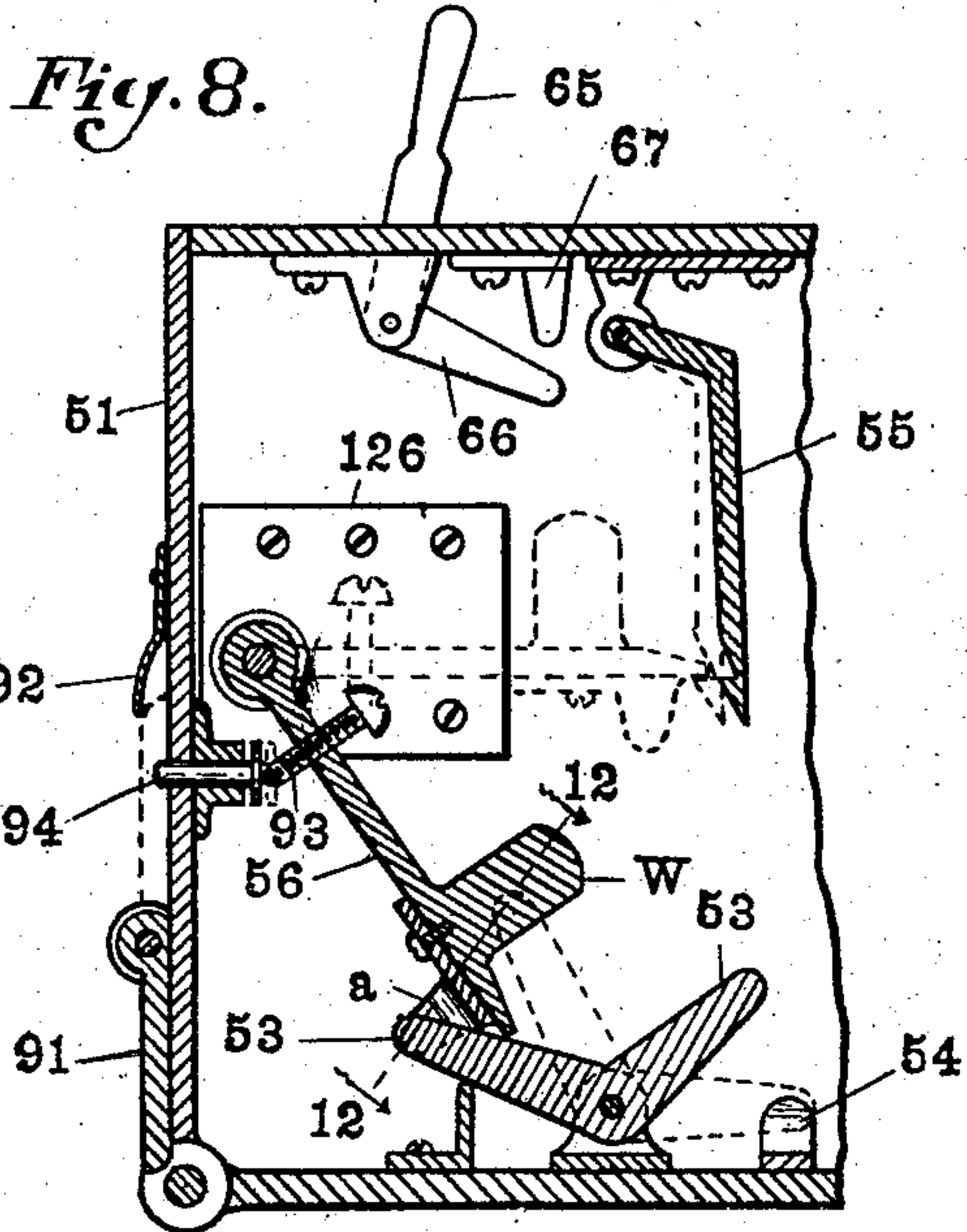
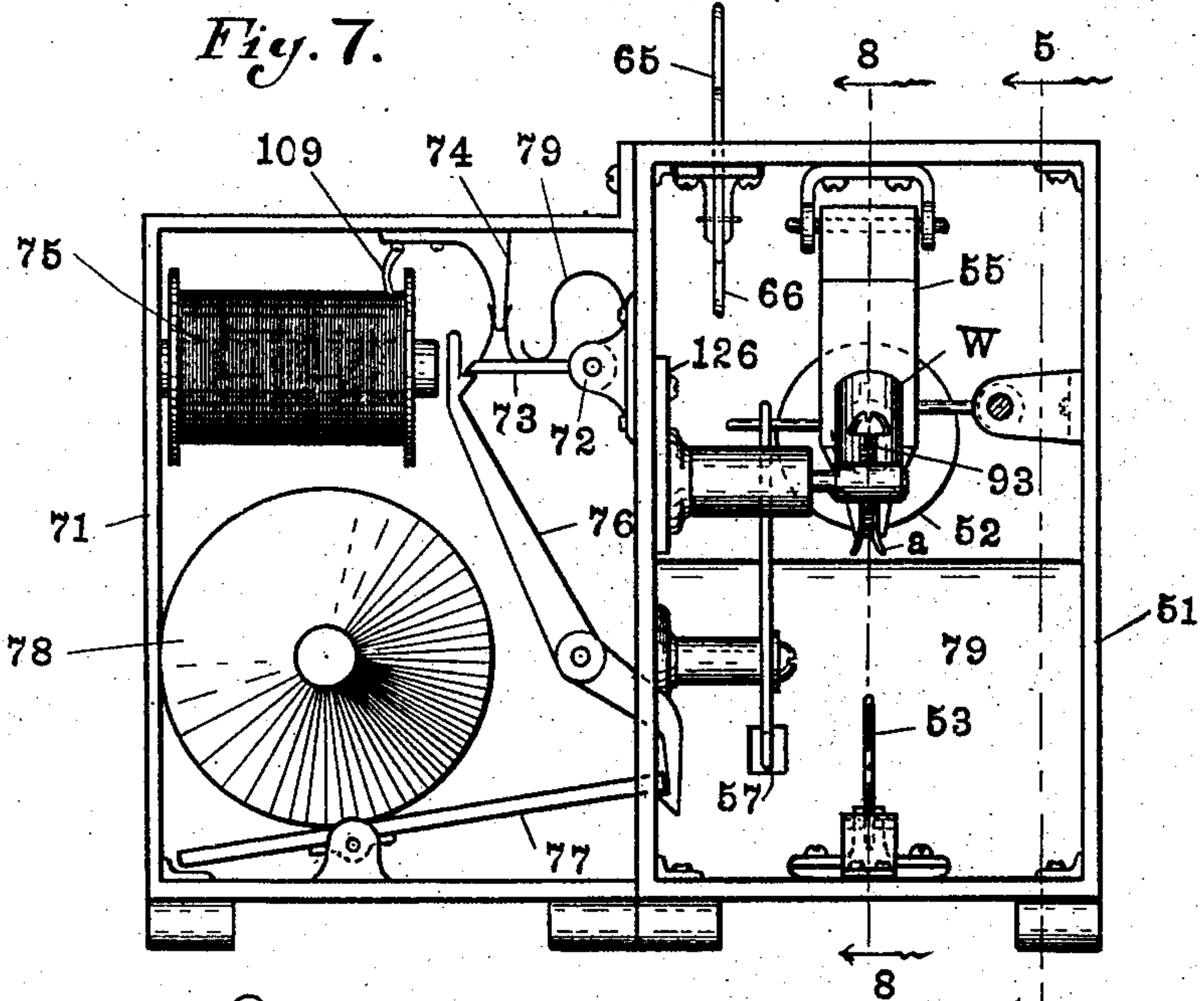


Fig. 10.

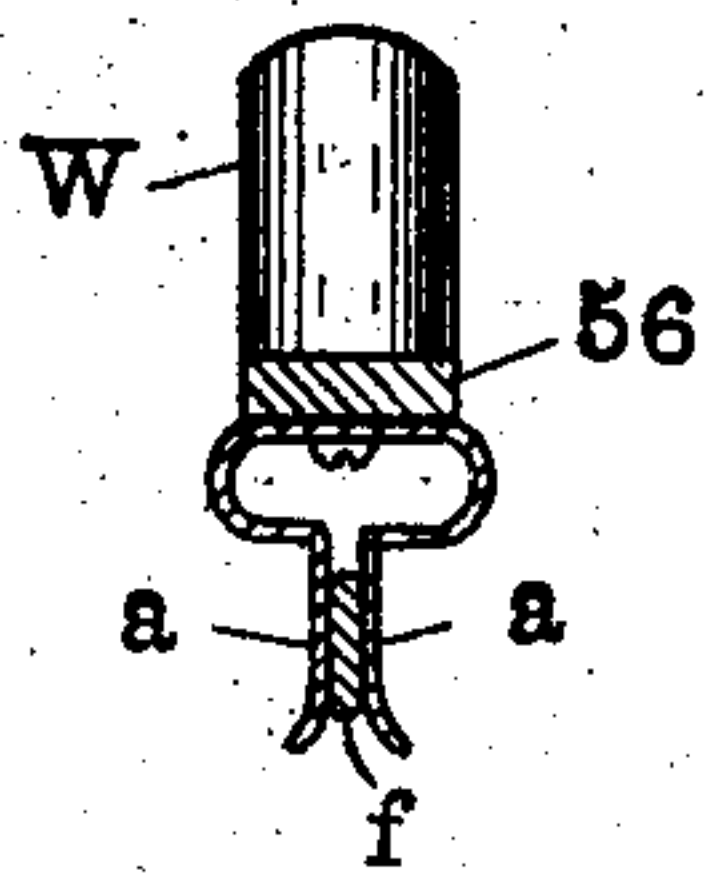


Fig. 11.

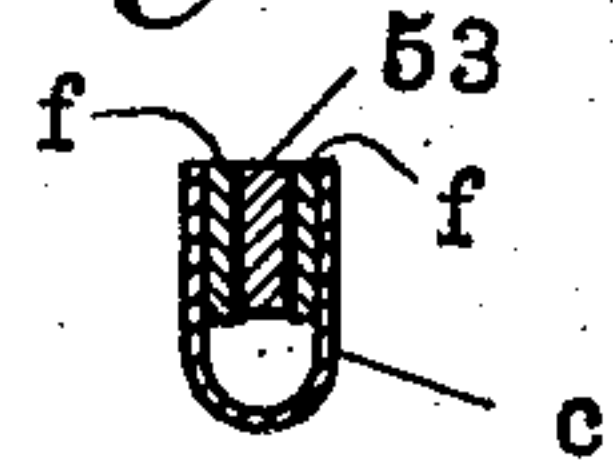


Fig. 12.

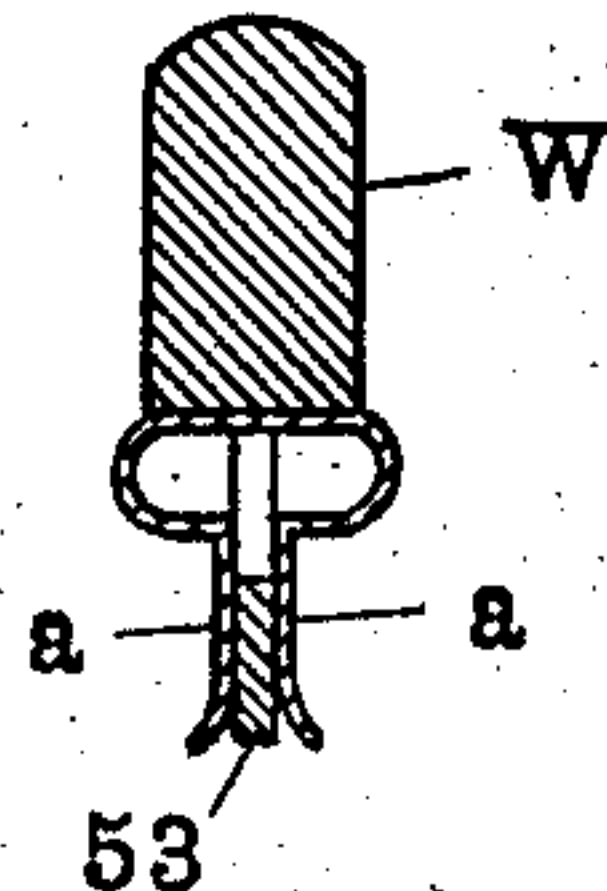
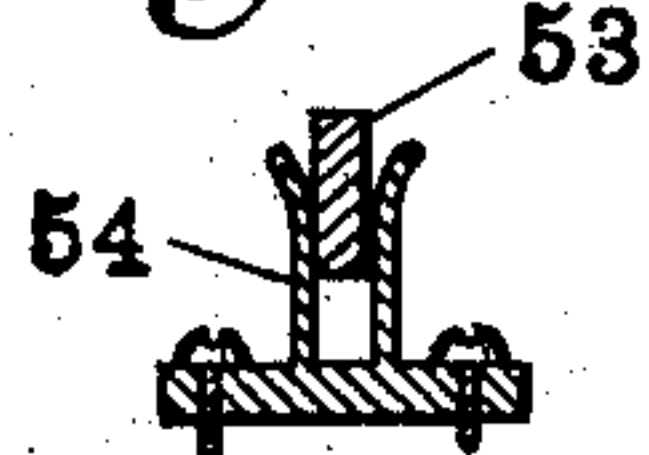


Fig. 13.



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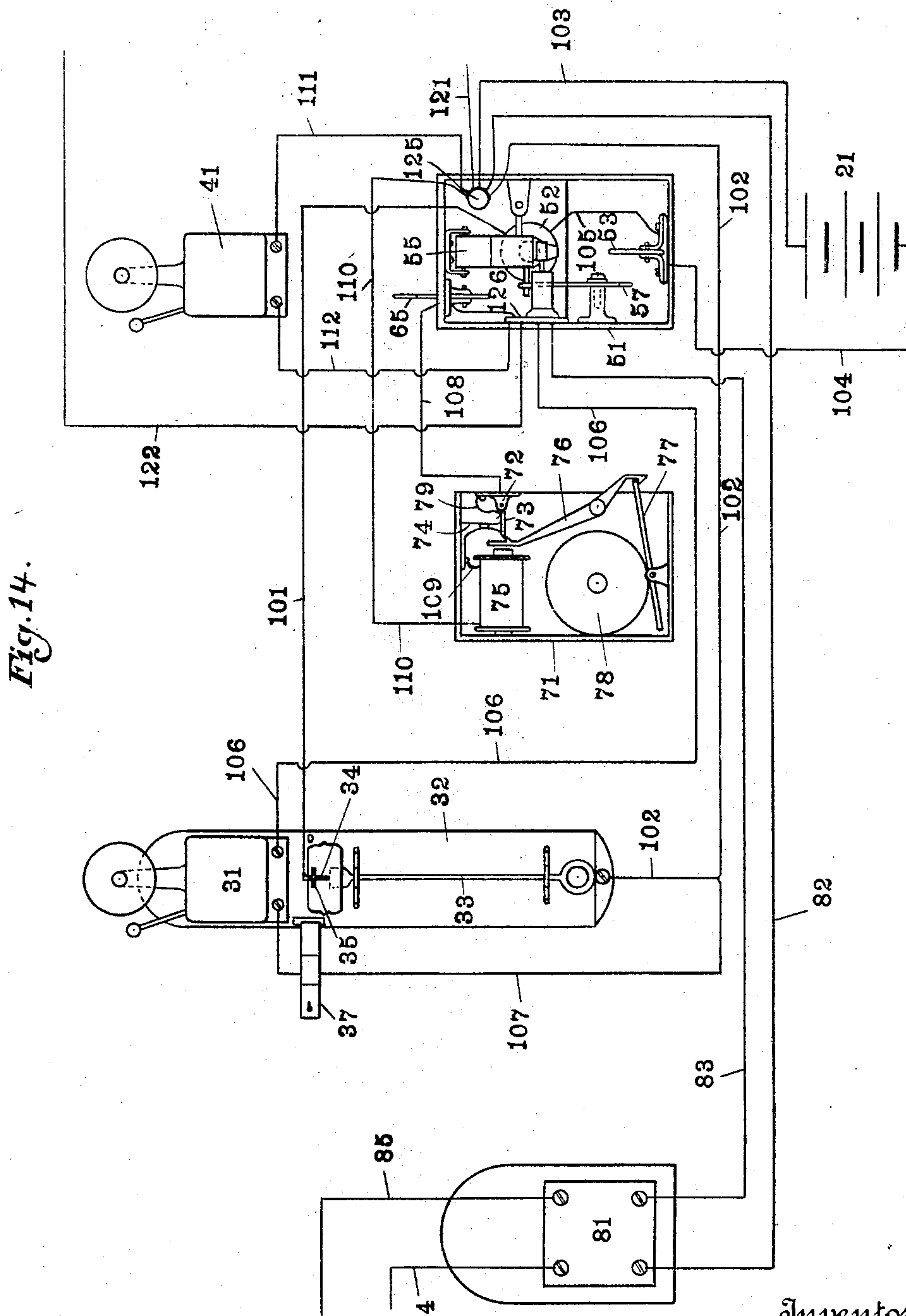
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APPLICATION FILED APR. 13, 1903.

NO MODEL.

5 SHEETS--SHEET 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 765,386, dated July 19, 1904.

Application filed April 13, 1903. Serial No. 152,404. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. HOWE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Automatic Fire-Alarm Systems, of which the following is a specification.

The object of my invention is to provide a means whereby, first, in case of fire at any one of numerous points an alarm will be automatically sent in to a central station and, second, to provide means at such central station whereby an alarm may be given at said point and at various other points.

This invention is especially designed for use in hotels and the like, the system in question providing means of communication between the office and the several rooms; but it is obviously adapted for use in any situation where it is desired to have such communication between a central station and several outlying points. Among the situations to which it is adapted are obviously office buildings and large manufacturing establishments, where in case of fire at one point there is danger of the same extending to other points in the same or adjacent buildings.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a front elevation of the apparatus provided for each of the rooms or individual stations; Fig. 2, a vertical sectional view of the lower portion thereof as seen when looking in the direction indicated by the arrows from the dotted line 2 2 in Fig. 1; Fig. 3, a horizontal sectional view thereof as seen when looking downwardly from the dotted line 3 3 in Fig. 1. Fig. 4 is an elevation showing the apparatus provided at the central station or operating-point as arranged for communication with eighteen different rooms or individual stations; Fig. 5, a transverse vertical sectional view through one of the central-station boxes or sections as seen when looking in the direction indicated by the arrows from the dotted lines 5 5 in Figs. 4, 6, and 7; Fig. 6, a horizontal sectional view as seen when looking downwardly from

the dotted lines 6 6 in Fig. 5; Fig. 7, a view, on an enlarged scale, similar to a portion of Fig. 4; Fig. 8, a sectional view as seen when looking in the direction indicated by the arrows from the dotted line 8 8 in Fig. 7 with the working parts in their operated positions; Fig. 9, a detail plan view as seen when looking downwardly from the dotted line 9 9 in Fig. 5; Figs. 10, 11, 12, and 13, detail sectional views as seen when looking in the directions indicated by the arrows from the dotted lines 10 10, 11 11, 12 12, and 13 13, respectively; and Fig. 14, a diagrammatic view showing the relations of the various parts of the apparatus to each other and illustrating the electrical connections and circuits.

As shown in Fig. 14, this apparatus includes a battery or other source of electrical energy 21, a room or individual-station apparatus, including an alarm-signal, such as an electric bell 31 and a thermostat 32; an alarm-signal, such as an electric bell 41, at the central station; a number of individual alarm-operating boxes 41 equal in number to the number of individual stations or rooms, and an alarm-starting apparatus 71, adapted to operate all the individual alarm-operating boxes when properly arranged. There is also preferably a "street-box" 81, through which my apparatus is connected with fire headquarters or a district-telegraph office or such like place.

The individual-station apparatus, as heretofore stated, consists in general of an alarm-signal (as the bell 31) and a thermostat 32. This thermostat is composed of an ordinary mercury-tube 33, similar in most respects to that of a common thermometer, to the mercury wherein at the lower end is connected an electrical conductor-wire, which will be presently described. Within the upper end of this tube is a screw 34, to which another wire is connected. Said screw 34 (or an extension thereon) extends downward toward but ordinarily not into contact with the mercury in the tube and is adjustable vertically (as may be desired) by means of the milled nut 35, mounted thereon and which is supported in a suitable bearing or housing 36. This is protected from being meddled with by means of

a covering door 37, which is usually shut over it and held by a hasp 38 thereon (which hasp when the door is closed extends through a slot in the base or frame 32) and a lock or pin 39, engaging therewith on the back side of said base or frame, as best shown in Fig. 3.

Each individual-station alarm-operating box contains an electromagnet 52, which is in circuit with the thermostat at the station it is designed to operate. A wire 101 leads to the screw 34 directly from said electromagnet, and another wire, 102, leads from said thermostat to the general binding-post 125 in the box 51, the battery connection being made by means of the wire 103, leading from the binding-post 125 to one side of the battery 21, while the wire 104 leads from the other side of said battery to the lever 53, whence the circuit continues along the horizontal arm of said lever to the contact 54 and thence by the wire 105 to the electromagnet 52, completing the circuit through said magnet and the battery whenever the mercury in the tube 33 comes in contact with the screw 34. As will now be plain, excessive heat at the individual station where the thermostat is located will cause the mercury to rise in its tube and come in contact with the screw 34, and so complete this circuit and energize the electromagnet. This will operate upon the pivoted armature 55, which, as best shown in Fig. 5, is provided with a catch arranged to support the swinging arm 56. Said arm is thereupon released and falls into the position shown in Fig. 8, coming in contact with the upright arm of the lever 53, rocking said lever on its pivot and breaking the contact between the horizontal arm of said lever and the contact 54, thus automatically throwing the electromagnet 52 out of circuit. A new circuit, however, is instantly established through the upwardly-extending arm of the lever 53 and the arm 56, which has fallen against it, and this, among other things, establishes an electrical circuit through the alarm-bell 31, thus automatically sounding an alarm at the individual station or point where the thermostat and said bell are located. The bell-circuit thus established consists of the wire 106, leading from the base or support 126 of the arm 56 to one side of the bell; the wire 107, leading from the other side of the bell to and becoming a part of the wire 102, which leads to the general binding-post 125; the wire 103, leading to the battery; the wire 104, leading from the other side of the battery to the lever 53, the circuit continuing thence through said lever and the arm 56 to the base or support 126 of said arm, which completes it and rings the bell. The bell will ring continuously until the circuit is broken.

The alarm-bell 41 at the central station is operated at the same time, it being connected to the general binding-post 125 by wire 111, while a wire 112 runs from said bell back to the base or support 126 of the swinging arm

56, the battery connection being as heretofore described. The alarm-bell at the central station is therefore always sounded at the same time as that at the point at which the thermostat is located.

It is desirable that the apparatus be also connected with fire-alarm headquarters or with the office of a district telegraph. I therefore provide a street-box 81 and connect the same by means of a wire 82 with the general binding-post 125 and by means of a wire 83 with the base or support 126 of the arm 56. From this street-box wires 84 and 85 lead off to the point desired.

In order to utilize a single battery for the entire apparatus at the central station, I connect the several individual boxes together. In doing this I extend a wire 121 from the general binding-post 125 in one box to the base or support 126 in the succeeding box and lead in from the preceding box a wire 122 and attach to it said base or support 126, and this, as will be readily understood, when suitably connected up puts all the boxes in circuit.

The operator is enabled to determine immediately from which individual station the alarm comes by means of a suitable annunciator or indicator, which may consist of a swinging door 91, which bears upon its normally concealed face a suitable number or character and which is normally held closed by a small spring-catch 92. It is opened when the arm 56 falls by a suitable strike 93 on said arm hitting a push 94 (mounted in the frame behind the annunciator 91) with sufficient force to drive it out from engagement with its spring-catch 92, so that it falls and displays the number or character on its under side. The arm 56 is designed to fall with considerable force, being provided with a weight W near its moving end. The operation of my apparatus may be said to be complete at this point so far as the single individual station is concerned. The operator who is on duty at the station, however, is to begin his duties at this time, and my apparatus will enable him to sound the alarm at all the other individual stations or rooms by apparatus set in motion by a single movement or in all the rooms on a single floor of the building, or he may operate separately and singly such of the alarms located at the various individual stations as in his judgment appears necessary. If it only appears necessary to sound the alarm at a few individual points, it is done by pressing the push-buttons 61, which through the corresponding rod 62 will swing the corresponding armature 55, which has the same effect (so far as the arm 56 and the results of releasing it are concerned) as the energizing the electromagnet has. When, however, it is desired to sound an alarm at all the individual stations on a certain floor or in a certain section of the building or in a certain building of the premises, (as the case may be,) the operative pulls

the bell-crank lever 65, with which each central-station alarm-operating box is provided, throwing its arm 66 into engagement with the contact 67, which establishes the following circuit: A wire 108 leads from the contact 67 to a binding-post 72 in the alarm-roll-starting apparatus, thence through an arm 73, a contact 74, and a wire 109 to an electromagnet 75, thence by wire 110 to the general binding-post 125, and thence through the battery, as heretofore described. This energizes the electromagnet 75 and draws the lever 76, one end of which forms the armature to said electromagnet, releasing platform 77, on which the alarm-starting roll 78 rests, and permitting said roll to start on its journey through the several alarm-starting boxes at the central station. The armature 76 also carries a catch for the arm 73, so that said arm is released by the same movement, and said arm 73 is thrown downwardly out of engagement with the contact 74 by means of spring 79, thus instantly breaking the circuit as soon as the work has been accomplished. The alarm-starting roll 78 is guided by suitable walls between which it runs, one of which may be one wall of the boxes 51 and the other a special wall 79, provided for the purpose. The alarm-starting roll 78 runs down the guideway thus provided therefor through all of the several boxes, said boxes being arranged in an inclined position, as shown in Fig. 4, for the purpose. The roll is wedge-shaped on its sides, and as it passes through each box comes in contact with the bell-crank lever 57, which extends up alongside and engages with the armature 55 and operates to throw the hatch carried by said armature or by said lever out of engagement with the arm 56, thus accomplishing the same work as is accomplished by the energizing of the electromagnet 52. This roll therefore will rapidly set each of the several alarms to ringing.

At the ends of each of the tiers of boxes I have provided a means whereby at will the alarm-starting roll may either be stopped or permitted to continue on into the next tier. This means consists of a hinged floor-plate 68 and a latch-pin 69. If the latch-pin 69 be withdrawn, the floor-plate 68 will fall down, as indicated in Fig. 4, and the alarm-starting roll 78 will fall to the next tier of boxes and continue on its course. If, however, the hinged floor-section 68 is left supported, the alarm-starting roll will stop at this point and continue no farther. It is therefore within the control of the operator whether a single floor or section of the premises shall be alarmed or the entire building or premises, and if it shall seem advisable at first to alarm only one floor or section that can be done, and if at a later time it appears advisable to alarm additional floors or sections that can be done by simply withdrawing one or more of the latch-pins 69. The inclosure E, into which

the roll thus passes, is preferably hinged at *h* and is held shut by a suitable fastening, as the catch-bolt *c*.

The swinging arm 56, as has already been stated, is adapted to make contact with the lever 53 as it falls. In order to do this, it is provided with the spring contact-arms *a*, which, as shown in Fig. 8, fall astride of one end of said lever 53. As this apparatus is likely to remain without use for long periods of time, there is some danger of corrosion of the contact-surfaces. In order to guard against this, I place between the contact-arms *a* a small piece of felt *f* or some such substance, which while it will protect the surfaces against which it bears and keep them bright is so light and soft as to be easily removed, while it will be easily driven out of place by the blow delivered by the arm when it falls. Similarly in order to protect the portion of the arm 53 with which the arms *a* come in contact I have provided a light clip *c* and placed within it and against the surfaces of the arm 53 similar small pieces of felt *f*. These are illustrated in Figs. 10 and 11, while the arrangement in the relative positions of the parts after they are operated is shown in Figs. 8 and 12. The weight *W* on the arm 56 gives impetus to its movement.

It will be seen that by the use of my apparatus the most complete control of the question of how extensively and how rapidly an alarm shall be sounded in case of fire can be had. If the fire is of small extent and at a single point, no other alarm than the one located at said point need be sounded. If adjacent places or rooms seem to be threatened, the alarms can be sounded in those rooms. If an entire floor or section of the premises appears to be in danger, then alarms can be rapidly sounded throughout such floor or section, while if the conflagration is extensive enough to threaten the entire premises the communication which is provided throughout every part thereof enables me to give a general alarm.

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

1. The combination, in a fire-alarm system, of a series of individual stations each containing a thermostat and an alarm-signal, a central station having a series of alarm-signal-operating boxes equal in number to the individual stations and each containing an annunciator and a trip mechanism and an electromagnet, a suitable source of electrical energy, electrical connections connecting the source of electrical energy the electromagnet and the thermostat in circuit whereby when the temperature at the thermostat causes the mercury to rise and complete the circuit the central-station mechanism will be operated and the alarm communicated to the annunciator at the central station corresponding to the individ-

ual station whence the alarm originates, and other electrical connections actuated by the operation of said annunciator whereby the alarm will be transmitted back to said individual station.

2. The combination, in a fire-alarm system, of a series of individual stations each provided with a thermostat and an alarm-signal, a central station having a series of alarm-signal-operating boxes equal in number to the individual stations, connections from the thermostats at the individual stations to the respective boxes, trip mechanisms in said boxes adapted to be operated when the corresponding thermostats complete the electrical circuit, levers engaged with the trip mechanisms and extending into the path of a starting-roll, means for starting said roll, and an inclined path down which said roll may pass and contact successively with said levers and thus start the alarms.

3. The combination, in a fire-alarm system, of a series of individual stations each provided with a thermostat and an alarm-signal, a series of alarm-boxes at a central station coupled together and arranged in tiers one above another, connections between said tiers at the ends which approach each other, pivoted floor-plates in said connecting inclosures, an alarm-starting roll adapted to pass through the several boxes, and means for supporting or releasing said pivoted floor-plates, whereby the alarm-starting roll is either caused to stop at the end of any particular row of alarm-boxes or permitted to pass on to the next, substantially as set forth.

4. In a fire-alarm system, the combination of a plurality of individual stations each containing a thermostat and an alarm-signal, a plurality of corresponding indicators arranged in a central station, a traveler for traversing said central-station indicators in succession, means for controlling the extent of movement of the traveler, and electrical connections between each thermostat, each alarm and the corresponding central-station indicator, whereby each thermostat will serve to automatically operate its individual-station alarm-signal and the corresponding indicator at the central station and a plurality of individual-station signals may be operated in succession from the central station.

5. The combination, in a fire-alarm system, of a plurality of individual-station alarm-signals, a plurality of corresponding indicator-operating means arranged at a central station, a traveler adapted to traverse said operating means in succession, electrical connections between the individual-station alarm-signals and the central-station operating means, and means for controlling the extent of movement of said traveler through said operating means.

6. The combination, in a fire-alarm system,

of a plurality of individual-station electrical alarm-signals, a plurality of individual-station thermostats, a plurality of corresponding indicators arranged at a central station, electrical connections between each thermostat and the corresponding central-station indicator, electrical connections between each individual-station alarm-signal and the corresponding central-station indicator, means for individually operating any desired individual-station alarm, and means for automatically energizing the circuit of a series of individual-station alarm-signals in succession.

7. The combination, in a fire-alarm station, of a plurality of individual-station electrical alarm-signals, a plurality of individual-station thermostats, a plurality of corresponding indicators arranged at a central station, electrical connections between each thermostat the associated electrical alarm and the corresponding central-station indicator, means for individually operating any desired individual-station alarm-signal, and means for automatically energizing the circuits of a series of individual-station alarm-signals in succession.

8. The combination, in a fire-alarm system, of a plurality of individual-station alarm-signals, a plurality of corresponding operating means arranged at a central station in oppositely-inclined tiers, a traveler adapted to traverse said tiers in succession to throw the individual-station alarm-signals into operation, and means for controlling the extent of movement of said traveler.

9. The combination, in a fire-alarm system, of a series of individual stations each comprising a thermostat and an alarm-signal, a central station equipped with an indicator for each individual station and with operating means for each of said individual-station alarm-signals, an electrical circuit controlled by each thermostat for operating its indicator, and an electrical circuit controlled by the means for operating the indicator for operating the alarm-signal at the individual station.

10. The combination, in a fire-alarm system, of a series of individual stations each comprising a thermostat and an alarm-signal, a central station equipped with an indicator and with operating means for each individual-station alarm-signal and also with an alarm-signal, means for operating said indicator, an electrical circuit controlled by each thermostat for actuating said means, and electrical circuits established by the operation of said means for operating both said alarm-signals.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 11th day of April, A. D. 1903.

JOHN C. HOWE. [L. S.]

Witnesses:

CHESTER BRADFORD,
JAMES A. WALSH.