

No. 839,966.

PATENTED JAN. 1, 1907.

R. SMITH.

FEED MECHANISM FOR CALENDER ROLLS OF PAPER MAKING MACHINES.

APPLICATION FILED MAY 9, 1906.

5 SHEETS—SHEET 1.

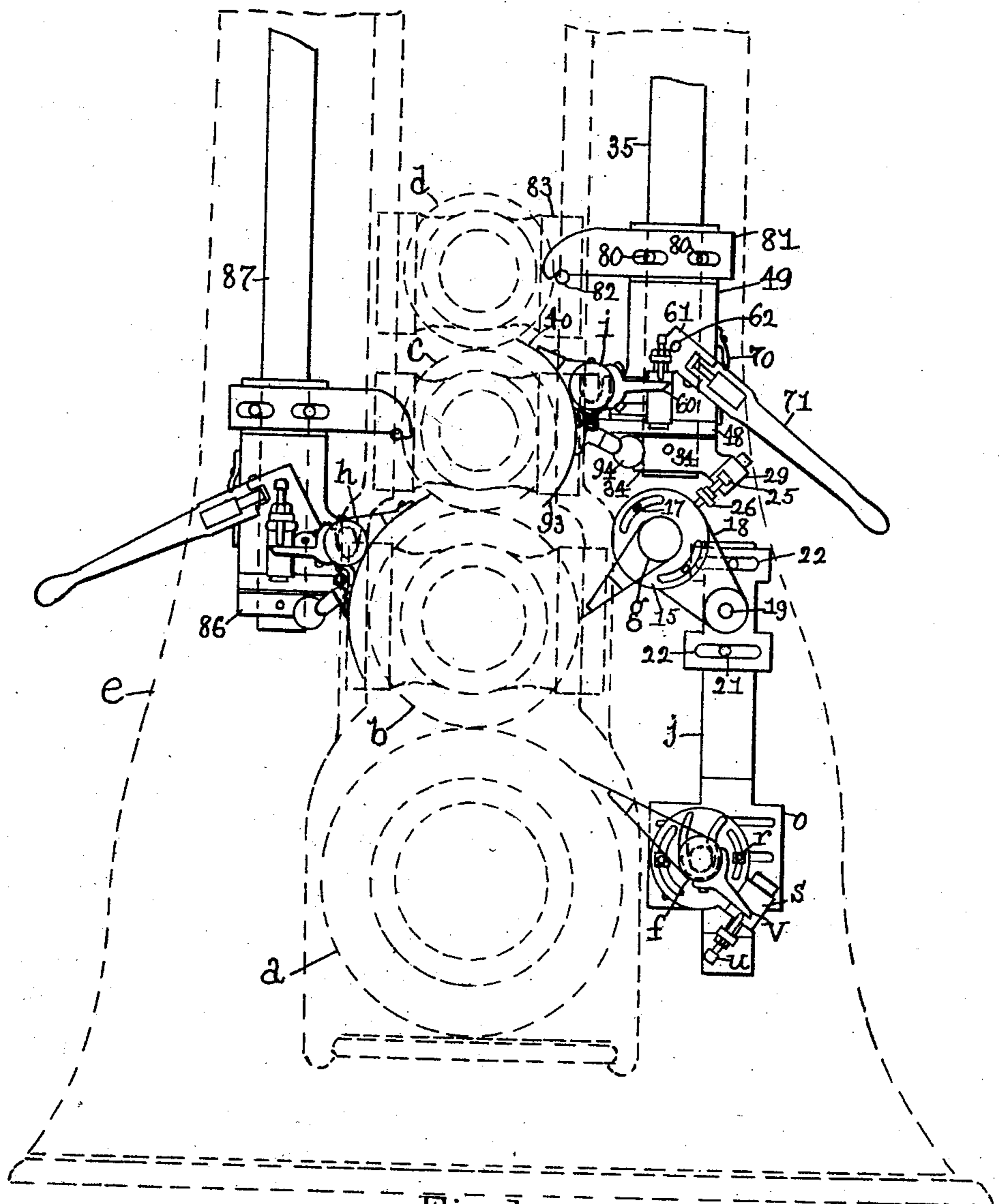


Fig. 1.

Witnesses.
C. W. Gannett
J. Murphy

Inventor.
Richard Smith
by Jas. H. Churchill
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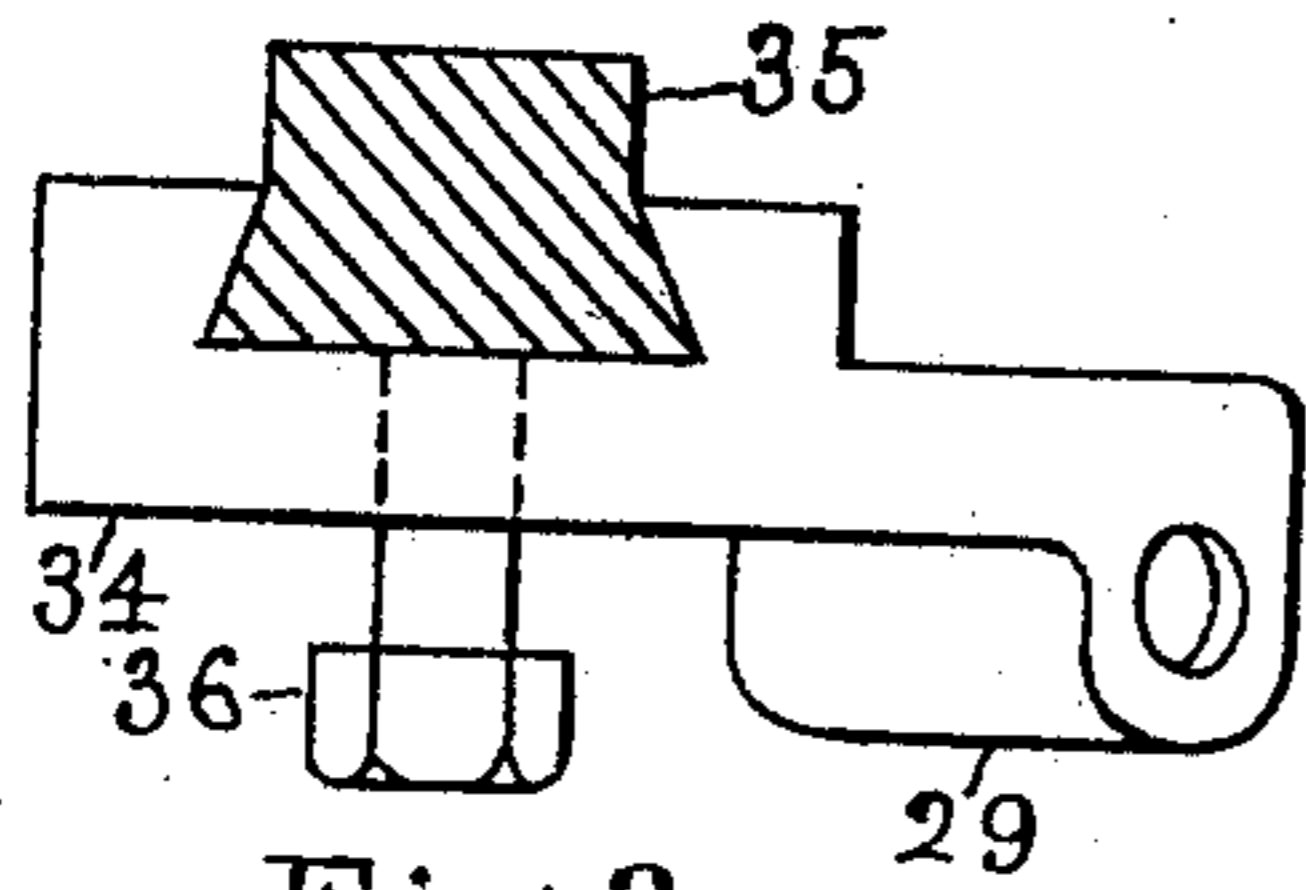


Fig. 3.

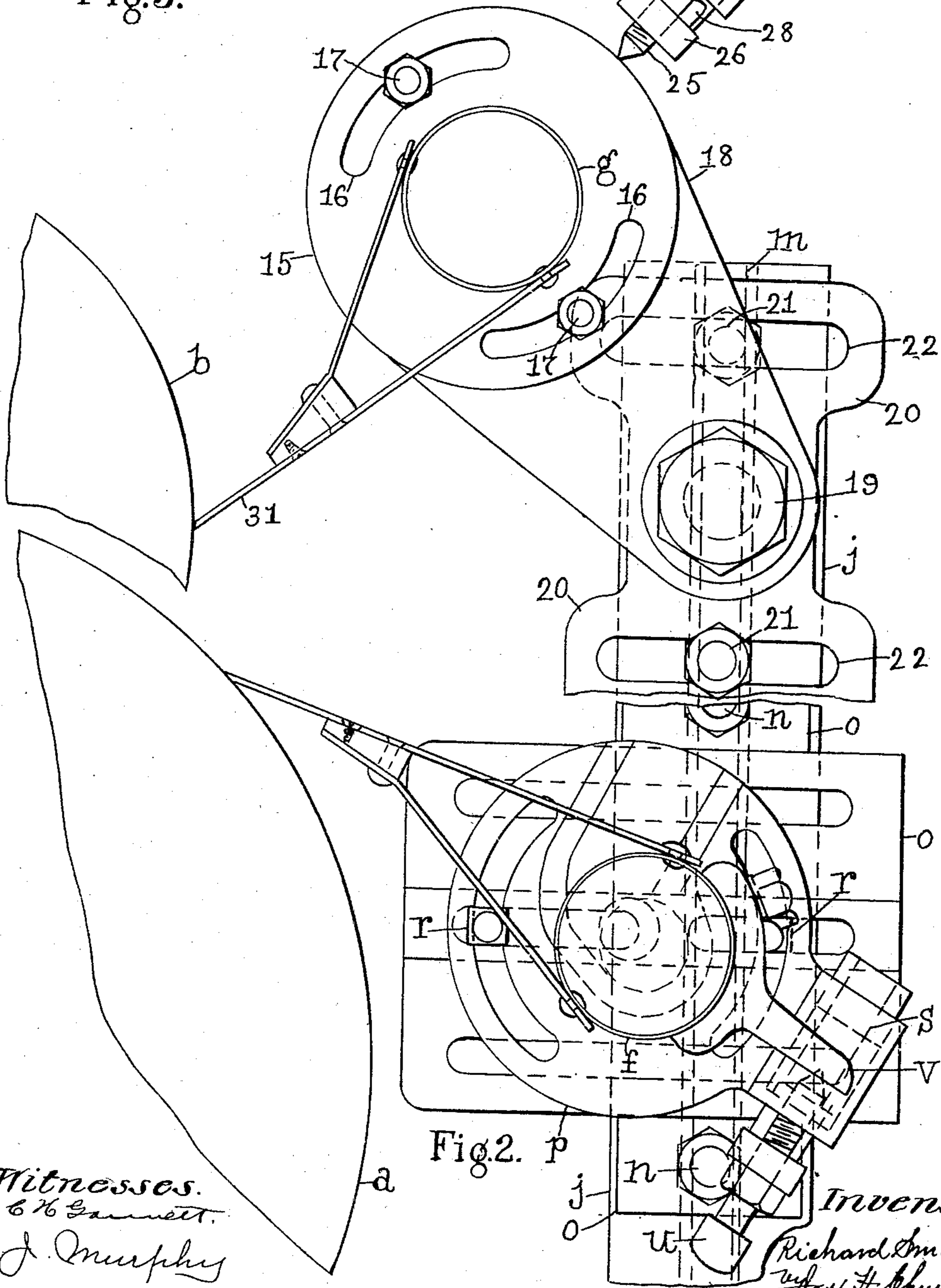
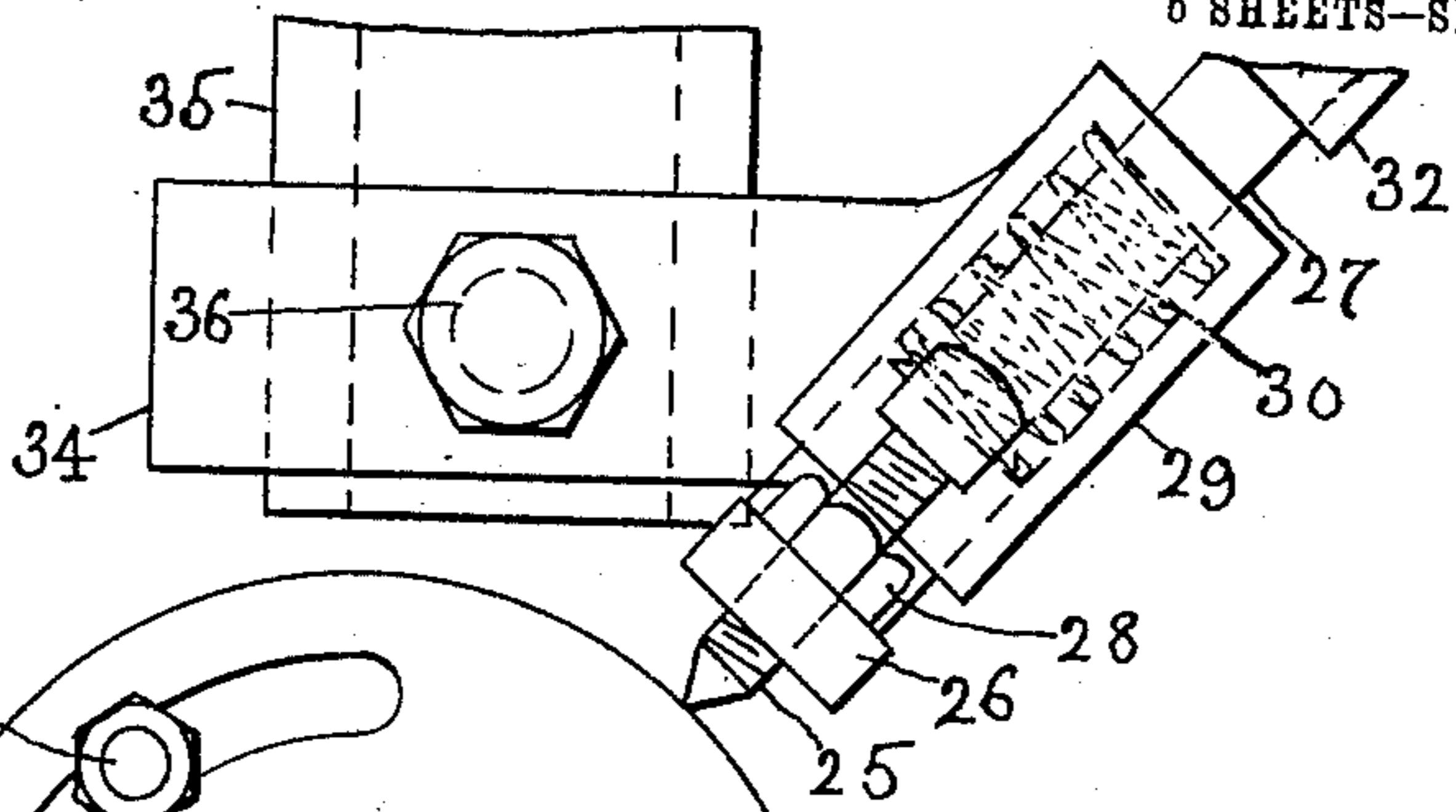


Fig. 2.

Witnesses.
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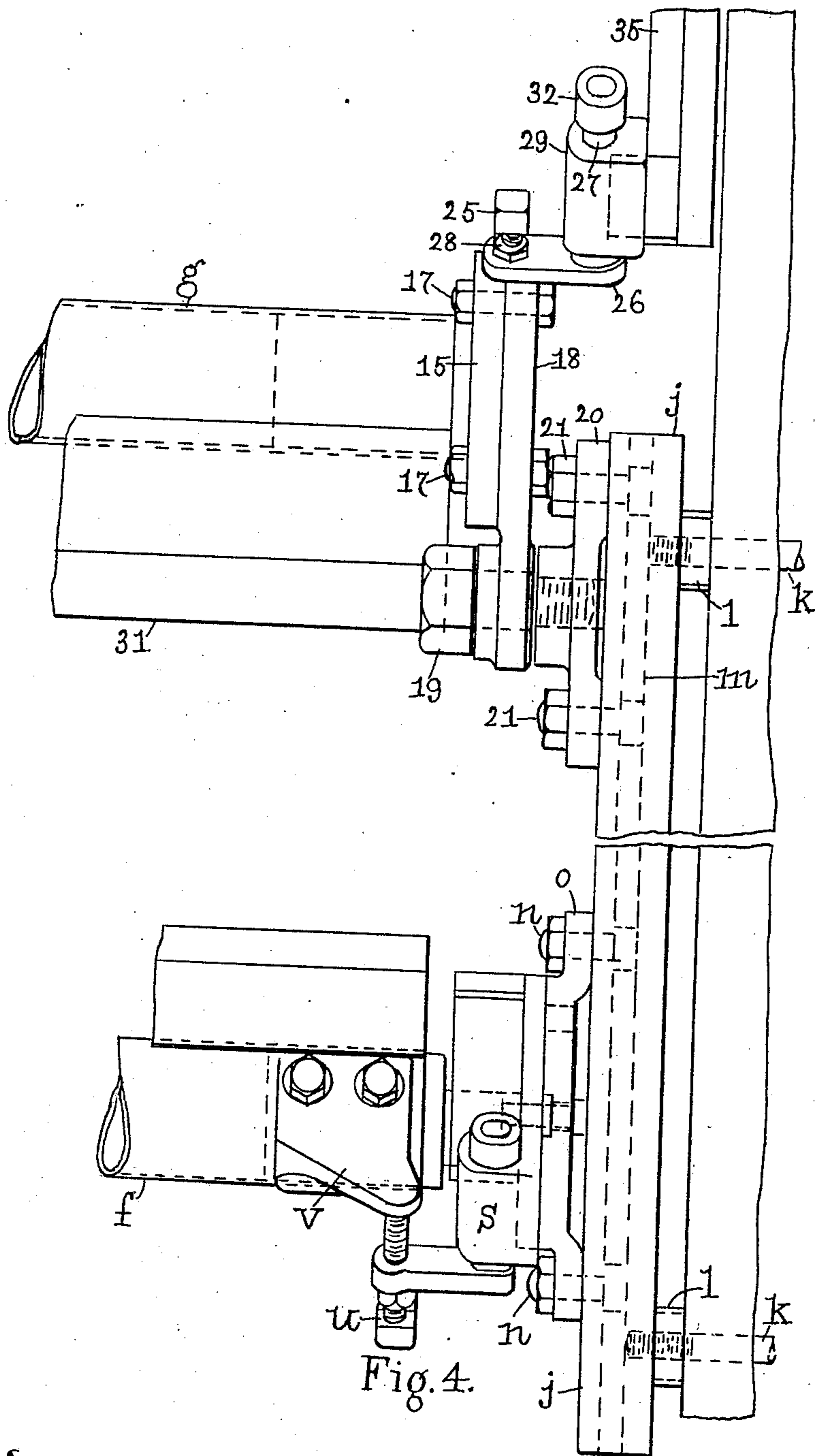


Fig. 4.

Witnesses.

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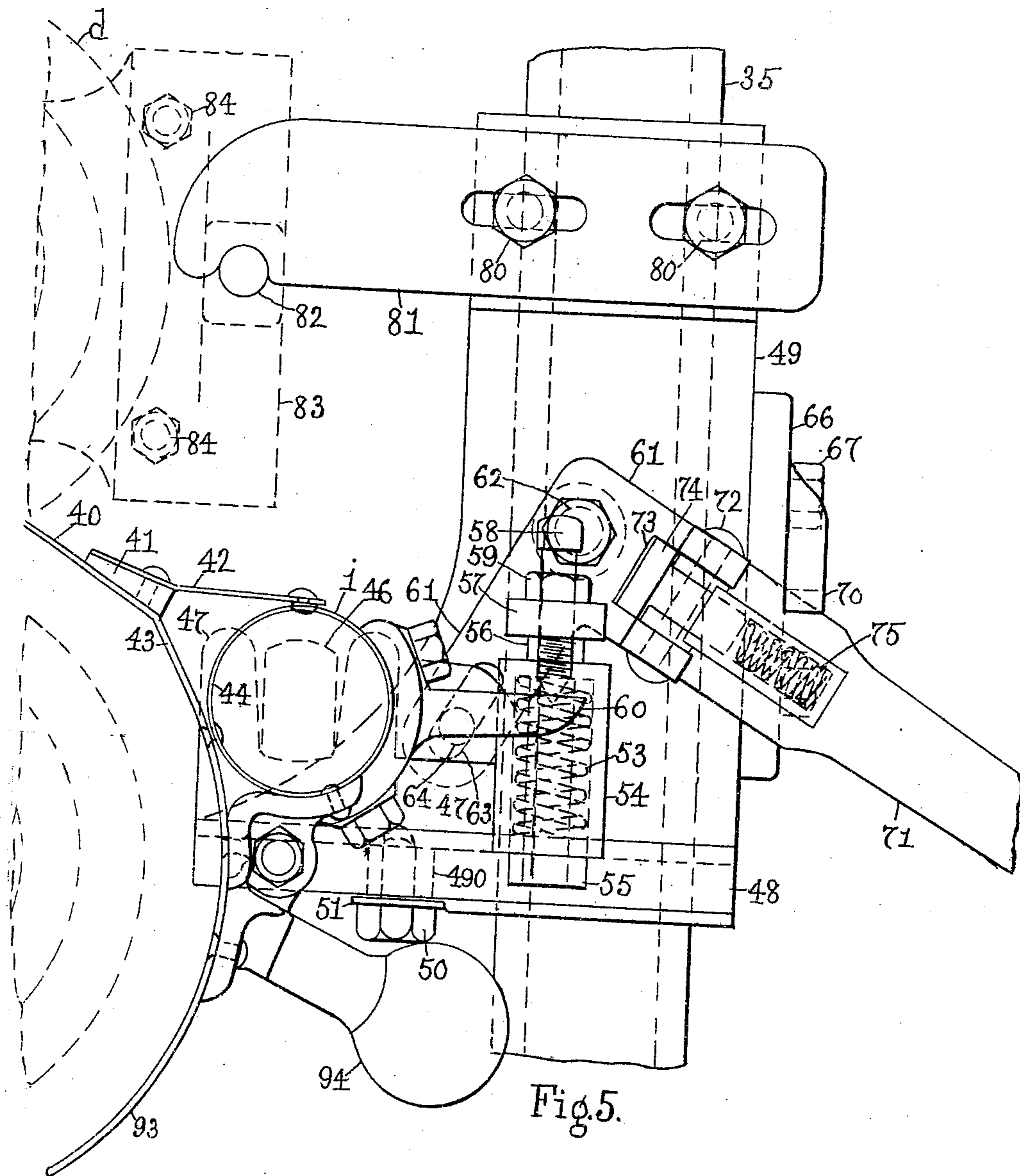


Fig. 5.

Witnesses.

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5 SHEETS—SHEET 5.

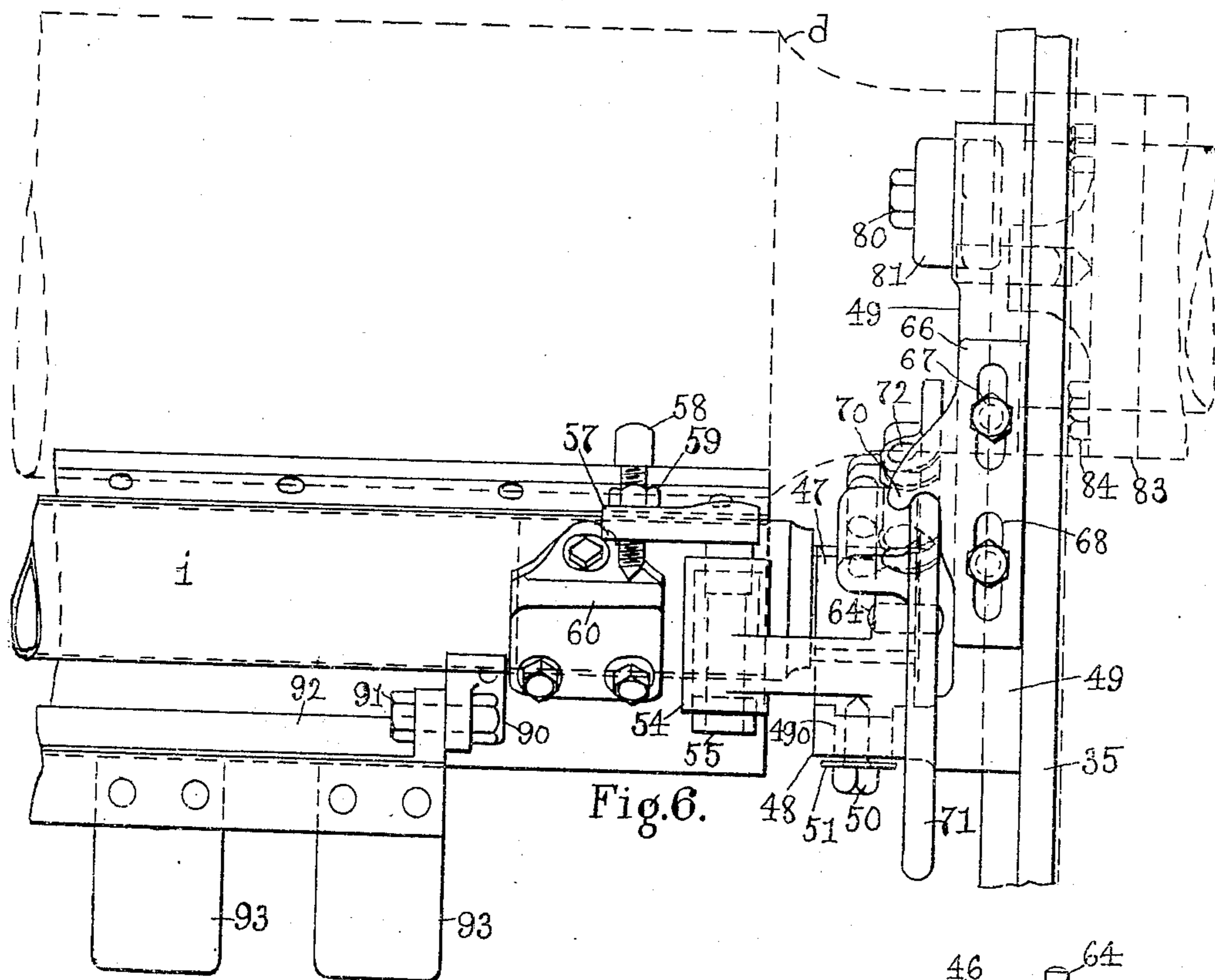


Fig. 6.

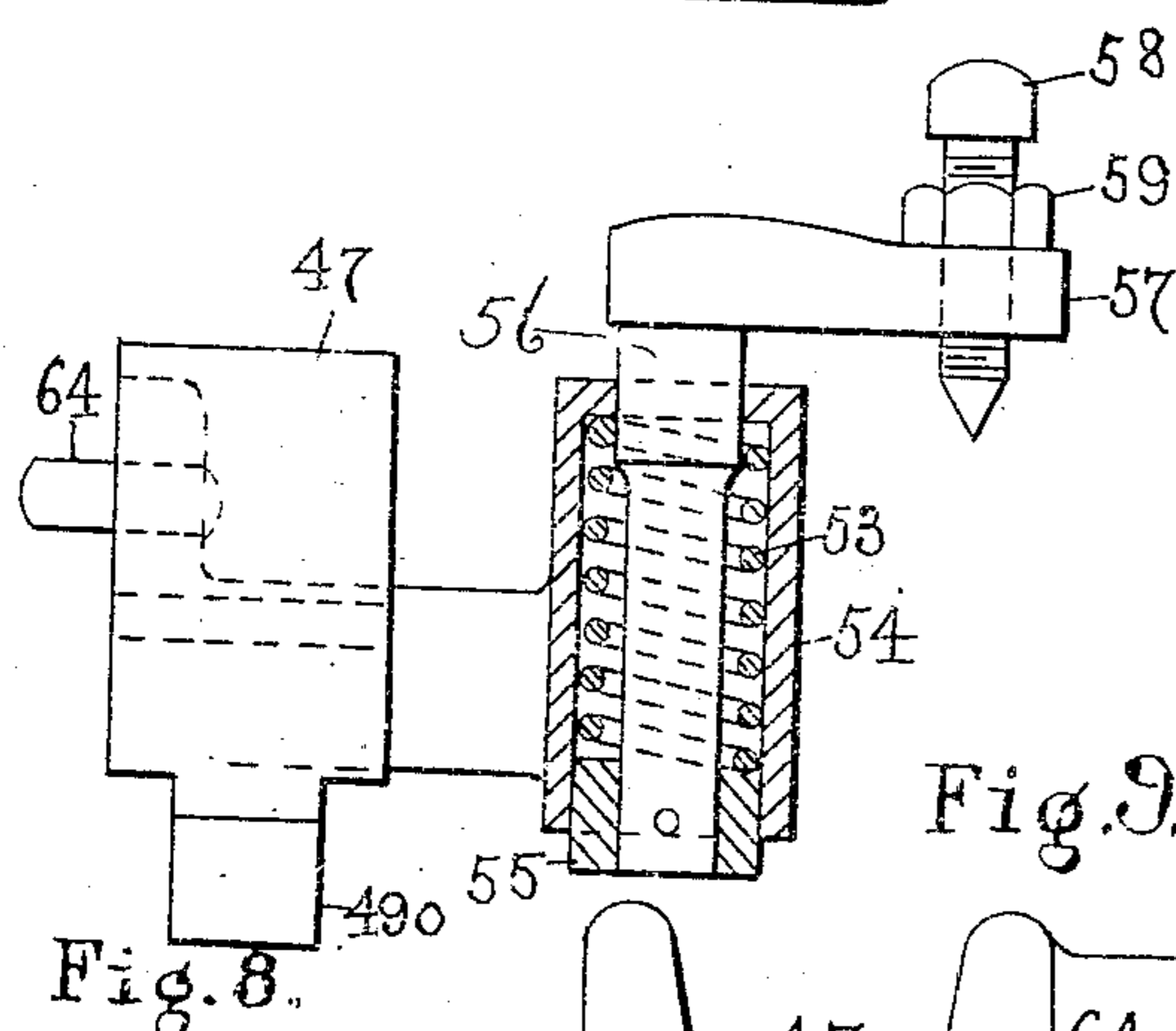


Fig. 8.

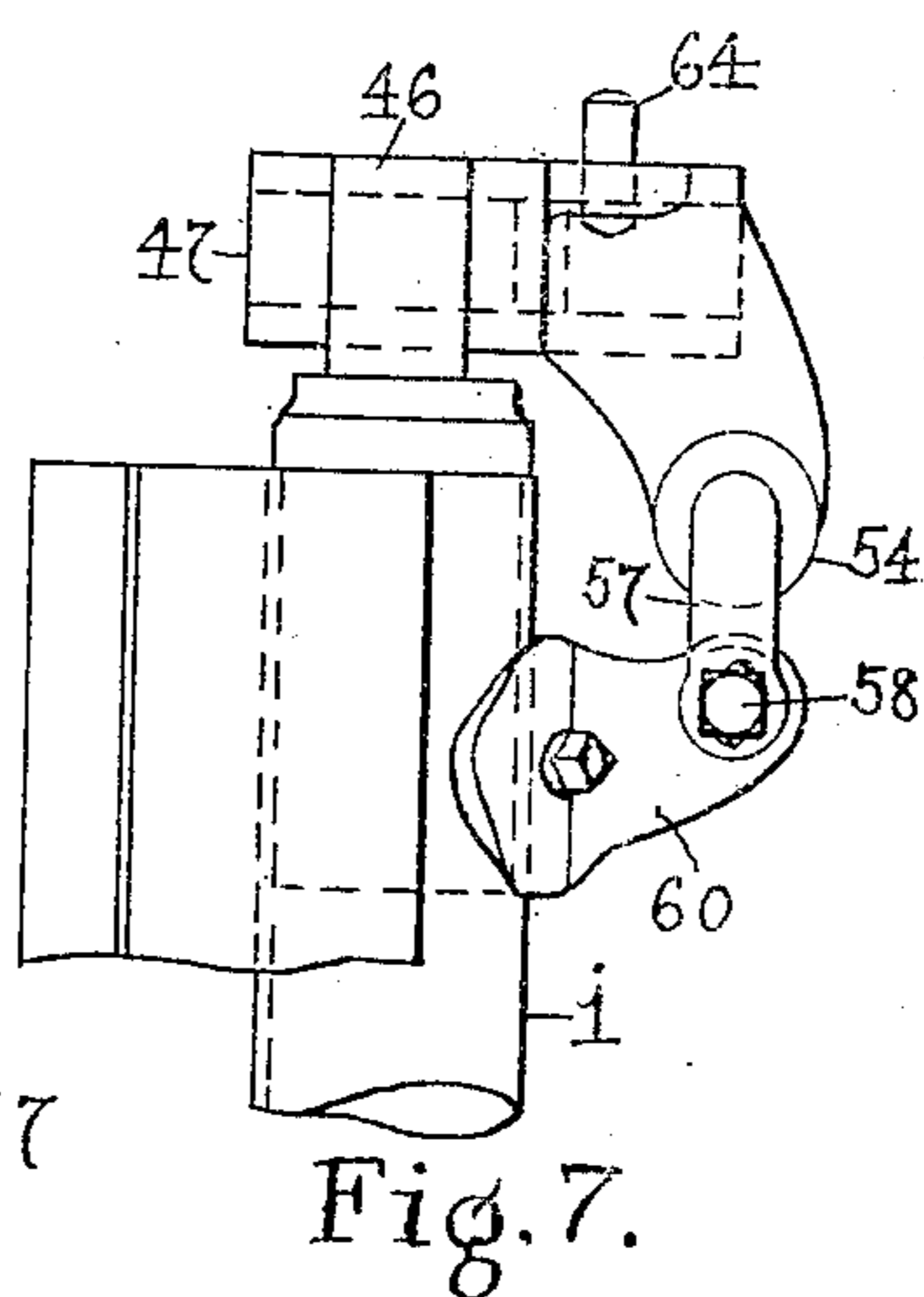


Fig. 7.

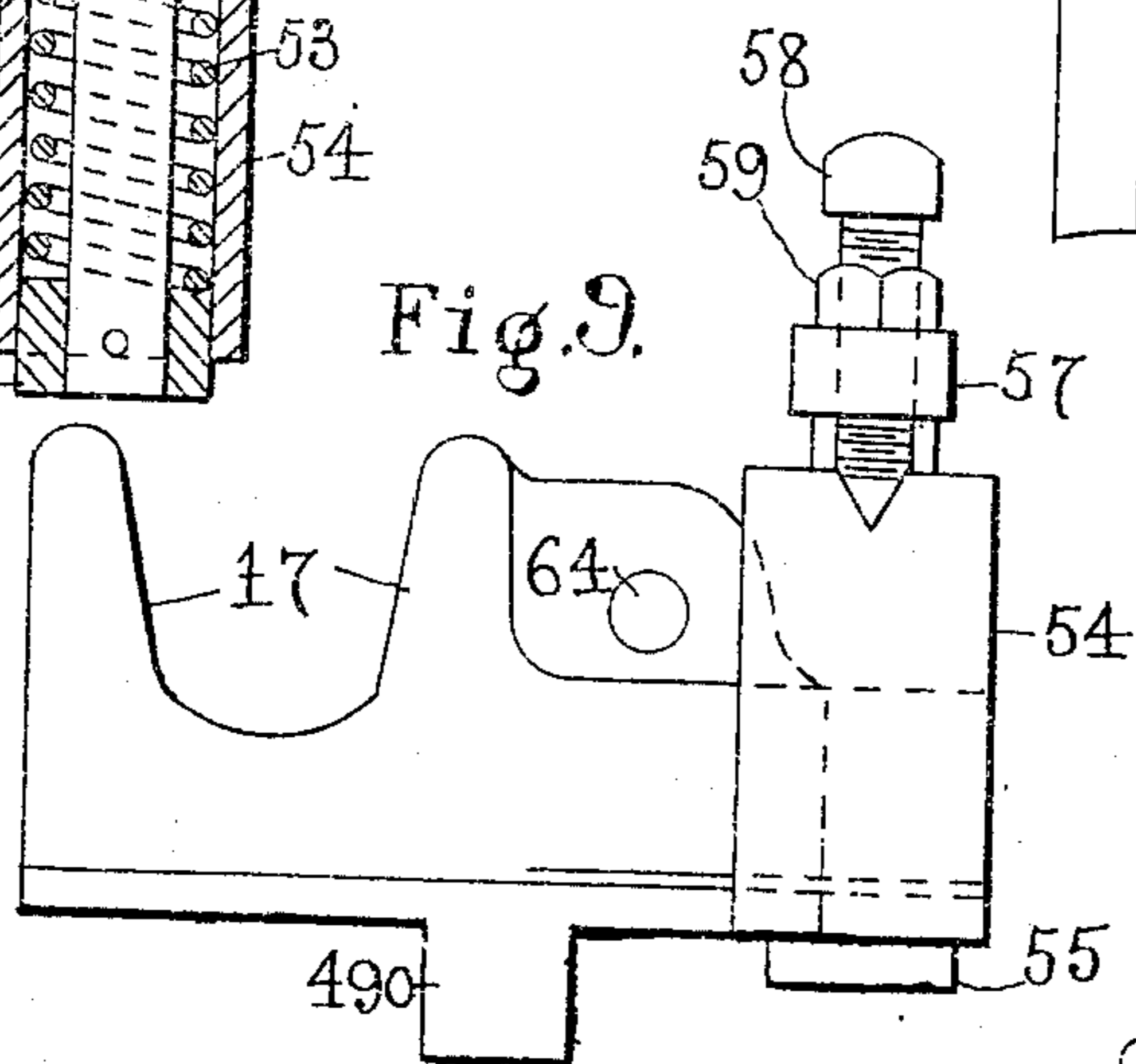


Fig. 9.

Witnesses.
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UNITED STATES PATENT OFFICE.

RICHARD SMITH, OF BELLOWS FALLS, VERMONT, ASSIGNOR TO SMITH
PAPER MACHINERY COMPANY, OF PORTLAND, MAINE.

FEED MECHANISM FOR CALENDER-ROLLS OF PAPER-MAKING MACHINES.

No. 839,966.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed May 9, 1906. Serial No. 315,864.

To all whom it may concern:

Be it known that I, RICHARD SMITH, a citizen of the Dominion of Canada, residing at Bellows Falls, in the county of Windham and State of Vermont, have invented an Improvement in Feed Mechanism for Calender-Rolls of Paper-Making Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a feed mechanism for calender-rolls of paper-making machines, and is an improvement upon the feed mechanism shown and described in United States Patent No. 743,403, granted to me November 3, 1903.

The present invention has for one of its objects to provide a feed mechanism in which the doctor-blade may be maintained in constant engagement with its cooperating cylinder or roll and separation of the roll from its doctor-blade by sudden jumping or movement of the roll avoided, as will be described.

Another feature of the invention consists in a novel means for supporting the doctors, so that any cylinder or roll of the stack of rolls may be removed without removing the doctor cooperating with it.

The invention further consists in novel means, as will be described, for adjusting the doctor with relation to its cooperating cylinder or roll.

Other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is an end elevation of a sufficient portion of a calender-stack provided with a feed mechanism embodying this invention to enable it to be understood; Fig. 2, details in end elevation, on an enlarged scale, of the doctors for the bottom and second rolls of the stack shown in Fig. 1; Fig. 3, a detail to be referred to; Fig. 4, a detail in side elevation of the doctors shown in Fig. 2; Fig. 5, a detail in end elevation of the doctor for the intermediate rolls; Fig. 6, a side elevation of the doctor shown in Fig. 5; and Figs. 7, 8, and 9, details to be referred to.

In the present instance the invention is shown as embodied in a calender-machine comprising a stack or series of four cylinders

or rolls *a b c d*, mounted in a framework, only one side *e* of which is shown.

The rolls *a b c d* have cooperating with them doctors *f g h i*, which are supported in a manner as will be described. To this end each side frame *e* has secured to it a support for the doctors *f g* and separate supports for the doctors *h i*. The support for each end of the doctors *f g* consists of a cheek-piece or bar *j*, secured to the side frame *e* by screws *k* and separated therefrom by thimbles *l*. The bar *j* is provided on its front face with a T-slot *m* for the reception of the heads of bolts *n*, by which the supporting-plate *o* for the doctor *f* is adjustably fastened to the cheek-piece or bar *j*. The doctor *f*, the bearing-plate *p* therefor having the slotted flange *q* secured to the plate *o* by screws *r*, and the tension bolt *s*, provided with the set-screw *u*, which cooperates with the lug *v* on the said doctor, are and may be the same as shown and described in the patent referred to.

The doctor *g* for the second roll *b* is journaled at each end in a bearing-plate 15, provided with concentric slots 16, through which extend bolts 17, which adjustably secure the said bearing-plate to a bracket or arm 18, mounted on a fulcrumed bolt 19, secured to a supporting-plate 20, which is adjustably secured to the cheek-piece or bar *j* by the bolts 21, having their heads located in the T-slot *m*. (See Figs. 2 and 4.) The supporting-plate 20 is provided with slots 22, which extend substantially at right angles to the slot *m* in the cheek-piece or bar *j*. It will thus be observed that the supporting-plate 20 is capable of being moved both longitudinally and transversely of its supporting-bar or cheek-piece, thereby facilitating adjustment of the doctor *g* with relation to the roll *b*, with which it cooperates. It will also be observed that the doctor *g* is free to move in the arc of a circle with the fulcrum-bolt 19 as a center.

The doctor *g* is held in engagement with the roll *b* with a yielding pressure, which is obtained as will now be described. For this purpose the bracket or arm 18 is engaged by a set-screw 25, (see Figs. 2 and 4,) extended through an arm 26 on a bolt 27 and locked in its adjusted position by the nut 28. The bolt 27 is extended through a bearing hub or box 29 and is acted upon by a coiled

spring 30 within said box to keep the blade 31 of the doctor *g* in engagement with the roll *b*. The movement of the bolt 27 by its spring 30 is limited by the head 32 on said bolt. The hub or box 29 is attached to a supporting-plate 34, which is mounted to slide on a cheek-piece or bar 35, attached to the side frame *e*, and said plate is secured in its adjusted position by the set-screw 36.

10 The adjustability of the spring-box 39 on the cheek-piece enables the spring-bolt to be accurately positioned with relation to the doctor.

The doctors *h i* for the intermediate rolls *c d* are supported in a novel manner, as will be described, and inasmuch as the supports for the said doctors are alike a detailed description of one will suffice. Referring to Figs. 5 and 6, the doctor *i* consists of a plate 40, secured to a bar 41, which is fastened to the metal pieces 42 43, riveted or otherwise fastened to the tube or body portion 44 of the doctor *i*, which body portion is provided with flattened journals 46. Each journal 25 46 is supported in a journal-box 47, which is mounted to slide on a horizontal flange 48 of a supporting-plate 49, which latter is vertically arranged and is dovetailed onto the cheek-piece or bar 35 to permit of vertical adjustment of said plate and which is secured in its adjusted position, as will be described. The journal-box 47 is adjustably mounted on the flange 48 to permit of lateral adjustment of the doctor *i* toward and from the roll *d*, and for this purpose the journal-box 35 47 is provided on its bottom with a depending square lug 490, which extends into a longitudinal slot in the flange 48 and is retained therein by a bolt or screw 50, extended into 40 a socket in the bottom of the lug 490, the said screw having on it a washer 51, which engages the under side of the flange 48 and serves to prevent the journal-bearing from lifting and tilting sidewise. The doctor- 45 blade 40 is held in yielding engagement with the roll *d* by a spring 53, located in a box 54, attached to the journal-bearing, said spring acting on the head 55 of the bolt 56, which is provided at its opposite end with the arm 50 57, carrying the set-screw 58 and lock-nut 59, said set-screw engaging a lug 60, attached to the body or tube 44 of the doctor *i*. The adjustment of the doctor *i* laterally with relation to the roll *d* may be effected, as herein shown, by a lever 61, pivotally mounted on the fulcrum-bolt 62, secured to the supporting-plate 49 and provided with a slot 63, through which extends a pin 64, projecting from the bearing-plate 47. By reference to 60 Fig. 5 it will be seen that movement of the lever 61 on its pivot effects movement of the bearing-plate 47 and the doctor *i*, supported thereby, laterally with relation to the roll *d*. Provision is made for locking the lever 61 65 against accidental movement, and for this

purpose a latch plate or bar 66 is secured to the side of the supporting-plate 49 by the screws 67, extended through slots 68 in the latch-plate and which permit of vertical adjustment of said latch-plate. The latch- 70 plate 66 is provided with a hook or latch 70, (see Fig. 6,) with the under side of which a handle-bar 71 for the lever 61 is adapted to be engaged, as represented in Fig. 5, to prevent upward movement of said handle until 75 the latter is disengaged from its latch, which is effected by moving the handle 71 laterally with relation to the latch 70. To permit lateral movement of the handle 71, the latter is mounted on a pivot-pin 72, carried by the 80 forked end of the lever 61. (See Fig. 5.) The forked end of the lever 61 is provided with a lug 73, with which coöperates a pin or locking-dog 74, carried by the handle and acted upon by a spring 75, the lug 73 coöper- 85 ating with the pin 74 to render the handle practically rigid on the lever 61 when it is desired to turn said lever on its pivot. When it is desired to clean the doctor *i*, the handle is depressed sufficiently to clear the latch 70, 90 after which it is turned on its pivot 72 until it is disengaged therefrom, and when clear of the latch the handle is elevated, so as to turn the lever 61 on its pivot and move the bearing-plate 47 and its doctor away from 95 the roll *d*. Provision is also made for maintaining the doctor-plate 40 in constant contact with its roll *d*, and for this purpose the supporting-plate 49 is dovetailed onto the cheek-piece or bar 35 and has secured to it, 100 as by the screws 80, one end of a horizontal arm 81, the other end of said arm resting on a stud or pin 82 on a gib 83, which is attached, as by screws 84, to the journal-box of the roll *d*, as represented in Fig. 5. 105

By inspection of Fig. 5 it will be seen that the supporting-plate 49 for the doctor *i* is connected with and supported by the journal-box of the roll *d*. Consequently the doctor *i* has a fixed relation to the roll *d* and moves 110 vertically with it. In this manner separation of the intermediate rolls *c d* from their coöperating doctors *h i* by sudden jumping of the rolls when the paper is first passed between the said rolls is avoided. 115

The plate 34 of the spring-box 29 on the cheek-piece 35 serves as a support for the supporting-plate 49 for the doctor *i* (see Fig. 1) in case it should be desired to remove the arm 81, and the supporting-plate 49 for the 120 doctor *h* may be similarly supported by a piece 86, (see Fig. 1,) secured to the cheek-piece 87 on the other side of the rolls.

In Figs. 7, 8, and 9 the construction of the bearing-plate and its attached spring-box is 125 shown in detail, wherein it will be seen that the spring-bolt is capable of being revolved around its center, which enables the set-screw 58 to be swung clear of the lug 60 on the doctor, which is then free to be removed 130

from its bearings, which latter are open at their top, as herein shown.

Each of the intermediate doctors has secured to it hinge-pieces 90, to which is pivoted by the pins or bolts 91 a bar 92, having fastened to it steel pieces or fingers 93 for guiding the paper into the nip between the rolls *c d*. The bar 92 and fingers 93 are held in position by the balance-weight 94, secured to the said bar.

From the above description it will be seen that the doctor-blades for the rolls, and especially for the intermediate rolls, are kept in constant contact with the said rolls, and the use of heavy springs heretofore employed to accomplish this result is avoided. It will also be seen that the doctors are not attached to the journal-boxes of the rolls. Consequently the rolls can be removed, if desired, without removing the doctors from the machine. So, also, the doctors cooperating with the intermediate rolls can be quickly and easily moved away from the same for purpose of cleansing or repairing the same, and this movement can be effected in a minimum time by means of the lever arrangement above described.

I claim—

1. In combination, a calender-roll, a doctor cooperating therewith and provided with journals, bearings in which said journals are mounted slidable toward and from said roll substantially at right angles thereto, supports on which said journal-bearings rest and slide, and means carried by said bearings and cooperating with said doctor for turning said journals in their bearings, and means for moving said bearings on their supports, substantially as described.

2. In combination, a calender-roll, a doctor cooperating therewith and provided with journals, slidable bearings in which said journals are mounted, supports on which said journal-bearings slide, means carried by said bearings and cooperating with said doctor for turning said journals in their bearings, and levers connected with said journal-bearings for sliding them on their supports.

3. In combination, a calender-roll, a doctor cooperating therewith, and a support for the doctor connected with the said roll to move therewith and maintain said doctor in contact with said roll, substantially as described.

4. In combination, a calender-roll, a doctor cooperating therewith, and means to connect said doctor with said roll to move therewith and to permit movement of the doctor with relation to said roll, substantially as described.

5. In combination, a doctor, bearings in which said doctor is journaled, supports for said bearings provided with flanges having slots, and means on said bearings extended into the said slots to secure said bearings in

sliding engagement with said flanges, substantially as described.

6. In combination, a doctor, bearings in which said doctor is journaled, supports for said bearings provided with flanges having slots, means depending from said bearings in said slots to secure said bearings in sliding engagement with said flanges, levers pivoted to said supports, and means to connect said levers with said bearings to effect a sliding movement of said bearings by rotary movement of said levers, substantially as described.

7. In combination, a doctor, bearings in which said doctor is journaled, supports for said bearings provided with flanges, means to secure said bearings in sliding engagement with said flanges, levers pivoted to said supports, means to connect said levers with said bearings, handles pivoted to said lever to move in a direction substantially at right angles to the direction in which the levers are moved, and latches cooperating with said handles, substantially as described.

8. In combination, a calender-roll mounted in journal-boxes, a doctor cooperating with said roll, journal-bearings for said doctor, and supports for said journal-bearings suspended from said journal-boxes, substantially as described.

9. In combination, a calender-roll, a doctor cooperating therewith, and a guide for the paper pivotally supported from said doctor, and a weight attached to said guide, substantially as described.

10. In combination, a calender-roll, a doctor cooperating therewith, pivoted arms to which said doctor is adjustably secured, and yielding means cooperating with said arms to hold the doctor in engagement with its roll, substantially as described.

11. In combination, a plurality of vertically-arranged calender-rolls, a framework in which said rolls are supported, doctors cooperating with said rolls, vertical cheek-pieces or bars secured to said framework out of line with each other, plates adjustably secured to the lower of said cheek-pieces, arms pivoted to said plates, means to secure one of said doctors to said arms, spring-boxes secured to the other of said cheek-pieces, and spring-actuated devices carried by said spring-boxes and engaging said pivoted arms, substantially as described.

12. In combination, a calender-roll, a doctor cooperating therewith, journal-boxes for said doctor slidable toward and from said roll, supports having substantially horizontal flanges upon which said journal-boxes rest, and means to slide said boxes on said flanges, substantially as described.

13. In combination, a calender-roll, a doctor cooperating therewith, journal-boxes for said doctor slidable toward and from said roll, supports having substantially horizontal

flanges upon which said journal-boxes rest, and slotted levers connected with said journal-boxes to slide the same on their supporting-flanges, substantially as described.

5 14. In combination, a calender-roll, a doctor cooperating therewith, journal-boxes for said doctor open at their upper ends and slidable toward and from said roll, supports for said boxes having substantially horizontal
10 flanges, and means for sliding said boxes on their supporting-flanges, substantially as described.

15 15. In combination, a calender-roll, a doctor cooperating therewith and provided with lugs or projections, journal-boxes for said doctor, spring-actuated devices carried by said journal-boxes and engaging the lugs or projections on said doctor to turn the same
20 in their boxes, and means to move said journal-boxes on their supports, substantially as described.

25 16. In combination, a calender-roll, a doctor cooperating therewith and provided with journals, boxes in which said journals are mounted to turn therein, slidable toward and from said roll, substantially at right angles

thereto, and means to turn said doctor and its journals without moving said boxes, substantially as described.

17. In combination, a calender-roll, a doctor cooperating therewith and provided with journals, boxes in which said journals are mounted to turn, slidable toward and from said roll, supports on which said boxes slide, a lug on said doctor, and a spring-actuated
35 device carried by a journal-box and cooperating with said lug to turn the doctor in its journal-boxes.

18. In combination, a calender-roll, a doctor cooperating therewith, and a support for
40 the doctor connected with said roll to move therewith yet capable of being bodily moved with relation to said roll, substantially as described.

In testimony whereof I have signed my
45 name to this specification in the presence of two subscribing witnesses.

RICHARD SMITH.

Witnesses:

P. N. OTTERS LAND;
W. V. CAMP.