A. S HOWELL.

PNEUMATIC FILM CONTROLLING DEVICE.

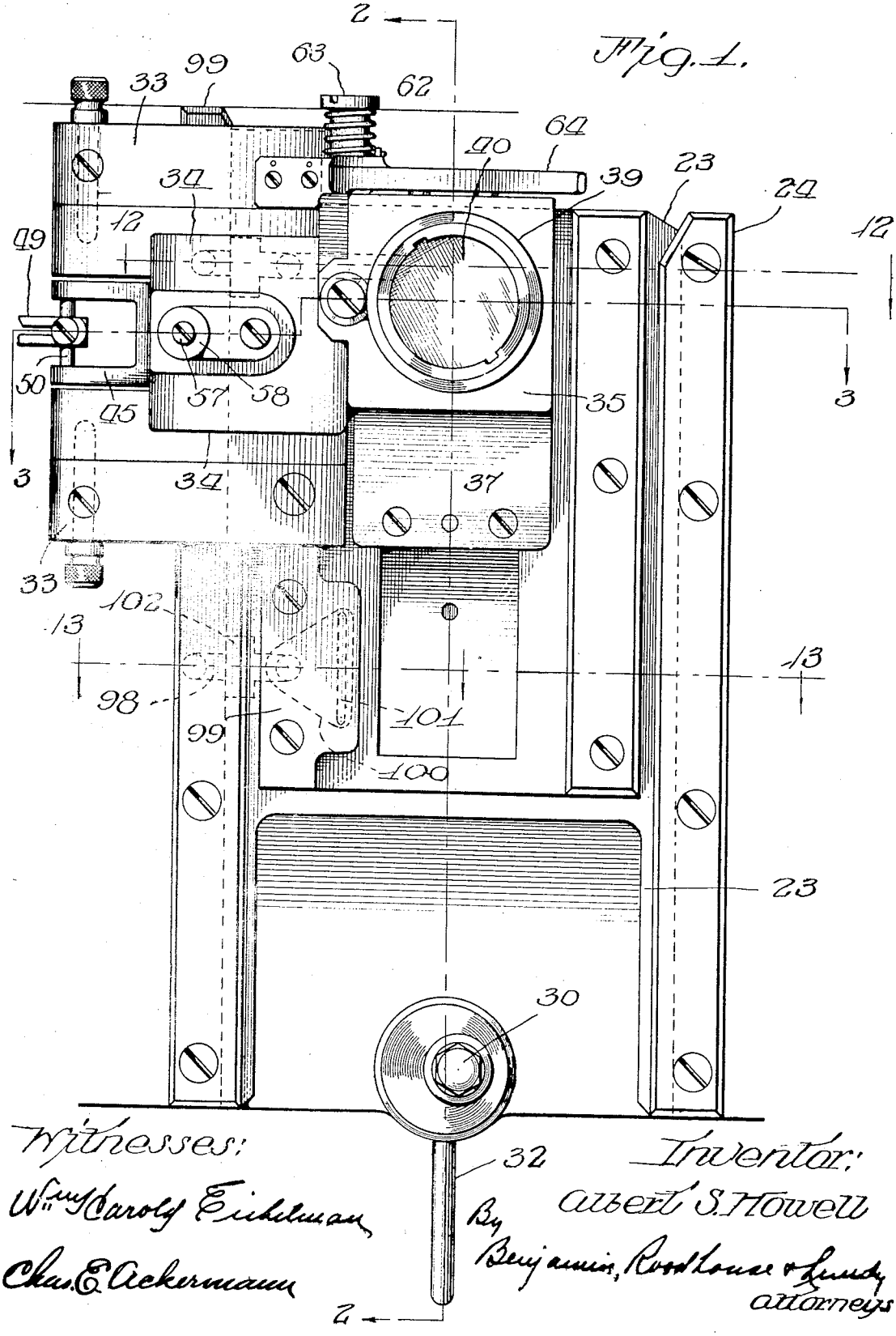
APPLICATION FILED APR. 22, 1915.

1,231,360.

Patented June 26, 1917.

7 SHEETS—SHEET 1.

Fig. 1.



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PNEUMATIC FILM CONTROLLING DEVICE.

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7 SHEETS—SHEET 2.

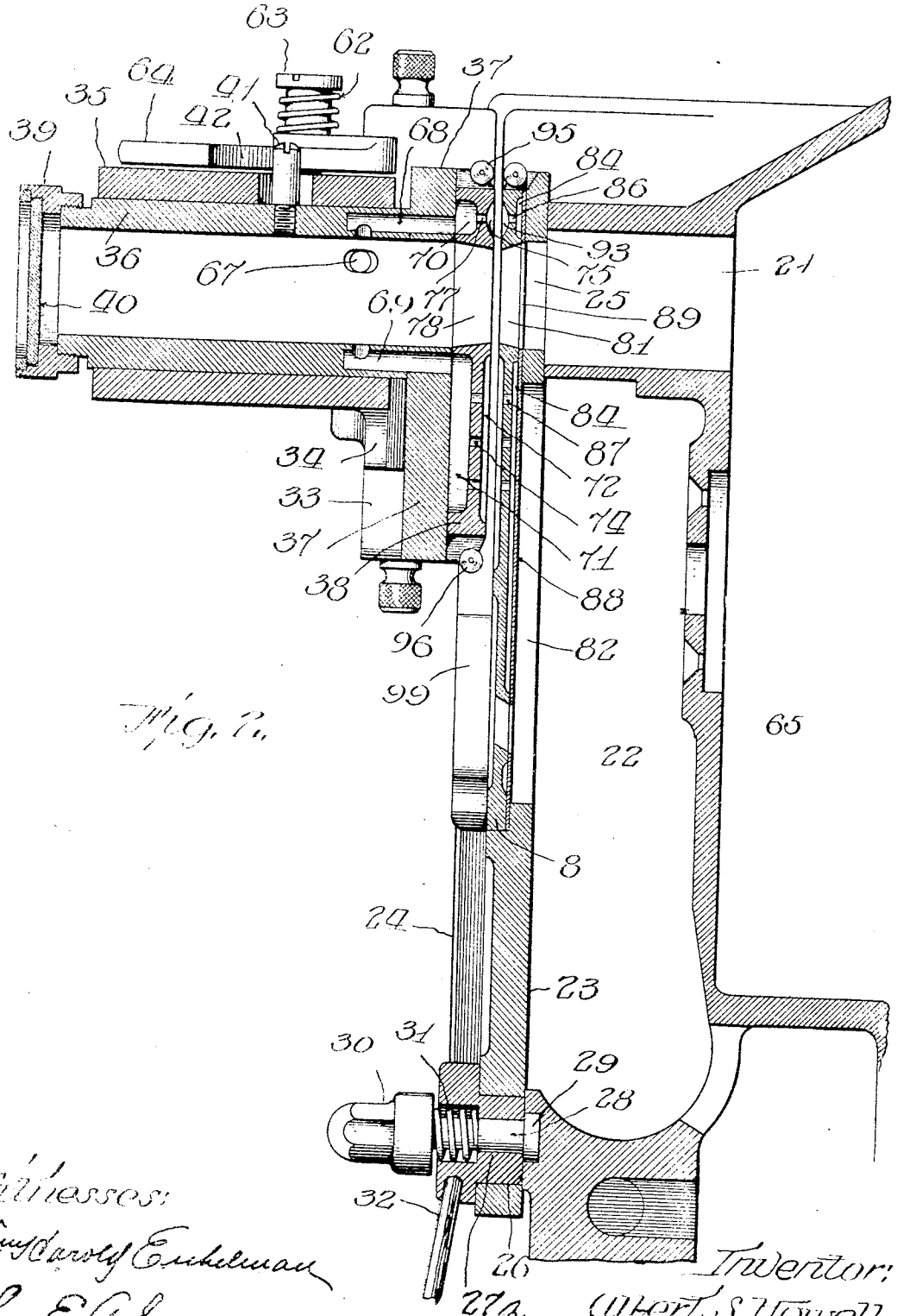


Fig. 7.

Witnesses:

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PNEUMATIC FILM CONTROLLING DEVICE.

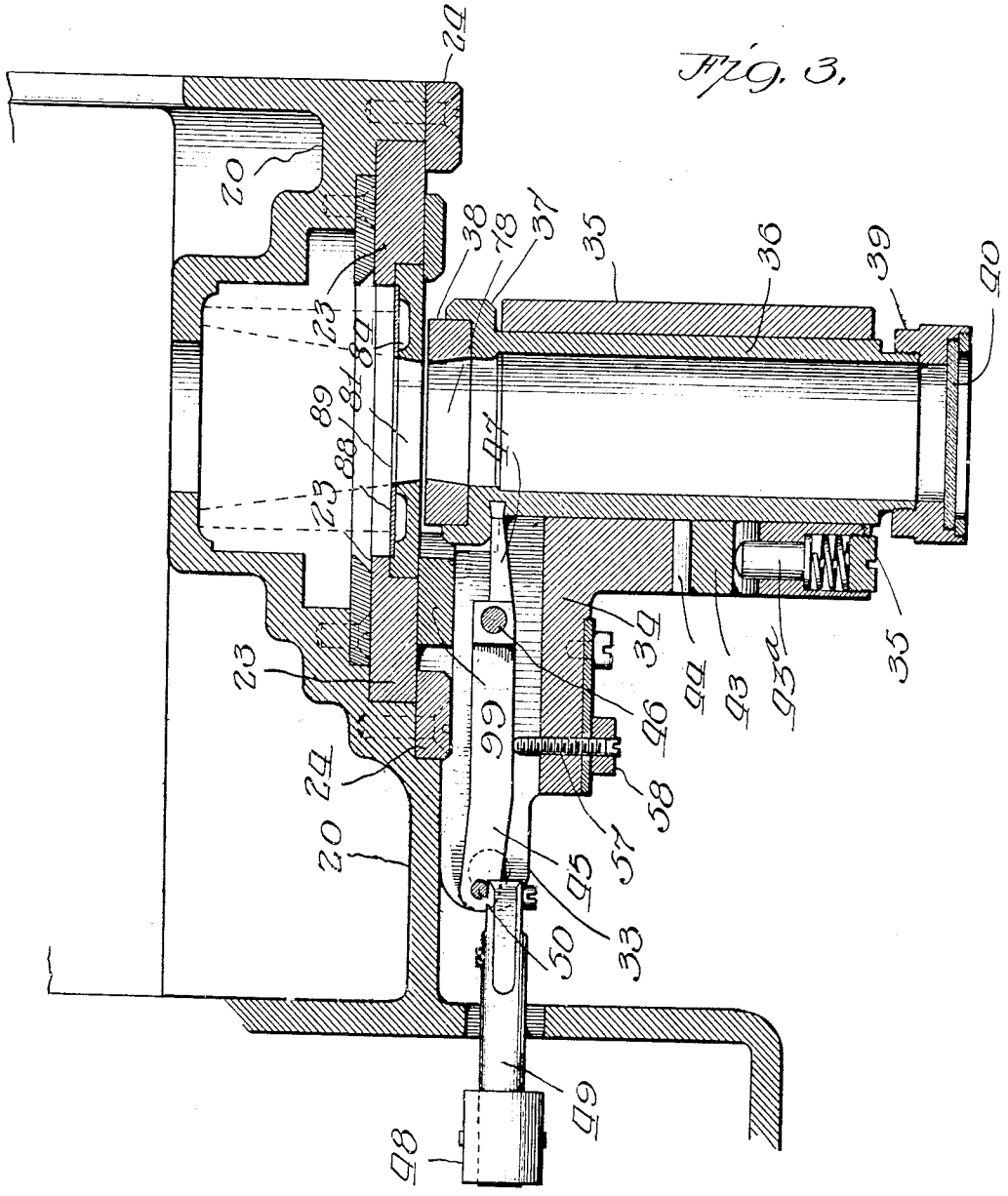
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7 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

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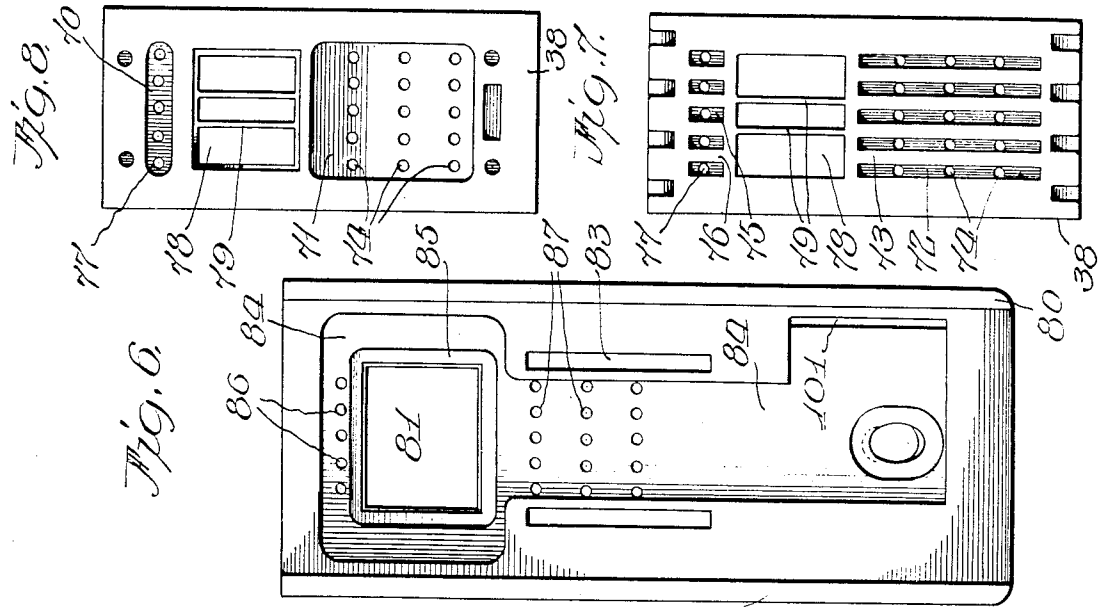
PNEUMATIC FILM CONTROLLING DEVICE.

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Patented June 26, 1917.

7 SHEETS—SHEET 4.



Witnesses:

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PNEUMATIC FILM CONTROLLING DEVICE.

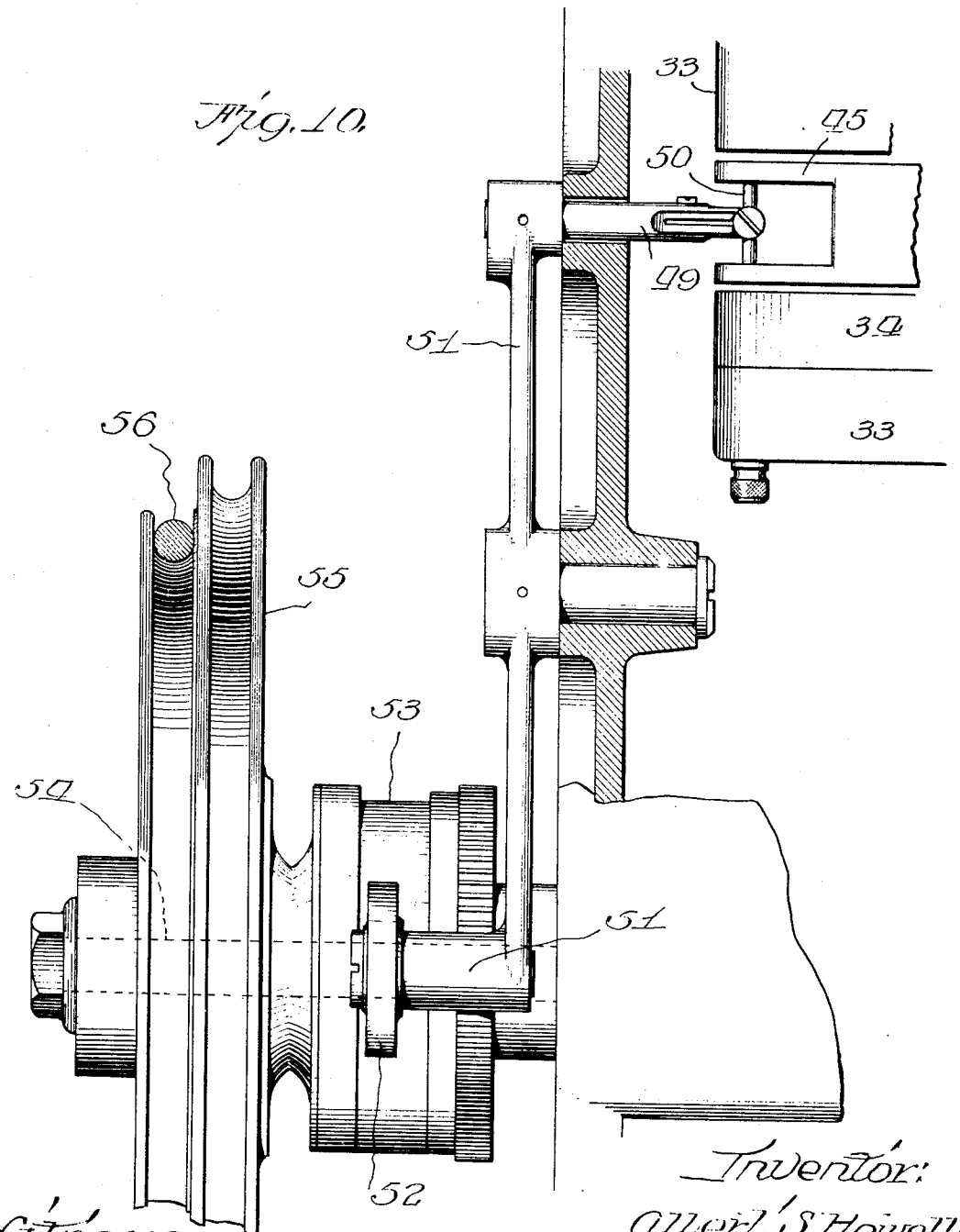
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7 SHEETS—SHEET 5.

Fig. 10.



Witnesses:

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7 SHEETS—SHEET 6.

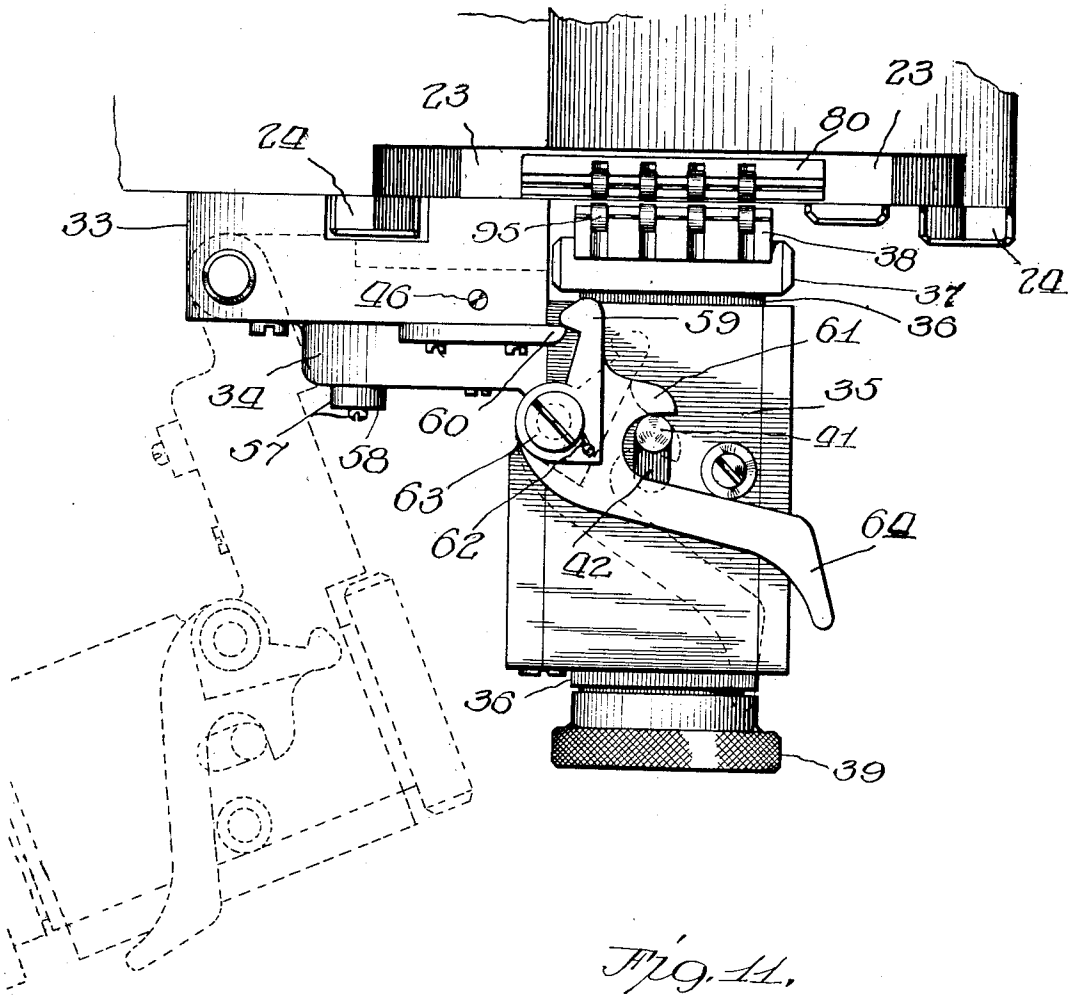


Fig. 11.

Witnesses:

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PNEUMATIC FILM CONTROLLING DEVICE.

APPLICATION FILED APR. 22, 1915.

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7 SHEETS—SHEET 7.

Fig. 12.

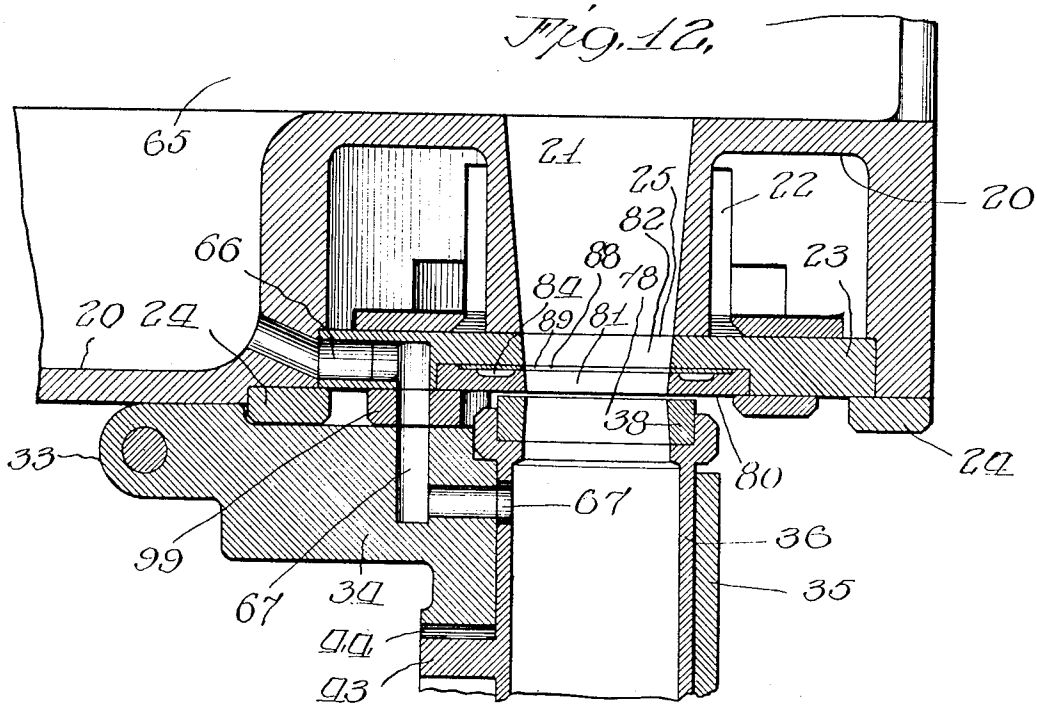
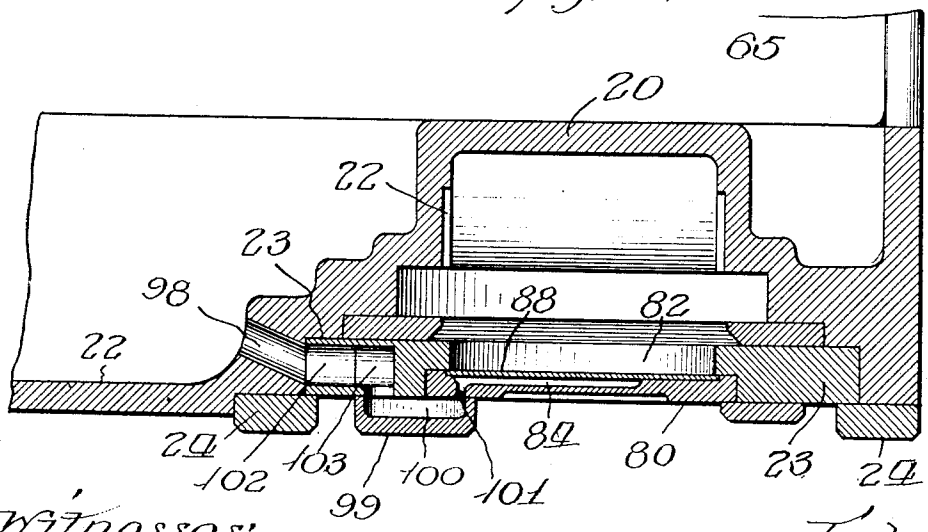


Fig. 13.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC FILM-CONTROLLING DEVICE.

1,231,360. Specification of Letters Patent. Patented June 26, 1917.

Application filed April 22, 1915. Serial No. 23,019.

To all whom it may concern:

Be it known that I, ALBERT S. HOWELL, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Pneumatic Film-Controlling Devices, of which the following is a specification.

My invention relates to cinematographic or motion picture apparatus wherein one or more strips of film are adapted to traverse a passage or conduit in front of a light opening. In devices of this kind it has heretofore been the practice to move the film through the conduit or passage upon suitable rollers or similar antifrictional elements for the purpose of permitting of the easy passage of the film. Owing to the extremely sensitive nature of the emulsion upon said film the friction generated by the engagement thereof by these rollers frequently causes scratches upon the surface of the film so that said film often is seriously damaged thereby and rendered unfit for further use.

It is therefore the principal object of my invention to provide means for permitting the film to traverse the conduit or passage in front of the light orifice with the danger of marring the same reduced to a minimum. It is a further object of my invention to provide suitable means whereby the film in transit through the passage or conduit will be held in suspension away from the side walls of said passage in a current of air impelled against opposite sides of said film. Still another object of my invention is the provision of suitable means whereby the air pressure may be constantly maintained in the film passage so that should the apparatus be stopped by accident or at predetermined points the film will be prevented from igniting by the heat of the light waves projected through the light orifice. Other objects of my invention are the provision of an apparatus of the type described that is simple in construction and consequently easy to operate, effective in attaining the advantages specified and economical to manufacture.

I prefer to accomplish the above, and other objects of my invention, by the means and in the manner hereinafter fully described and as more particularly pointed out in the claims, reference being had to the accompanying drawings wherein a preferred form of my invention is disclosed.

In the drawings—

Figure 1 is a front elevation of a fragmentary portion of a cinematographic apparatus showing my invention applied thereto.

Fig. 2 is a vertical sectional view thereof taken on line 2—2, Fig. 1 and looking in the direction indicated by the arrows.

Fig. 3 a transverse horizontal sectional view taken on line 3—3, Fig. 1 and looking in the direction indicated by the arrows.

Fig. 4 is an elevation of one of the backing plates employed in connection with the film conduit walls.

Fig. 5 is a front elevation of the stationary wall or plate of the film conduit.

Fig. 6 is a rear elevation of said stationary wall or plate.

Fig. 7 is an elevation of the movable plate or wall of the film conduit showing the face thereof adapted to oppose or lie against the plate shown in Fig. 5.

Fig. 8 is a rear elevation of the plate illustrated in Fig. 7.

Fig. 9 is a sectional view taken on line 9—9, Fig. 5.

Fig. 10 is a side elevation of the actuating mechanism for the movable wall of the film conduit.

Fig. 11 is a top plan of film conduit the movable wall and sight tube connected therewith being shown closed in full lines and illustrated in open position in dotted lines.

Fig. 12 is a horizontal section taken on the plane of line 12—12, of Fig. 1, looking in the direction of the arrows.

Fig. 13 is a horizontal section taken on the plane of line 13—13, Fig. 1, looking in the direction of the arrows.

It is known to persons skilled in the art of cinematography that the mechanism used to move the film in machines relating to one branch of the art is readily applicable to apparatus employed in other branches thereof. For example, a mechanism for moving the film in a camera for photographing the negative will actuate the same on other film when said mechanism is applied to a projecting machine for throwing the pictures upon a screen, or in a printing machine for printing the positive film from the the negative film. I have, therefore, deemed it unnecessary to herein illustrate any particular type of apparatus to which my invention is applied for it will be obvious the mecha-

nism may be employed in divers types of machines.

Referring to the drawings similar reference characters identify the same parts throughout the various figures.

By reference to Figs. 1 and 2 of the drawings it will be seen that 20 indicates the front wall of a suitable cinematographic apparatus that is of any convenient shape to accommodate the mechanism and which is provided with the usual aperture 21. Below this aperture is a vertically elongated recess or chamber 22 in which a suitable film actuating shuttle (not shown) of any desired type or construction is adapted to be mounted. The forward open portion of the shuttle recess is preferably closed by slidable film framing plate 23 that is held in position by guides 24, 24, engaging the longitudinal edges thereof so that said plate may be bodily reciprocated vertically.

Adjacent its upper end said plate 23 is provided with a rectangular shaped opening 25 of substantially the same proportions and dimensions as the view or scene upon the film, while adjacent its lower end said plate has a substantially circular opening 26 into which a cam disk 27 is fitted. This cam disk is mounted upon a short bolt 28 the head 29 of which is journaled in the front wall 20 of the apparatus and the outer end of said bolt has a nut 30 tapped thereon to retain an expansion spring 31 between the same and the outer face of said cam 27. By rotating the cam through the medium of the rod 32 the plate 23 is correspondingly raised or lowered in order to "frame" the scene upon the film and thereby bring the opening 25 in said plate in proper registry therewith.

Pivotally mounted in lugs or bosses 33 on the slide-plate 23 is a suitable gate 34 that is provided with a tubular embossment 35 integral therewith and which projects outwardly therefrom in axial alinement with the aperture 21 of the frame 20. Slidably fitted in the base of this embossment is a tube 36 the inner end of which is enlarged to provide a pendent number 37 to which the outer or movable wall 38 of the film passage (to be hereinafter fully described), is secured. Tube 36 is provided upon its outer end with a ferrule 39 in which a transparent disk 40 of ruby glass is mounted and through which the film in front of the aperture may be readily observed. During the intermittent movement of the film through the film passage it is desirable to move the outer wall away from the same a very slight distance and to accomplish this I prefer to reciprocate the tube 36 and the members carried thereby in the embossment 35. A set screw 41 is tapped into the upper segment of the tube 36 through a longitudinally elongated slot 42 made in the adjacent portion of the embossment so that the longitudinal movement of the tube is adapted to be limited thereby. A lug 43 projects laterally from the tube at substantially right angles to the set screw 41 and extends into an elongated slot 44 in the side of the embossment as shown in Fig. 3 of the drawings. This lug 43 is adapted to engage a spring pressed plunger 43^a fitted longitudinally the wall of the embossment and having its ends extended into the slot 44 which engages the lug 43 in order that the tube may be kept normally at the limit of its inward movement and thereby retain the outer wall of the film passage in a plane adjacent to or contacting the film.

A vibratory frame 45 is pivoted horizontally on a pin 46 extending transversely between the hinge lugs of the gate and the inner end of this frame is provided with a longitudinally extended arm 47 that is adapted to engage a recess in the adjacent portion of the tube 36. Motion is imparted to frame 45 by means of a vertically disposed lever 48 pivoted intermediate its ends on the wall of the apparatus. The upper portion of lever 48 carries a lateral rod 49 the free end of which engages a vertical transverse pin 50 carried by the adjacent portion of the vibratory frame 45. At its lower end lever 48 is provided with a lateral extension 51, upon the outer end of which a roller 52 is journaled, which latter is adapted to engage the circumference of a cam disk 53. A stub shaft 54 is secured to, and projects from the adjacent wall of the machine, and at one end carries grooved pulleys 55 with which the cam disk 53 is formed integral and said pulleys are driven by a belt 56 connecting them with any suitable source of power. From the above it will be obvious that the rotation of the cam disk with the pulley will oscillate the lever 48 which, through the rod 49 upon its upper end, will impart a vibratory motion to the frame 45 causing a rapid and slight reciprocatory motion to the tube 36 within the embossment 35. This motion of the tube is very slight and is so timed that the tube and film-passage wall 38 carried thereby will be moved several hundredths of an inch away from the film during each intermittent movement of said film past the aperture.

In order to limit the movement of the rocking frame 45, a screw 57 is tapped through the wall of the gate so that its inner end may be engaged by the frame and after the same has been properly adjusted it is locked by a nut 58 screwed onto the outer end of said screw.

In order to lock the gate in closed position I provide a suitable latch the operation of which is adapted to simultaneously move the tube and film-passage wall out-

wardly away from the film. The latch preferably comprises a hook-shaped pawl 59 the end of which engages the end edge of a strike plate 60 projected laterally from the front wall of the apparatus. Said pawl is provided with an arm 61 extended therefrom and in engagement with the guide pin 41, hereinbefore mentioned, so that the movement of the pawl is adapted to move the pin and the tube to which it is attached. A coiled spring 62 surrounds the post 63 upon which the pawl is pivoted and keeps said pawl normally pressed toward its strike plate and a handle member 64 is provided for actuating the latch.

As has hereinbefore been stated, one of the objects of my invention is the provision and distribution of an air pressure in order that the film may be firmly held in position when stopped in front of the aperture and to provide a current of air in which said film will be suspended during its movement through the film passage to thereby prevent scratching or marring of its sensitive emulsion surface. This air pressure may be generated and fed to the machine in any suitable manner the particular mechanism therefor not being shown. It is initially fed into the lamp house 65, which is substantially air-tight in order to cool the same and prevent over heating thereof. From the lamp house a portion of the air is admitted to the tube 36 through an angular passage 66 in the wall of the machine, the outlet opening of which registers with the inlet opening of an angular passage 67 made in the gate and embossment. Suitable longitudinal bores 68 and 69 communicate with the inner bore of tube 36 and discharge at their opposite ends in the recesses 70 and 71 made in the face of the movable wall 38 of the film passage. Suitable parallel grooves 72 are cut longitudinally in the opposite face of this plate so as to provide parallel ribs 73 between the same, while a plurality of holes 74 are tapped in said grooves to establish communication with both faces of the plate below the aperture 78. Similar grooves 75 and ribs 76 are formed opposite recess 70 and holes 77 establish communication between opposite sides of the plate above the aperture, and the latter is provided with a grating 79 across its face. The air entering the recesses 70 and 71, passes through holes 74 and 77 respectively where it is distributed into the grooves or channels 72 and 75 respectively communicating therewith. As the plate lies close to, or in contact with, the film when the latter is stationary, the air pressure is exerted against one surface of the film forcing it against the opposite or stationary wall of the film passage.

This stationary wall preferably comprises a plate 80 of substantially rectangular shape that is provided in its upper portion with an opening of rectangular outline registering with and providing a continuation of the aperture 21 of the apparatus. This plate is set into an opening 82 made in the front wall of the casing of the machine in front of the shuttle chamber 22 and is provided with longitudinal parallel slots through which the picks or teeth of the shuttle are adapted to operate. The back of the plate (Fig. 6) is preferably grooved out to provide a shallow chamber 84 through which the compressed air is adapted to circulate and a rim or flange 85 is provided around the aperture opening 81. Two sets of discharge holes 86 and 87 are respectively bored through the plate above and below the aperture opening through which the air passes to the opposite side of said plate. A closure or backing plate 88 (Fig. 4) is provided to fit this rear face of plate 80 and is likewise provided with an aperture opening 89 and pick slots 90 that register with the corresponding portions of the wall plate 80. The opposite face of this plate is provided with parallel longitudinal grooves 91 below the aperture opening into which the holes 87 discharge the air and which provide ribs 92 between each other. Above the aperture opening suitable grooves 93 are cut into which holes 86 discharge the air and which provide ribs 94 therebetween. Rollers 95 and 96 are journaled respectively at the upper and lower edges of the movable plate 38 and a set of alining rollers 97 are journaled in the upper edge of the stationary plate 80 opposite and alining rollers 95 in order to prevent friction of the moving film passing through the film passage.

A suitable air passage 98 similar to and below air passage 66 is made through the casing from the interior of the lamp house to the exterior of the framing or aperture plate 80 and the outer opening of said passage is covered by an escutcheon plate 99 secured to the face of said aperture plate. The rear face of the escutcheon is provided with a triangular shaped recess or depression 100 into which the air discharges and from which it is fed through a vertically elongated slot 101 to the opposite face of said aperture plate and into the air channel 84 above mentioned. In order to take care of the movement of the aperture plate during framing the bore of the passage 98 is preferably enlarged or lengthened vertically as at 102 where it registers with the bore 103 in said aperture plate.

From the above it will be observed that the air pressure is exerted upon the opposite surfaces of the film while it is in transit through the film passage, and the pressure being substantially the same upon both sides the film will be suspended away from the walls of the passage during movement. It

will also be observed that during the momentary stoppage of the film the air pressure will also be exerted against the surfaces thereof. This latter is especially advantageous when the mechanism is adapted to a film printing apparatus for the reason that the pressure will be exerted upon the outer surfaces of the negative and the positive film thereby holding them in position register and in close contact with each other during the moment of exposure in front of the aperture.

While I have herein illustrated and described certain specific means for carrying out my invention, it, of course, will be obvious to others skilled in the art of cinematography, that various modifications or refinements thereof are possible without departing from the spirit of my invention. I, therefore, desire it understood that all obvious modifications or refinements thereof are contemplated within the scope of my invention as expressed in the appended claims, and I do not limit myself to any particular type of cinematographic machinery to which my invention may be applicable.

What I claim is:—

1. In apparatus for moving film, an aperture element, a passage through which the film is adapted to travel past said aperture, and means for exerting pneumatic pressure upon the film during transit through said passage.

2. In apparatus for moving film, an aperture element, a passage through which the film is adapted to travel past said aperture, and means for exerting pneumatic pressure upon opposite surfaces of the film during its transit through said passage.

3. In apparatus for intermittently moving film, an aperture element, a passage through which the film is adapted to travel intermittently past said aperture, and means for exerting pneumatic pressure upon the film to suspend the same during its periods of motion through said passage.

4. In apparatus for moving film, an aperture element, a passage through which the film is adapted to travel past said aperture, and means for exerting pneumatic pressure upon the film to suspend the same during its transit through said passage.

5. In apparatus for moving film, an aperture element, means for moving film across said aperture, and provisions whereby pneumatic pressure is exerted against the film and the latter is held out of contact with the surrounding walls during transit.

6. In apparatus for moving film, an aperture element, means forming a passage through which the film is moved across said aperture, and provisions whereby pneumatic pressure is exerted against the film and the latter is held out of contact with said means during transit.

7. In apparatus for moving film, an aperture element, guide plates forming a passage through which the film is moved across said aperture, and provisions in said plates whereby pneumatic pressure is exerted against the film and the latter is held out of contact with said plates during transit.

8. In apparatus for moving film, an aperture element, means for intermittently moving film across said aperture, and provisions whereby pneumatic pressure is exerted against the film and the latter is held out of contact with the surrounding walls during its periods of movement.

9. In apparatus for moving film, an aperture element, means forming a passage through which the film is moved intermittently across said aperture, and provisions whereby pneumatic pressure is exerted against the film and the latter is held out of contact with said means during its periods of movement.

10. In apparatus for moving film, an aperture element, guide plates forming a passage through which the film is intermittently moved across said aperture, and provisions in said plate whereby pneumatic pressure is exerted against the film and the latter is held out of contact with said plates during its periods of movement.

11. In apparatus for moving film, an aperture element, a stationary guide plate, a guide plate adapted to be moved with relation to said first-mentioned guide plate and forming a passage therebetween through which the film is adapted to be moved across said aperture, and provisions whereby pneumatic pressure is exerted between said plates against the film and the latter is held out of contact with said plates during transit through said passage.

12. In an apparatus for moving film, an aperture element, a gate hinged adjacent to and movable in front of said element, a tubular member carried by said gate adapted to aline with said aperture element, an aperture plate carried by said tubular member, and a second aperture plate carried by said aperture element adapted to provide a passage-way in combination with the first-mentioned plate, through which passageway the film is adapted to travel, and means for causing said tubular member to reciprocate upon said gate independently of said aperture element and in a plane parallel thereto.

13. In an apparatus for moving film, an aperture element, a gate hinged adjacent to and movable in front of said element, a plate reciprocally mounted on said gate adapted to co-act with said aperture element and provide a passageway therebetween through which film is adapted to travel, means for reciprocating said plate comprising a lever pivoted on said gate which lever operatively engages said plate, and means

independent of the movement of said gate for effecting the vibratory movement of said lever.

14. In an apparatus for moving film, an aperture element, a gate pivotally mounted in front thereof, a plate reciprocally mounted on said gate, and means for reciprocating said plate independently of the movement of said gate, which said plate is adapted to coöperate with said aperture element and form a passage through which film is adapted to travel.

Signed at Chicago, Cook county, Illinois, this 19 day of April, 1915.

ALBERT S. HOWELL.

Witnesses:

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