Nov. 18, 1924. 1,515,774

L. L. JONES

METHOD OF AND APPARATUS FOR AUTOMATICALLY STOPPING AUTOMATIC PRESSES

Filed Sept. 14 1921 6 Sheets-Sheet 1

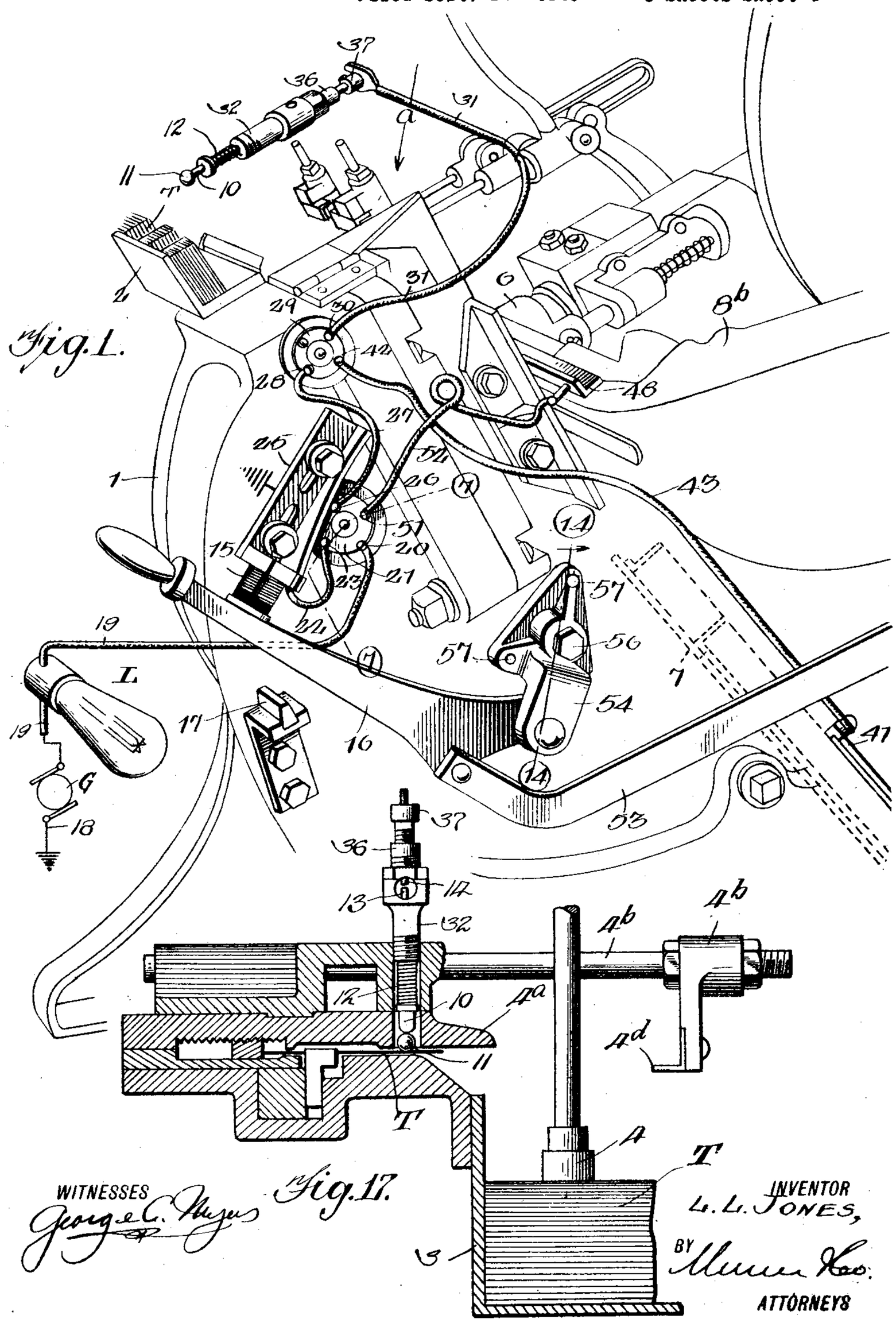

Fig. 1.

Fig. 17.

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Filed Sept. 14 1921 6 Sheets-Sheet 2

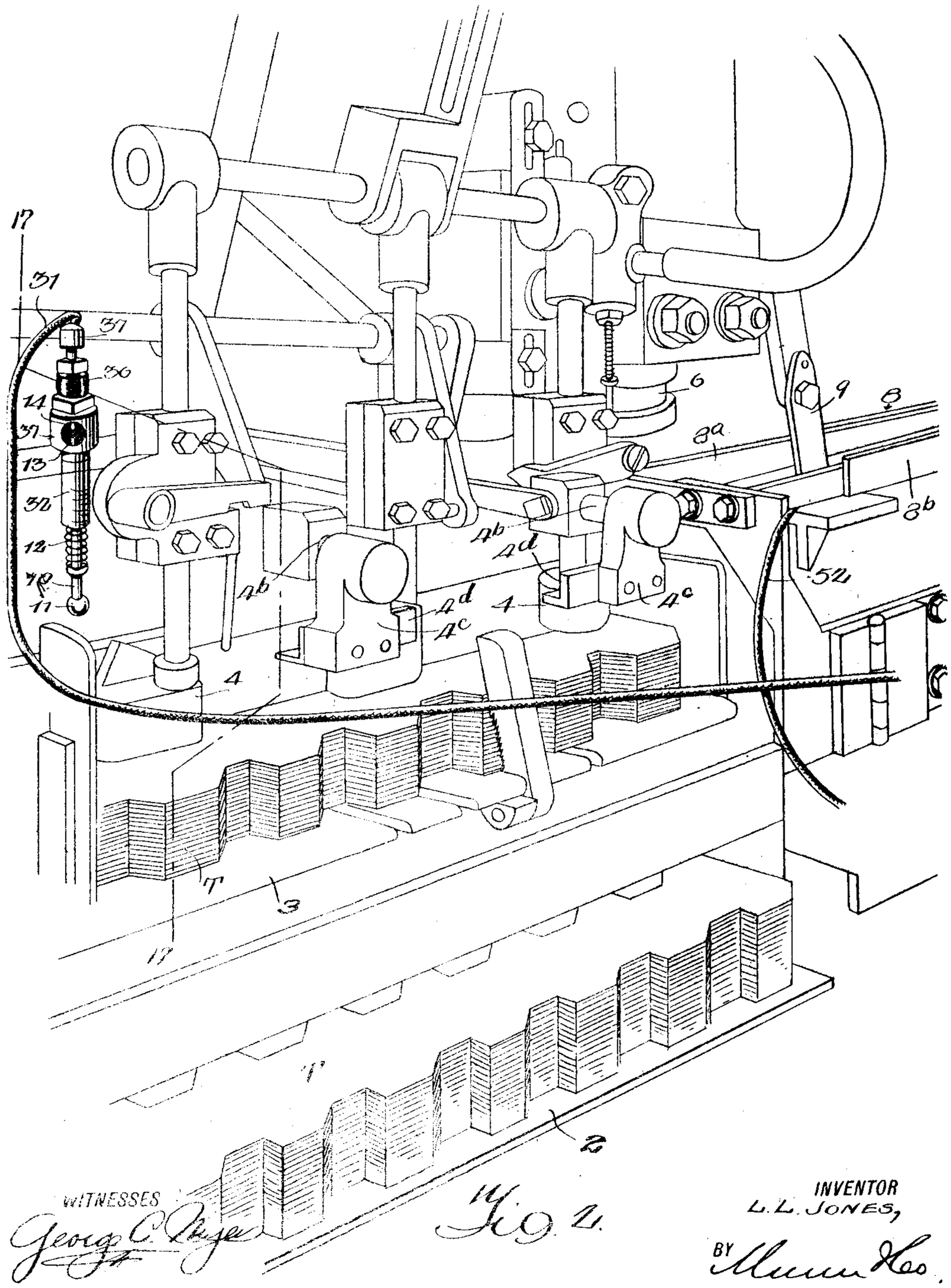

Fig. 2.

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Filed Sept. 14 1923 6 Sheets-Sheet 3

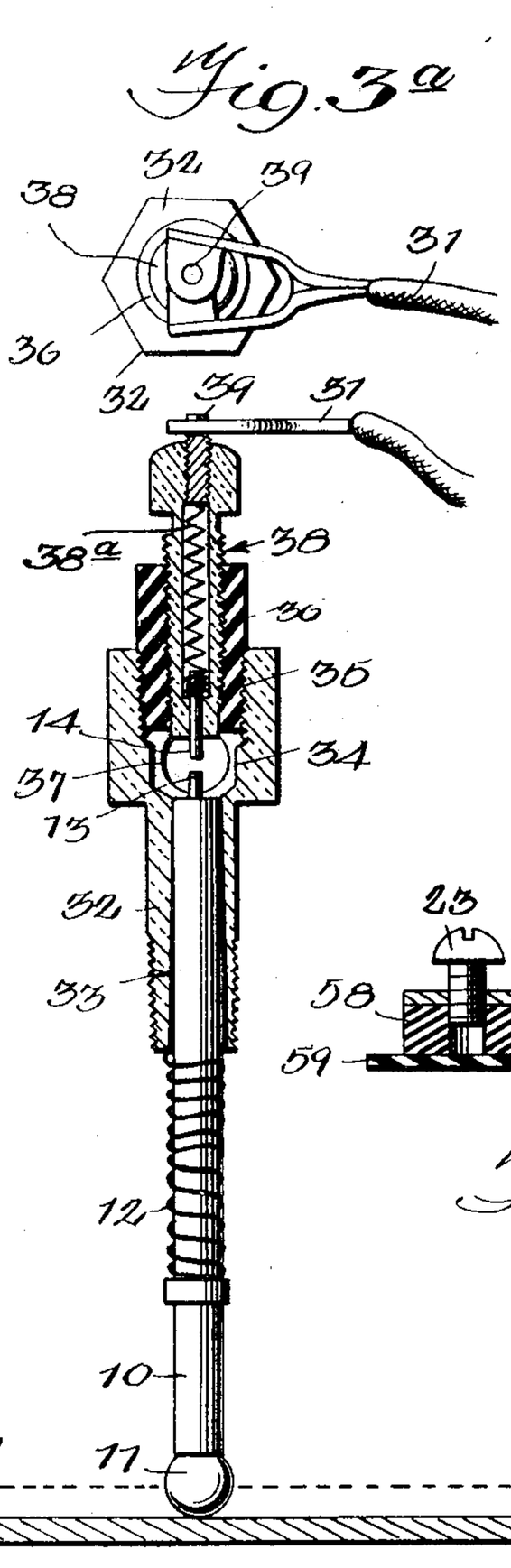

Fig. 3a

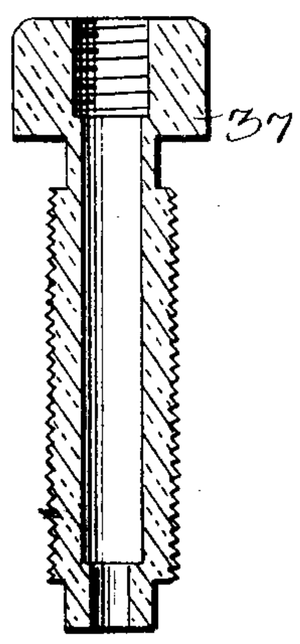

Fig. 4.

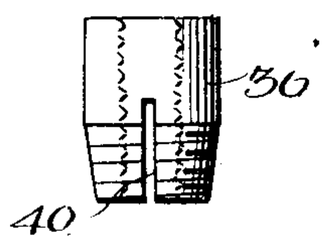

Fig. 5.

Fig. 6.

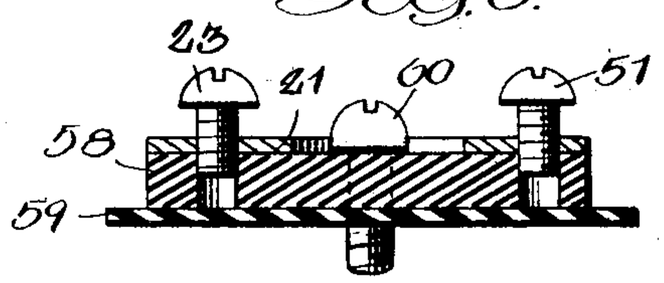

Fig. 7.

Fig. 3.

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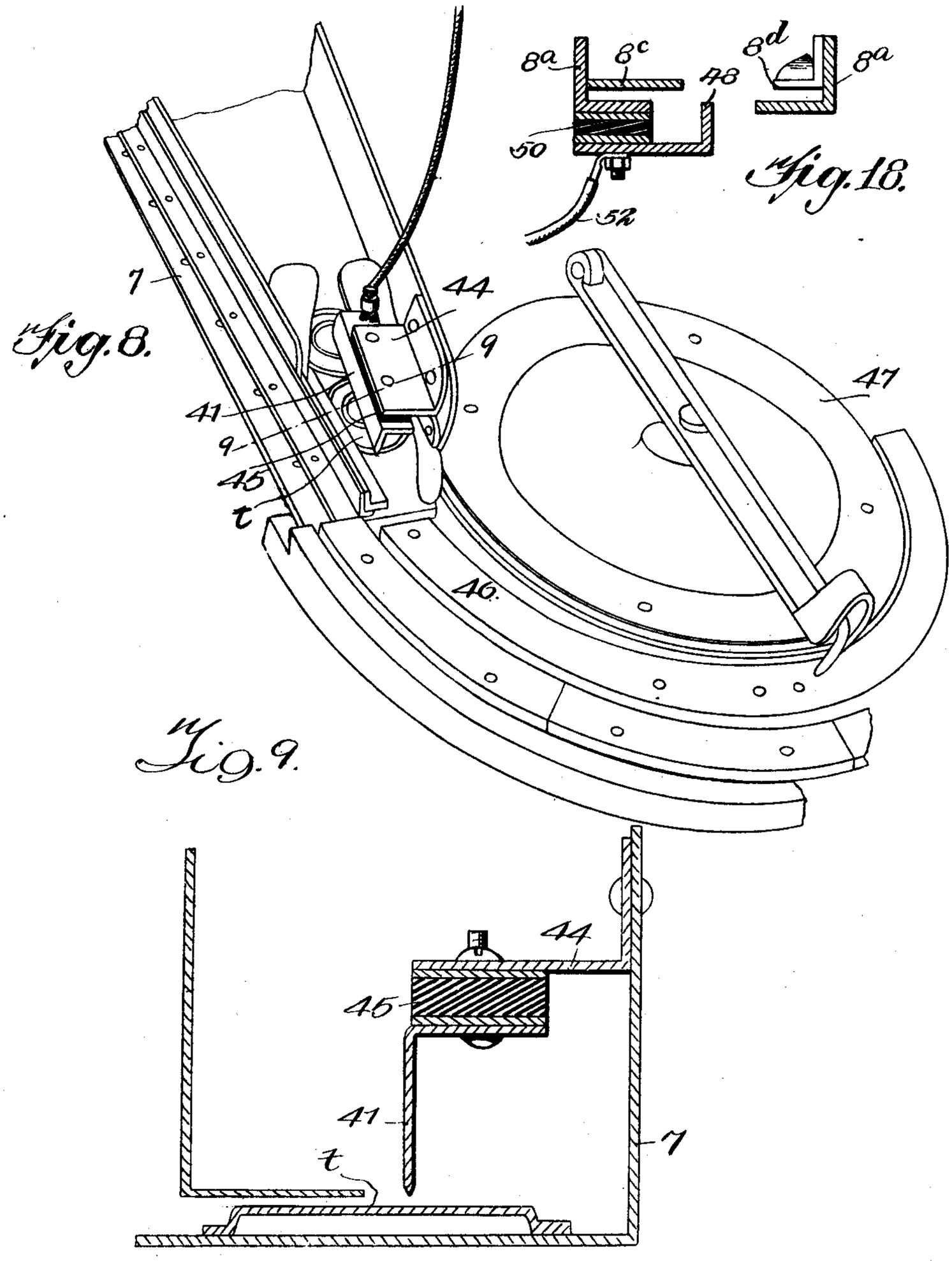

Fig. 8.

Fig. 18.

Fig. 9.

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Filed Sept. 14 1921 6 Sheets-Sheet 5

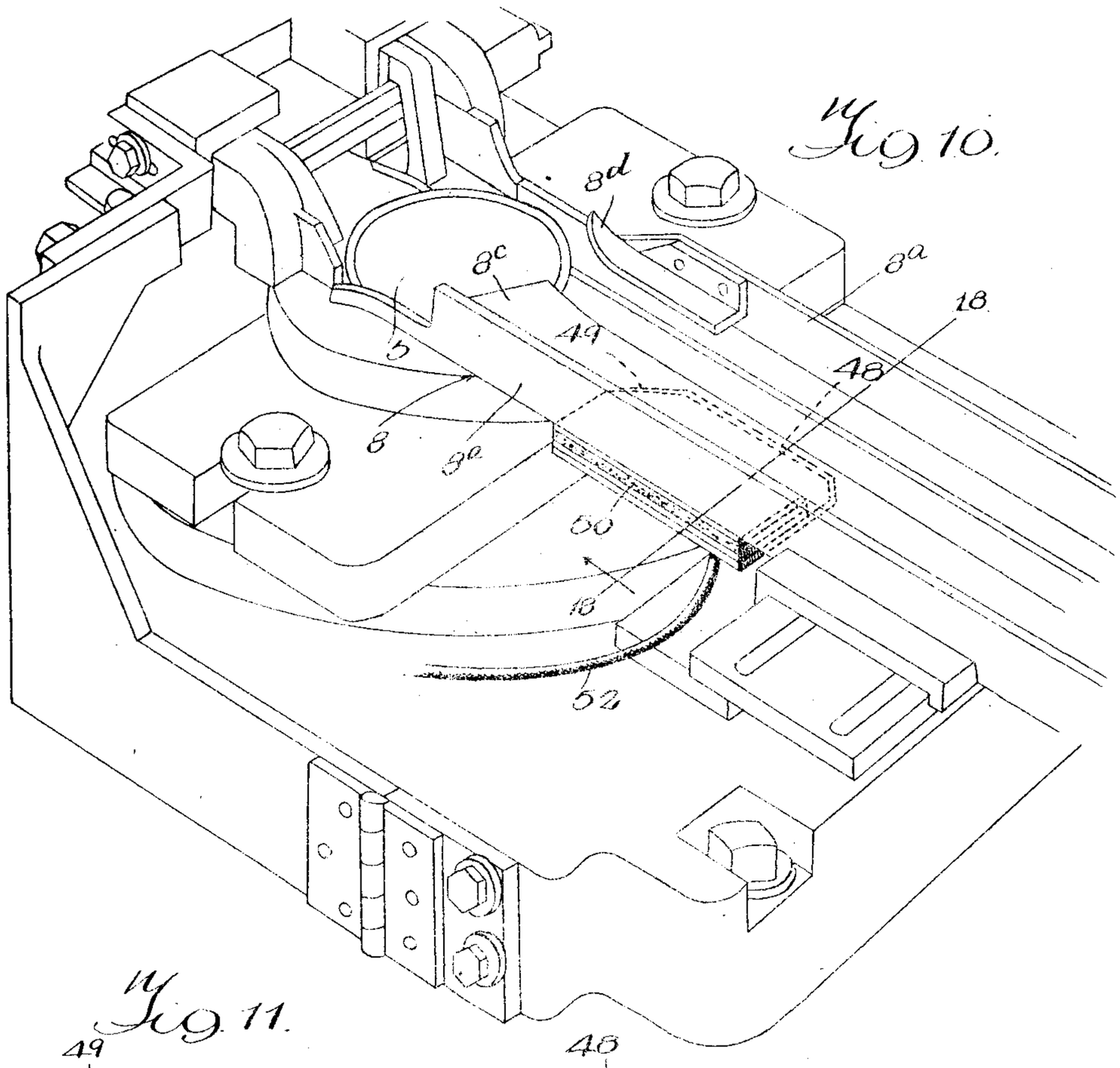

Fig. 10.

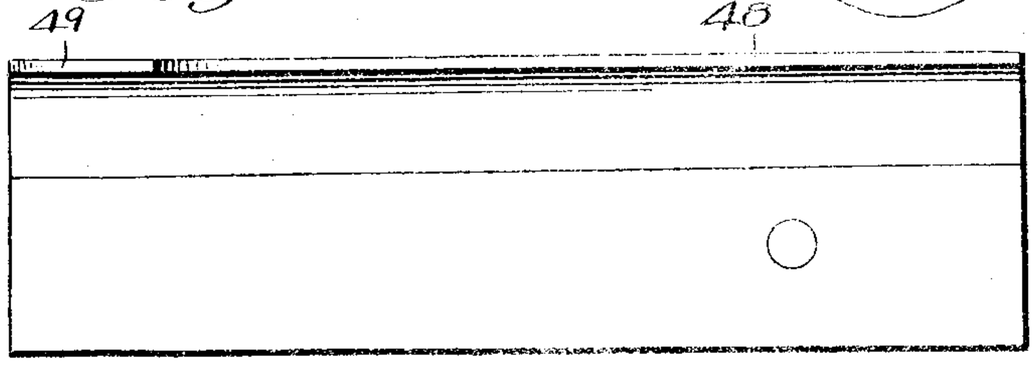

Fig. 11.

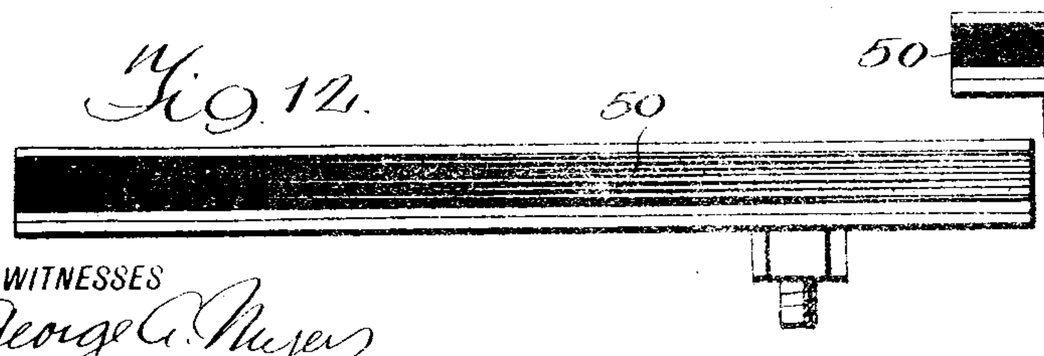

Fig. 12.

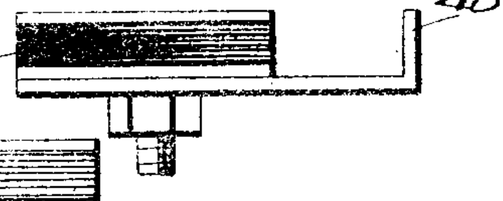

Fig. 13.

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METHOD OF AND APPARATUS FOR AUTOMATICALLY STOPPING AUTOMATIC PRESSES

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Fig. 14.

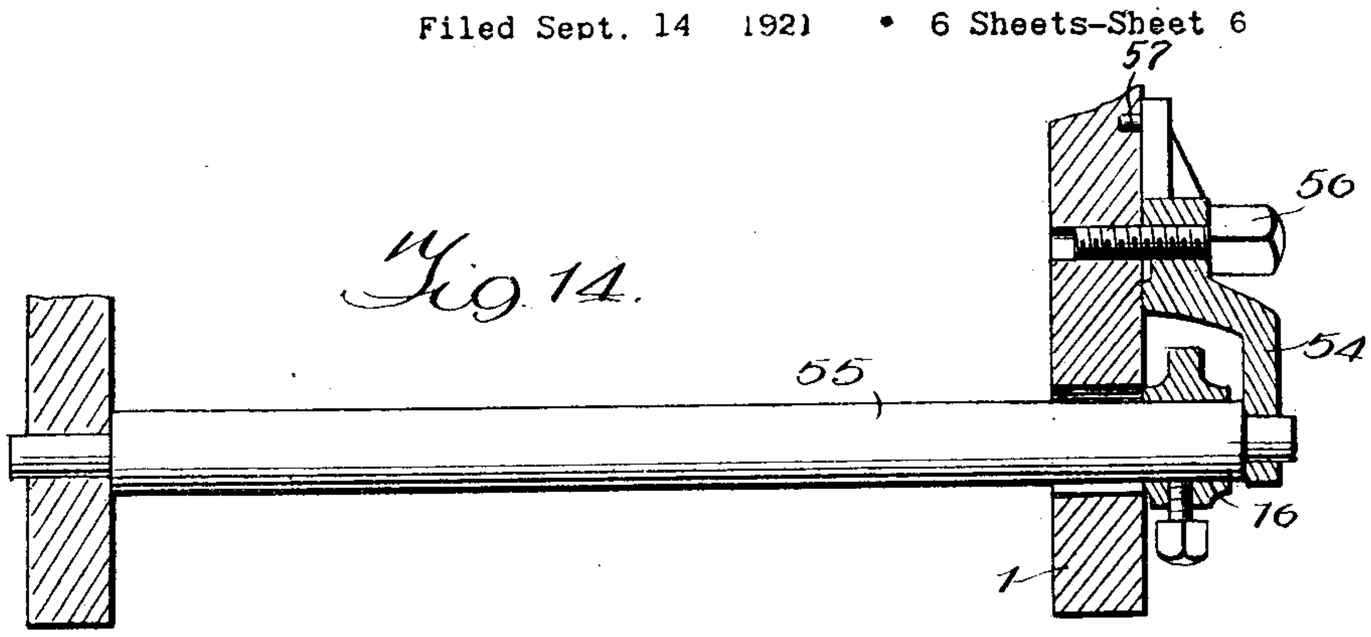


Fig. 15.

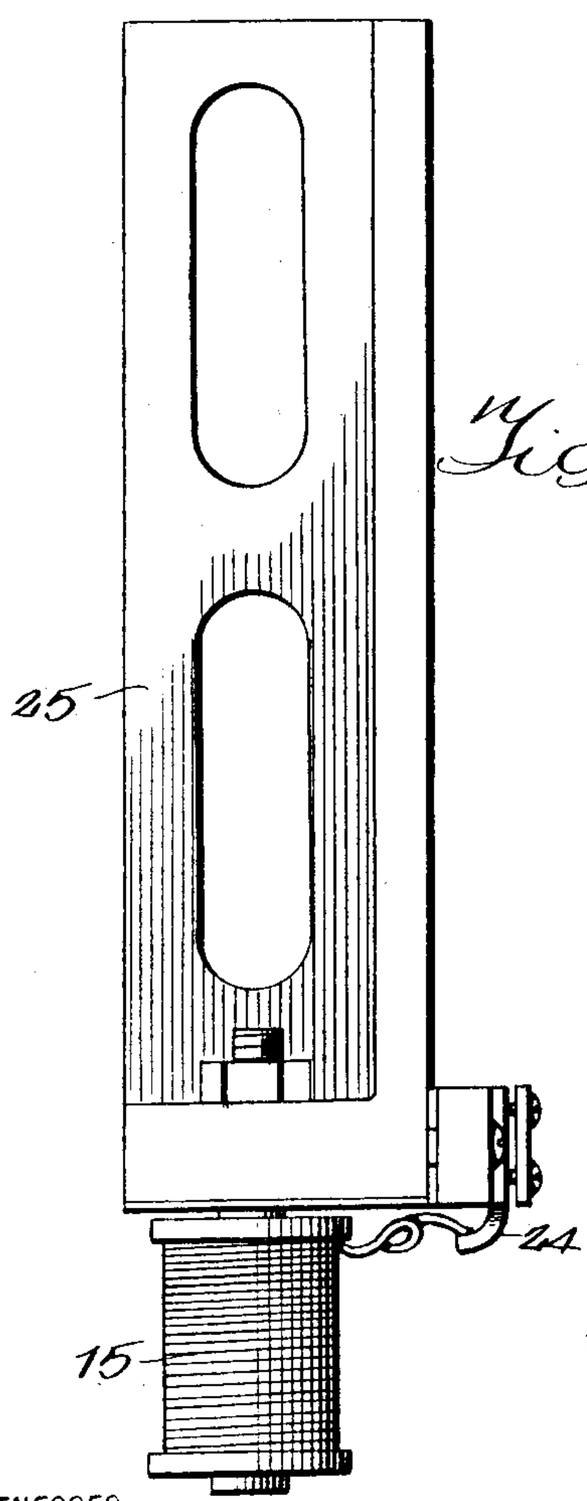
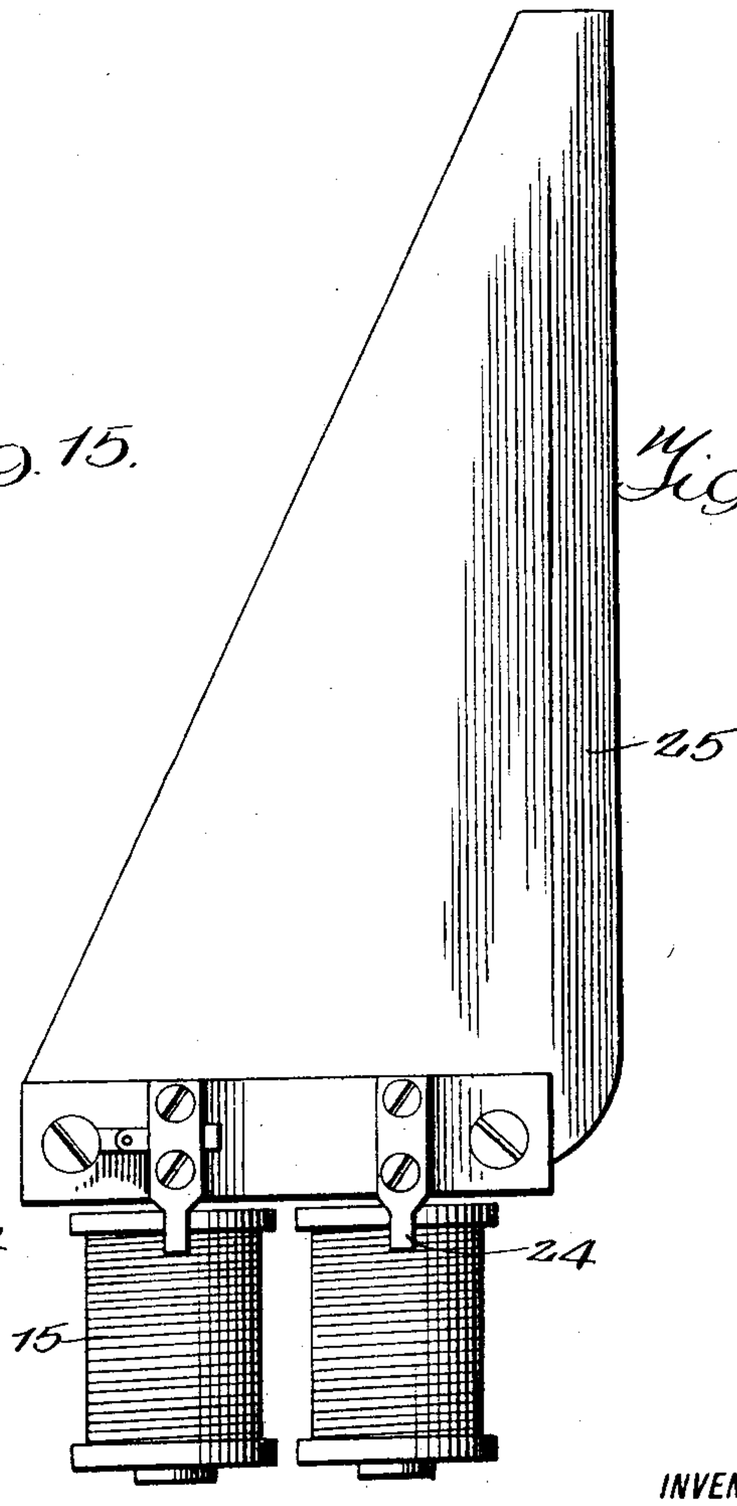


Fig. 16.



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UNITED STATES PATENT OFFICE.

LYMAN LLEWELLYN JONES, OF SEATTLE, WASHINGTON.

METHOD OF AND APPARATUS FOR AUTOMATICALLY STOPPING AUTOMATIC PRESSES.

Application filed September 14, 1921. Serial No. 500,717.

To all whom it may concern:

Be it known that I, LYMAN LLEWELLYN JONES, a citizen of Canada, and a resident of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Methods of and Apparatus for Automatically Stopping Automatic Presses, of which the following is a specification.

My invention relates to improvements in stop-motion mechanism, and it consists not only in the construction, combination and arrangement herein described and claimed, but also in the method of accomplishing the operation thereof.

One of the foremost objects of the invention is to provide means for automatically stopping an automatic or other type of press for stamping tin can tops or the like, upon the happening of any one or all of a number of false occurrences, e. g. when an excessively thick plate is fed in, the sticking of the die in the work, the clogging of the can top chute and the clogging of the scrap chute.

A further and most important object of the invention is to provide means for normally holding the starting lever of a press as described, in the operative position until a strain beyond a predetermined limit is imposed on the press through false functioning, whereby the starting lever is jarred loose and the press caused to stop.

A further object of the invention is to provide means of the character described, by the use of which on individual presses, a single operator can command a number of such presses.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawings, in which:

Figure 1 is a perspective view of an automatic strip-metal feed press in light outlines, illustrating the application of the invention in heavier lines,

Figure 2 is a similar view of that portion of the press indicated by the arrow *a* in Figure 1,

Figure 3 is a vertical section of the tin strip contact which gauges the size of tin strips fed into the machine,

Fig. 3ª is a detail plan view of the structure in Fig. 3.

Figures 4, 5 and 6 are detail views of parts of the tin strip contact disassembled,

Figure 7 is a cross section, taken substantially on the line 7—7 of Figure 1, illustrating the construction of one of the junction blocks,

Figure 8 is a perspective view of the can lid discharge chute of the press, also illustrating the disk by means of which the lid edges are curled,

Figure 9 is a cross section on the line 9—9 of Figure 8, illustrating the construction of the knife-edge contact for closing an electrical circuit when the lids jam in the chute,

Figure 10 is a perspective view of the tin scrap discharge chute (also shown at the right of Figure 2) illustrating the position of the electrical contact for closing a circuit when the metal jams thereagainst,

Figure 11 is a plan view of the contact shown in Figure 10,

Figure 12 is a side elevation,

Figure 13 is an end elevation,

Figure 14 is a detail sectional view illustrating the construction and disposition of the starting lever shaft on the press frame, taken substantially on the line 14—14 of Figure 1,

Figure 15 is a front elevation of the iron base which supports the electro-magnets,

Figure 16 is a side elevation thereof,

Figure 17 is a detail cross section taken substantially on the line 17—17 of Figure 2 and Figure 18 is a cross section taken on the line 18—18 of Figure 10.

The automatic tin-strip feed press requires a brief descriptive introduction so that its purpose and mode of operation and the purpose and mode of operation of the invention, may be known. The press comprises a frame 1, with a rack 2 on which the tin strips T are piled, in readiness to be placed on the shelf or ledge 3, as shown in Figure 2.

From this shelf or ledge, single sheets of tin are picked up by suction cups 4, fed into the so called magazine 4ª (Fig. 17) of the press and then to the right over the die 5 (see Fig. 10) to be acted on by the punch or dolly 6 (see Figs. 1 and 2), and thus produce tin can tops *t*, two of which are shown in the discharge chute 7 in Figure 8. The mechanism by which the tin sheets are fed into the press includes pusher rods 4ᵇ (Fig. 2) which have heads 4ᶜ fitted with angle irons 4ᵈ to properly engage the sheets for the purpose stated. The scrap tin is carried away by the scrap chute

8 (see Fig. 1.) into which the metal is "kicked" by the properly timed impeller 9, shown in Figure 2. The construction of the scrap chute 8 includes the opposed angle irons 8^a which provide a supporting frame work for the chute proper 8^b; (Fig. 1). Situated at the left and right respectively of the chute (Fig. 10) are members 8^c and 8^d for functioning to properly guide the scrap 10 until the chute portion 8^b is reached.

The press is subject to a number of mal-operations, which the invention is designed to remedy to the extent of promptly stopping the press so that the cause of such operation may be removed. Such causes are the introduction into the machine of two plates T or of an excessively thick plate, sticking of the metal on the die 5 due to improper sharpening of the latter, clogging of the chute 7 by can tops, and clogging of the chute 8 by pieces of scrap metal.

The tin strip contact 10 comprises a plunger with a ball-end 11, normally pressed down by the spring 12 (see Fig. 3) so that a sheet of tin T must be forced into position therebeneath after having been picked up by the suction cups 4 in Figure 2. A tin plate of normal thickness simply raises the plunger 10 without bringing the contacts 13 and 14 into engagement, but when a plate of unusual thickness (see dotted lines Fig. 3) or two plates are forced under the ball 11, the contacts 13 and 14 will then be brought into engagement and short-circuit the electro-magnet 15 (Fig. 1) which in turn release the lever 16 so that the press is stopped. The lever 16 falls by gravity against the rubber cushion 17.

It is necessary to understand the electrical circuit which embraces the electro-magnets 15, and which is affected by the closure of the contacts 13 and 14. A suitable source G furnishes electrical current, one wire 18 being grounded to the frame 1 of the press, another wire 19 running to the binding screw 20 of a metal ring 21 on one of two junction blocks. A lamp L is connected in the wire 19 for the purpose of providing a resistance. A wire 22 runs from the binding posts 23 on the junction ring 21, to one of the binding posts 24 of the electro-magnets 15 (see Fig. 16) the other binding post being grounded to the iron base 25, and so to the frame of the press as indicated in Figure 1.

Under normal conditions, i. e. the proper operation of the press, current flows from the source G, through lamp L over wire 19, junction ring 21, magnets 15 to ground at the frame, returning therefrom over wire 18 to the source G. The resultant energization of the electro-magnets 15 is sufficiently strong to maintain the attraction of the starting lever 16 through the normal jarring of the press due to the operation thereof. An abnormal jar will shake the lever 16 loose so that it falls and stops the machine.

The closure of the contacts 13 and 14 (described above) short circuits the electro-magnets 15 with the same result, current then flowing along the following path: From the source G over wire 19 to the binding post 20 and ring 21 of the first junction block, out at binding post 26, over wire 27 through the binding post 28 of the metal ring 29 of the second junction block, out at binding post 30, over wire 31 to the contacts 14, from thence to the contact 13 (now in engagement) and back to the negative pole of the source G through the ground connections and wire 18.

The tin strip contact comprises a metal bushing 32 with threads at the bottom and a non-circular head by means of which the bushing is screwed into a suitable opening in the press frame. This bushing has internal bores of several sizes; the bore 33, which accommodates the plunger 10, is tapered, the bore 34 is larger than the latter, and the bore 35 is threaded to receive the insulating plug 36. An opening 37, communicating with the bore 34, reveals the contacts 13 and 14. A contact screw 38, occupying a threaded bore in the bushing 36, carries the contact 14 which in turn is affixed to a spring 38^a in a bore of the screw 38. The spring is held in place by a plug 39 through which the connection of the wire 31 to the tin strip contact is made. The insulating bushing or plug 36 has kerfs 40 at quarters (see Fig. 5) so that upon screwing the plug down into the bushing 32, the adjustment of the contact screw 38 becomes fixed.

The can top contact 41 consits of a piece of metal bent into L-shape and having the lowermost edge (Figs. 8 and 9) sharpened so as to cut through the enamel or other covering on the can top and complete an electrical circuit, in the event that one or more of such can tops ride on top of others and thus clog the chute 7. The electrical circuit mentioned, may be traced in Figure 1: Current flows from the source G over wire 19, junction ring 21 and wire 27 to the second junction ring 29, out at the binding post 42, over wire 43 to the knife edge contact 41, through the metal of the can top to ground at the frame of the press, thence returning to the source G via wire 18.

The completion of this circuit again results in short circuiting the electro-magnets 15 so that the latter lose strength and are compelled to release the lever 16 so that the press is stopped. The connection of the wire 43 is made directly to the contact 41 as shown in Figure 8. This contact is supported by a bracket 44. and the latter in turn by the side of the chute 7. A block of insulation 45 separates the contact from the bracket.

Although the description immediately following has no direct bearing on the invention itself, it may not be out of place to say that the can tops from the chute 7 are discharged into the semi-circular throat 46 wherein the edges are curled by coming in contact with the groove-edged curler wheel 47. The can tops sometimes clog at the mouth of the throat 46 before being engaged by the curler wheel 47, and under such circumstances, it is necessary to stop the press. This is accomplished through the function of the knife-edge contact 41 and in the manner just disclosed.

The scrap chute contact 48 is much on the order of the contact 41 just described, the exception being that the knife edge of the latter is now omitted, and the contact is turned up instead of down. The contact 48 has a beveled approach 49. It is mounted beneath the scrap chute 8 (see Fig. 10) an insulating block 50, however, intervening. It is only when the chute 8 becomes clogged by an accumulation of scrap tin, that the contact 48 functions to stop the press, this being accomplished by short circuiting the electro-magnets 15, current flowing along the following path: From the source G over wire 19 to the junction ring 21, out at the binding post 51, over wire 52, to the contact 48, returning to the negative pole of the source of energy via the ground connection and wire 18. As before, the electro-magnets 15 are short circuited, causing the release of the lever 16 and the consequent stopping of the press. The lever 16 has a connection 53 which extends to the means (not shown) by which the press is stopped.

The edge of the contact 48 (Fig. 10) does not reach high enough to make contact with the scrap so long as it lays flat in the trough above it, and does not become jammed. But the scrap is so light from having ends cut out of it, that if it happens to catch in the chute it wads up so that the impeller 9 (Fig 2) pushes the scrap down against the contact edge 48. The normal function of the impeller is to "kick" the scrap out of the chute.

It sometimes happens that the scrap chute is not adjusted properly, permitting the scrap to get underneath the chute. In such event, it strikes the beveled approach 49 which, again, short circuits the current and stops the press. It may also happen that the stripper-ring on the punch of the press may push jammed scrap against the contact. In any event, the tendency of the scrap to jam in the chute soon causes a sufficient piling or doubling up of the scrap between the two pieces of angle iron of which the chute is composed, thereupon making contact with the member 48 and performing the function mentioned.

The bearing bracket 54 (Fig 1) supports the outer end of the starting lever shaft 55 (Fig. 14) the reduced end of which moves freely in it. It is important that the stopping lever 16 should have very little friction at the moment when it is disengaged from the magnet 15. To further this purpose, the frame 1 has an aperture at the right side made sufficiently large to avoid contact with the starting lever shaft 55. The left reduced end of the shaft 55 has bearing in the left side of the frame. The lever 16 is fixed on the shaft 55. The bracket 54 is secured by means of a screw 56 and dowels 57. It is desirable that the starting lever shaft should be loose enough in its bearing to allow a rolling motion and thereby facilitate the movement of the lever upon deenergization of the magnet.

Both electric junction blocks are alike in construction. One is shown in detail in Figure 7. The junction ring 21 (mentioned before) is secured on the thick insulating washer 58 by the four binding screws. This washer is fitted against a larger but thinner insulating washer 59, all being held in place on the side of the frame by the central screw 60.

While the construction and arrangement of the improved automatic stop motion mechanism as herein described and claimed, is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:—

1. Stop motion mechanism, including a starting and stopping lever, and electromagnetic means energized to hold the lever in the starting position with a predetermined force, to withstand vibrations of a strength equal to said force but not those in excess thereof.

2. Stop motion mechanism, comprising a starting and stopping lever subject to vibrations, electro-magnetic means for holding the lever in the starting position, and an electrical circuit for energizing said means to produce a holding force of a predetermined strength on the lever to counteract vibrations of equal force but not those in excess thereof.

3. Stop motion mechanism, comprising a starting and stopping lever subject to vibration, electro-magnetic means for holding the lever in the starting position, and a closed electrical circuit furnishing current to said means to hold the lever during vibrations of a strength equal to that of said means, but not in excess thereof.

4. Stop motion mechanism, comprising a starting and stopping lever subject to vibration, electro-magnetic means for holding the lever in the starting position, a closed electrical circuit furnishing current to said

means to hold the lever during vibrations of a strength equal to that of said means, but not in excess thereof, and associated means for short-circuiting said electromagnetic means to weaken the hold of the latter for the release of the lever.

5. In combination with a machine causing vibration in operation, a lever for starting and stopping the machine, and means to which the lever adheres in the starting position during vibrations of a predetermined normal strength but which is overcome by vibrations exceeding said strength to drop the lever to the stopping position.

6. In combination with a machine causing vibration in operation, a lever by which the machine is started and stopped, an electro-magnet in a circuit which remains closed to continuously energize the magnet at a certain strength to hold the lever in the starting position during normal vibrations which if exceeded jars the lever loose, and electrical contact means distributed among a plurality of locations throughout the machine, closable by a malfunctioning of machine parts at such locations to short circuit the electro-magnet for the weakening thereof and the release of the lever.

7. In combination with an automatic press including sheet feed mechanism, a die, a chute for the product, a scrap chute and a lever for starting and stopping the press; an electro-magnet continuously energized at a predetermined strength to hold the lever in the running position but being adapted to be jarred loose by vibrations exceeding the strength of the magnet when the sheet sticks on the die, and electrical contact means closable to short circuit and weaken the electro-magnet for the dropping of the lever and stopping of the press, upon the feeding in of an extra thick sheet, or the clogging of the product chute or the clogging of the scrap chute respectively.

8. The method of automatically stopping a press, consisting of jarring its starting and stopping lever loose from an energized electromagnet while in a running position by vibrations caused by the press and exceeding the strength of the electromagnet.

9. The method of automatically stopping a press, consisting of holding its starting and stopping lever in a running position by a predetermined force, jarring the lever loose to fall to the stopping position, by vibrations of a strength exceeding said force and caused by the operation of the press; and diminishing said force for the release of the lever through instrumentalities becoming active upon the mal-functioning of parts of the press.

10. In an automatic strip feed press, a starting and stopping lever, continuously energized electro-magnetic means for holding the lever in the running position, and a contact associated with the feed mechanism and in shunt circuit with said electro-magnetic means, including a stem moved to close a circuit by a strip of extra thickness, and thus short-circuit the electro-magnetic means for the release of the lever.

11. In an automatic strip feed press including a starting and stopping lever, continuously energized electro-magnetic means for holding the lever in the running position, and contact means associated with the feed press mechanism and in shunt circuit with said electro-magnetic means, including a relatively fixed contact point and a relatively movable contact point pressed into engagement with the relatively fixed contact point by the admission of a strip of extra thickness to close the associated circuit and short circuit the electro-magnetic means for the release of the lever.

12. In an automatic strip feed press including a starting and stopping lever, and a discharge chute; a closed circuit embracing and continuously energizing electro-magnetic means for holding the lever in the running position, and insulated contact means in the chute, closing a circuit when the latter becomes clogged to short-circuit the electro-magnetic means and cause the release of the lever.

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