

(No Model.)

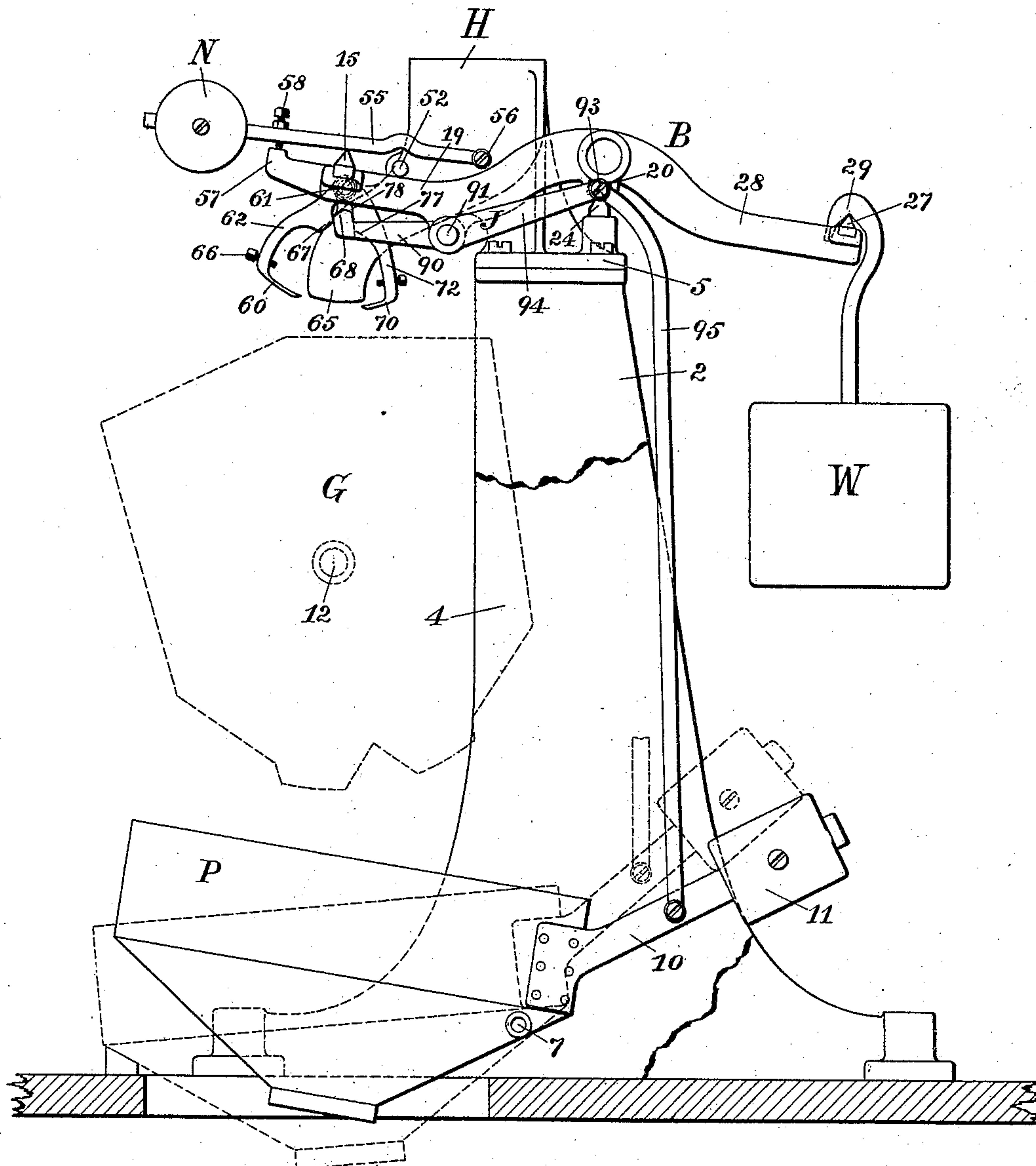
3 Sheets—Sheet 1.

F. H. RICHARDS.  
REGULATOR FOR GRAIN SCALES.

No. 442,640.

Patented Dec. 16, 1890.

Fig. 1



Witnesses:

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Inventor:

Francis H. Richards

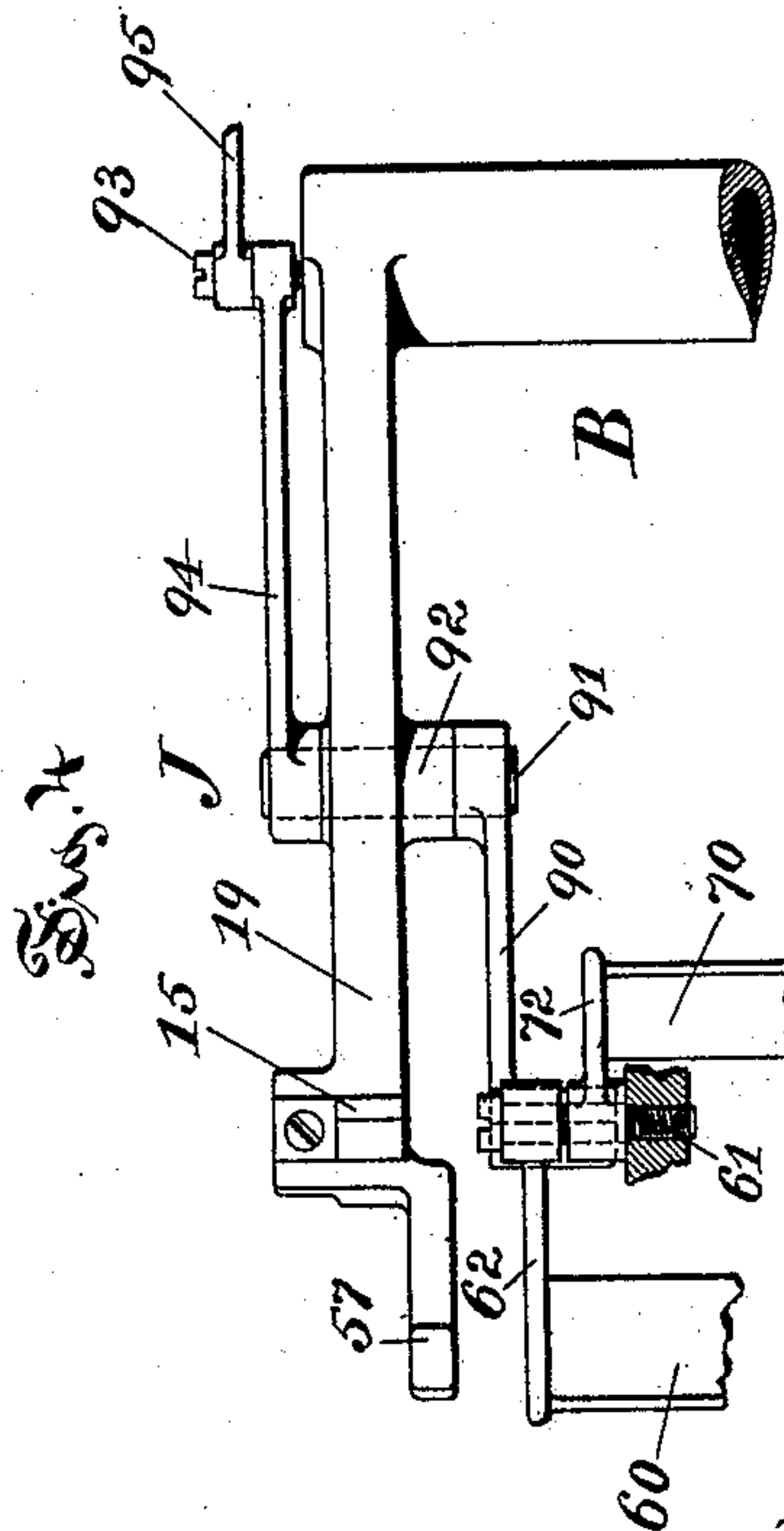
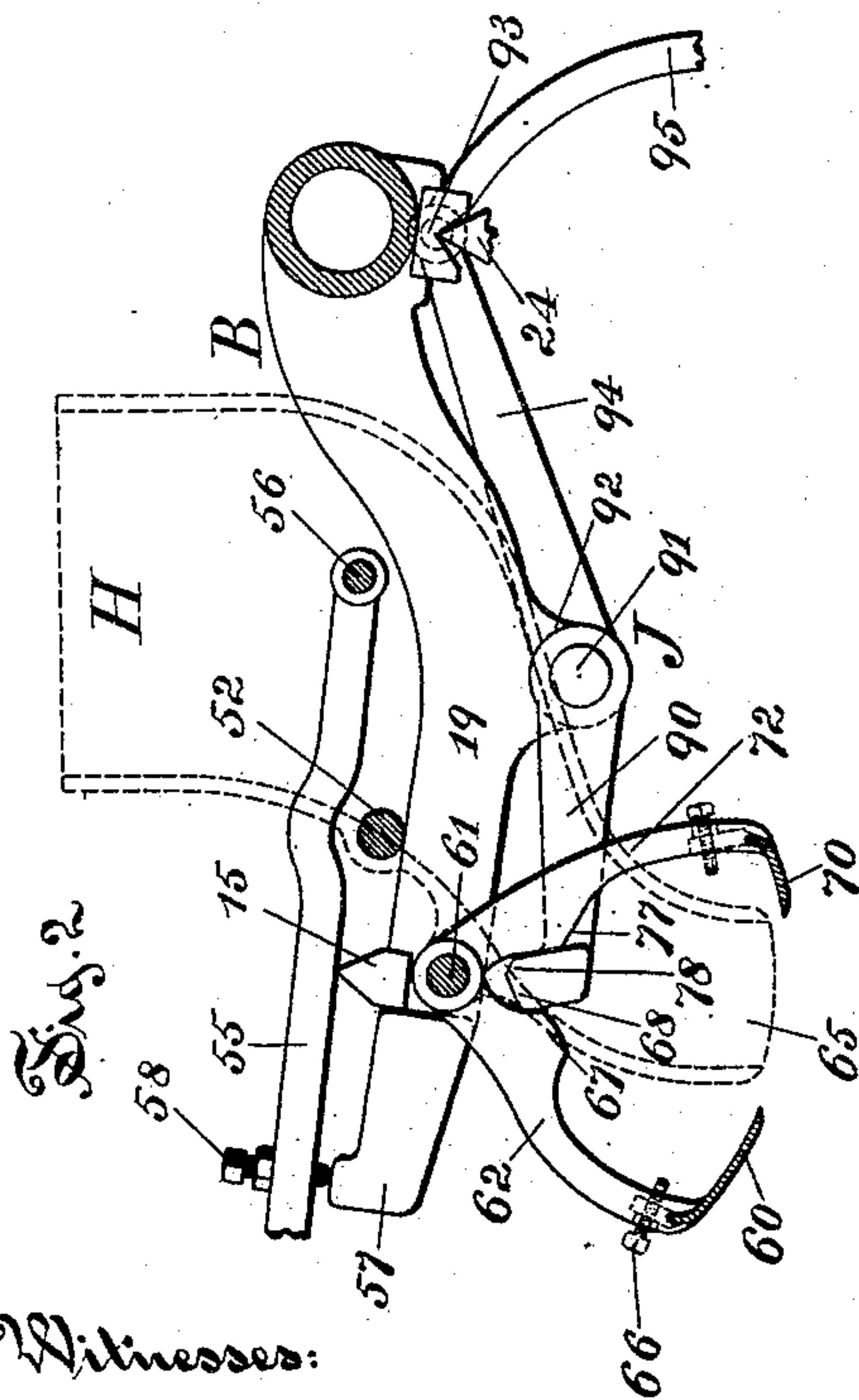
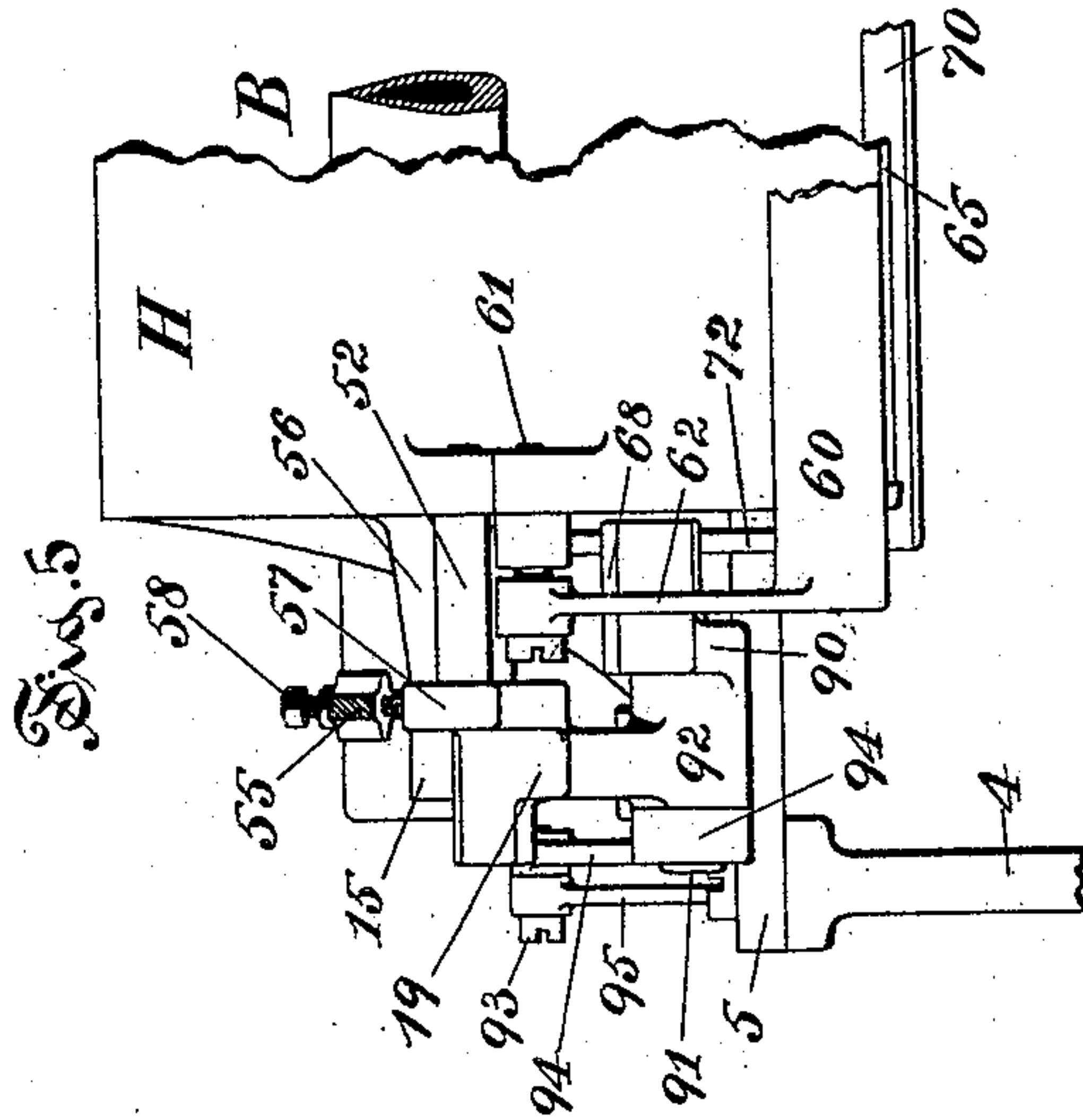
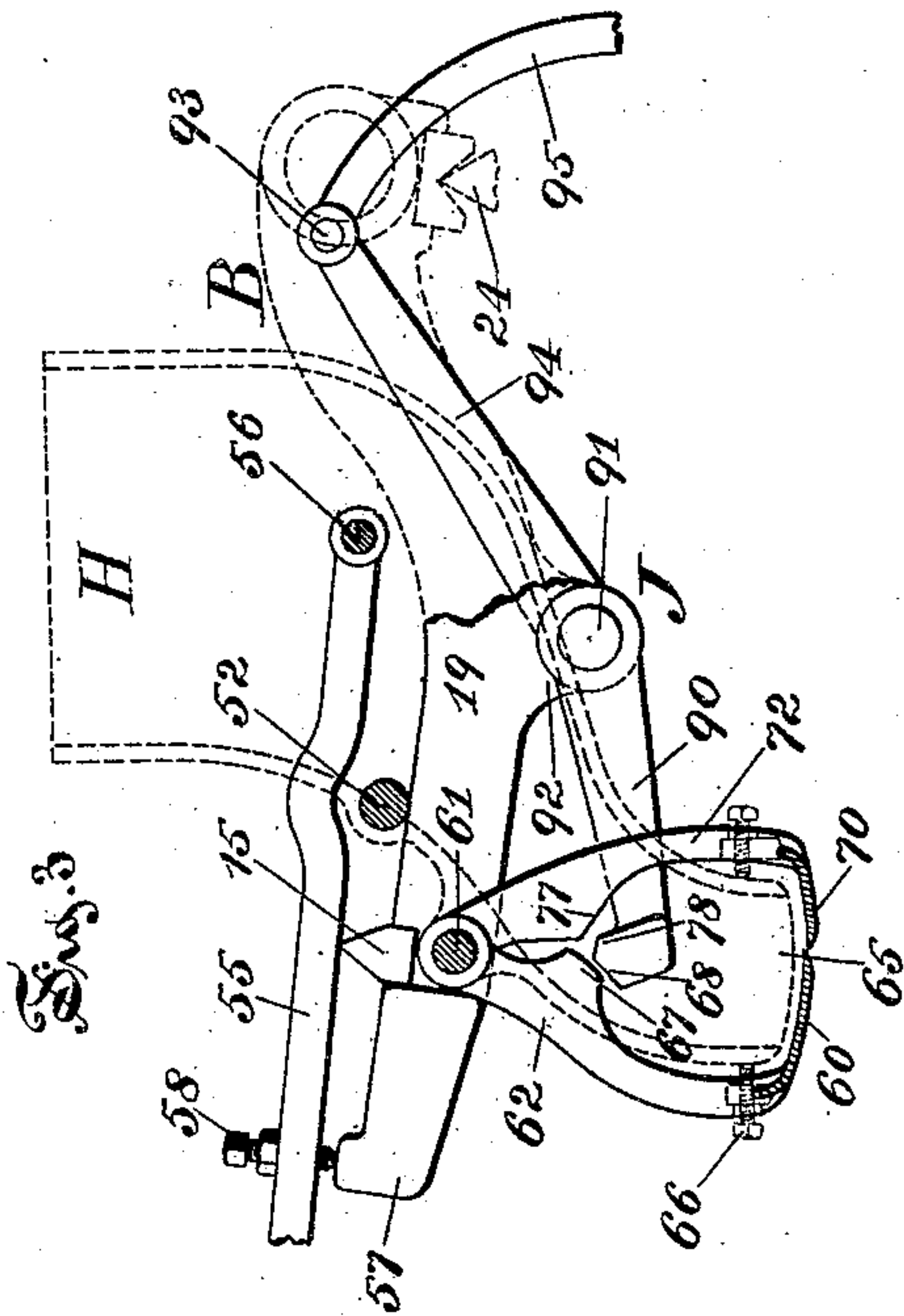
(No Model.)

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F. H. RICHARDS.  
REGULATOR FOR GRAIN SCALES.

No. 442,640.

Patented Dec. 16, 1890.



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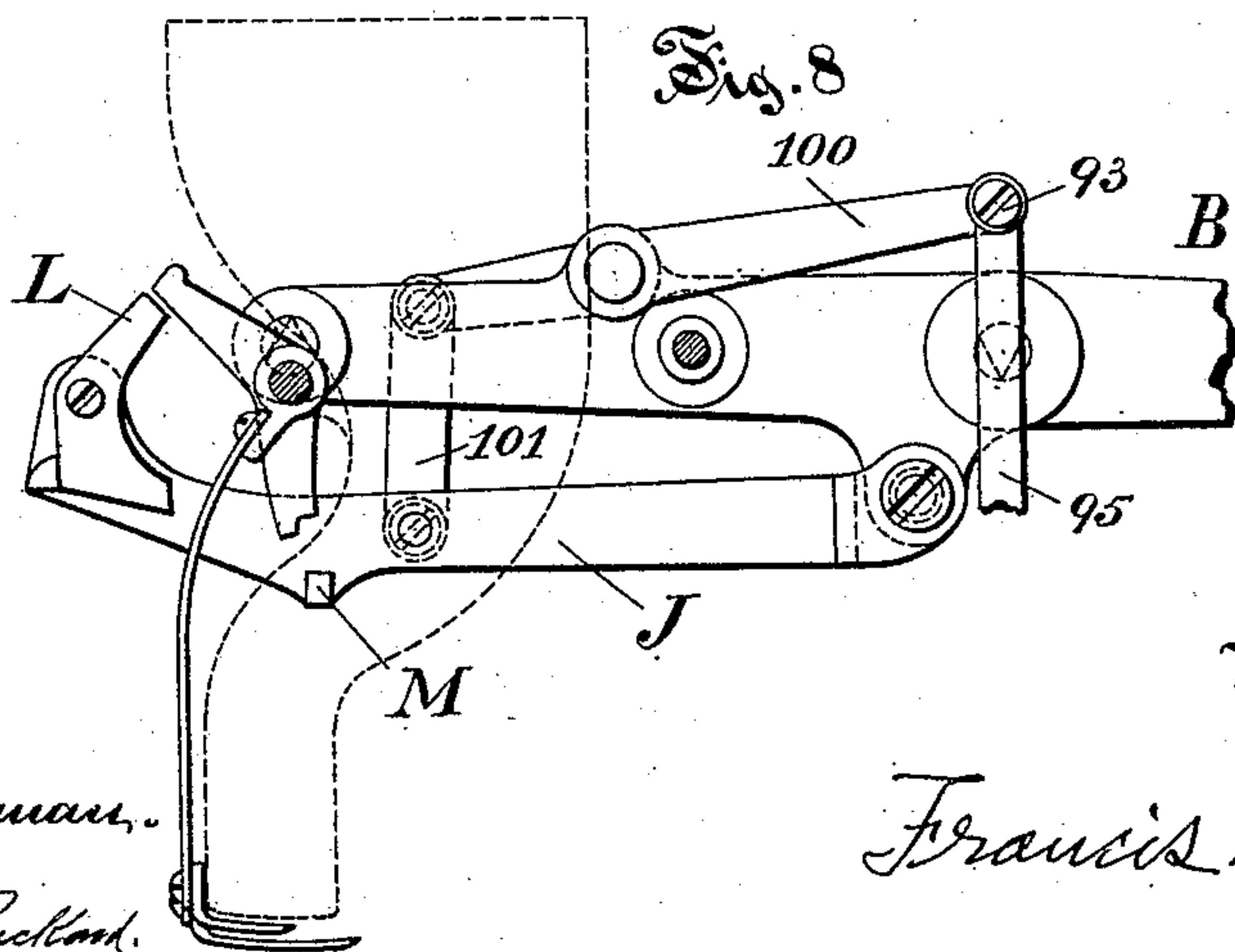
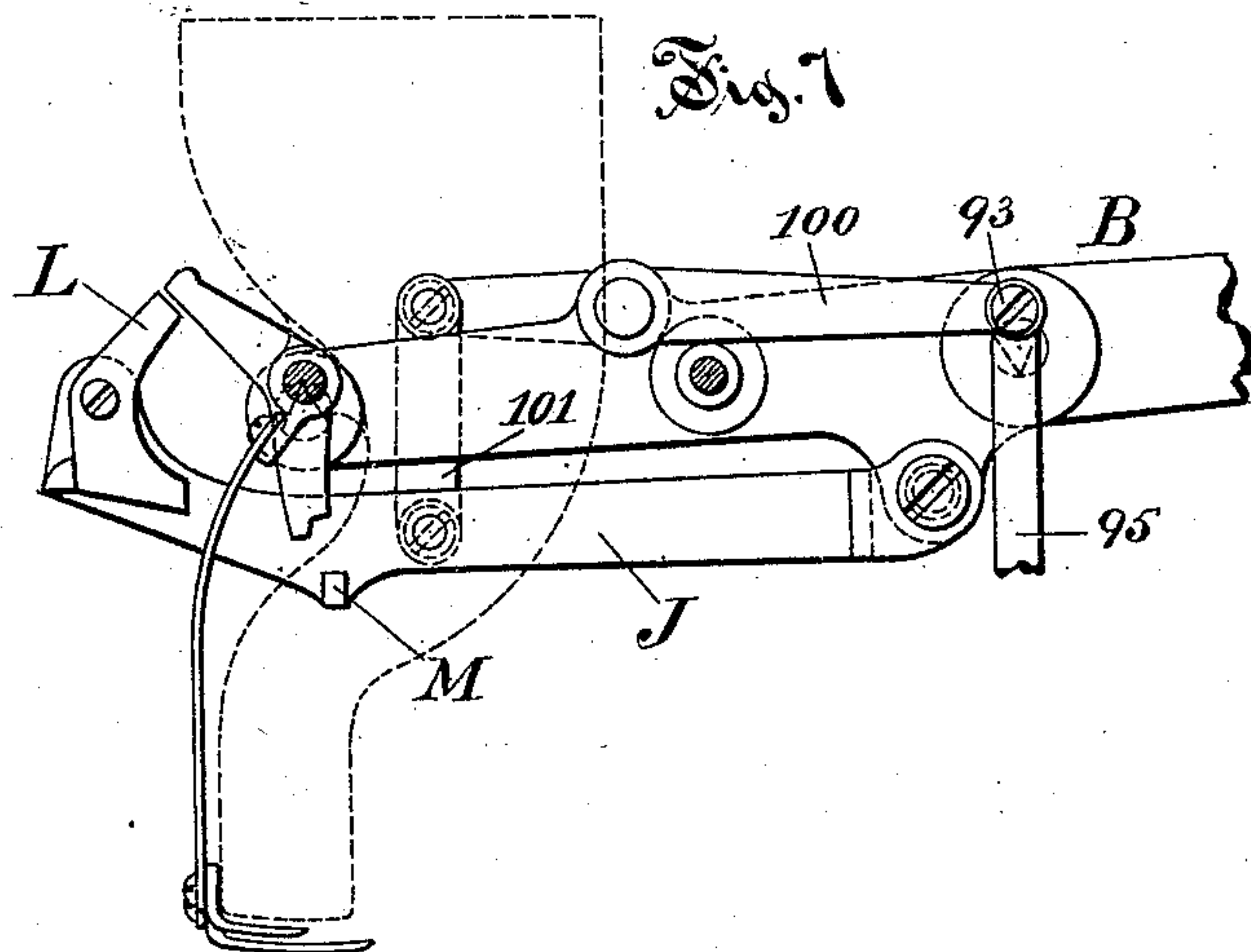
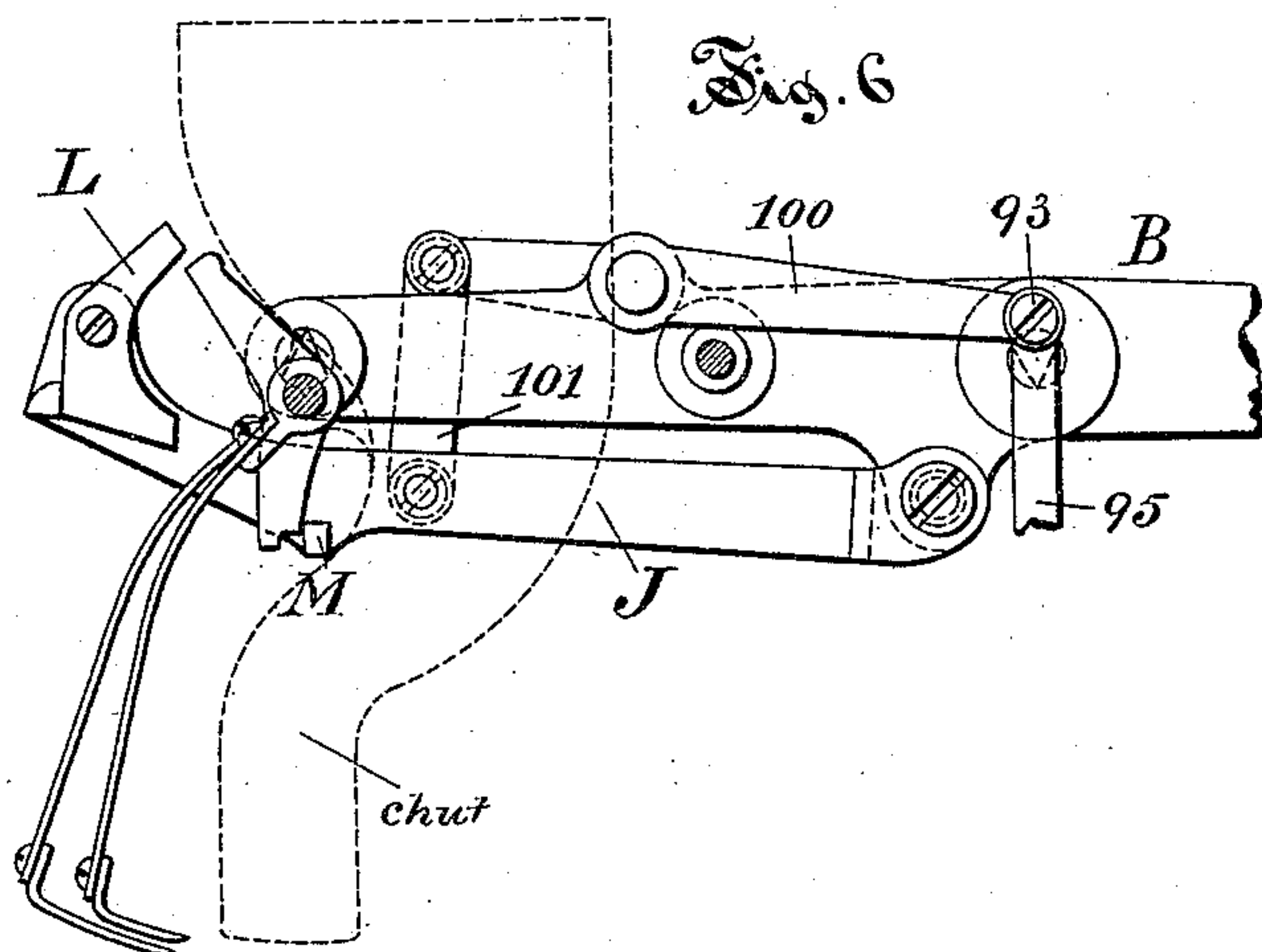
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3 Sheets—Sheet 3.

No. 442,640.

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# UNITED STATES PATENT OFFICE.

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## REGULATOR FOR GRAIN-SCALES.

SPECIFICATION forming part of Letters Patent No. 442,640, dated December 16, 1890.

Application filed April 25, 1889. Renewed February 20, 1890. Serial No. 341,104. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Grain-Weighers, of which the following is a specification.

This invention relates to self-regulating automatic grain-weighers operated by the power or weight of the grain weighing.

The invention has for its object to furnish such a grain-weigher in which the regulation shall be obtained by making inoperative from time to time, as required, the valve-actuating devices. It is in the nature of an improvement on the mechanism described and broadly claimed in my application, Serial No. 340,814, filed February 17, 1890, to which reference may be had.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation, partially in section or broken away, of an automatic grain-weigher embodying my present improvements. Figs. 2 and 3 are detail views similar to a portion of Fig. 1, showing successive stages of the operation of the reducing and cut-off valves. Fig. 4 is a plan view of the principal parts shown in Fig. 2. Fig. 5 is a front elevation of so much of the machine as shown in Figs. 2 and 3. Figs. 6, 7, and 8 are views similar to Figs. 2 and 3, showing my improvements in connection with another form or kind of valve mechanism.

Similar characters designate like parts in all the figures.

In Figs. 1 to 5, inclusive, my present improvements are shown in connection with other improvements not of my invention, but which are described in the prior application of C. H. Cooley, Serial No. 338,544, filed January 30, 1890, to which I have permission to refer. Said machine, as shown in said prior application and in said Figs. 1 to 5, has a frame-work, which usually comprises two side frames 2 and 4, held together by ordinary tie-rods or braces, (not shown,) and a top plate 5, to which is attached the supply-chute H. The grain-bucket G, of the double-chambered kind used in the well-known "Hill" grain-scale, is suspended under the

chute H and discharges its loads of grain into the regulator-hopper P, which is pivoted at 7 to the frame-work, or which is otherwise supported in any suitable manner below said grain-bucket. The hopper P has one or more arms or levers 10 10, each carrying a counterbalancing-weight 11. Suitable stops (not shown) are in practice provided for properly limiting the rising and falling movements of the hopper. In Fig. 1 the hopper is shown by solid lines in its highest position, as when empty or nearly empty of grain. When full or nearly full of grain, it is carried down, as indicated by the dotted lines. This furnishes the means and power for shifting the valve-actuating devices, as hereinafter more fully set forth.

The grain-bucket G is journaled at 12 in bearings formed in the usual hangers, which are suspended by V-shaped bearings from knife-edges 15 on the scale-beam B. This beam has V-shaped bearings 20, one at each end thereof, and which rest on the knife-edges 24, that are carried by the frame-work. Opposite to arms 19 an arm 28 extends rearward, and is provided with a knife-edge 27, on which the main weight W is suspended by hook 29. The usual and necessary means for causing and controlling the operation of the grain-bucket are not shown in this application.

The movement of the beam B is or may be limited in its upward movement (of the bucket) by some suitable stops, as 52, and is stopped in its downward movement by the discharge of the grain. A special stop (not shown) may be, and sometimes is, provided for the latter purpose.

The main weight W is or may be made to fully balance the weight of the loaded bucket, thus dispensing with the supplemental weight usually employed in this class of grain-weighers to counterbalance the completed load; but in order to retain the same mode of making up that load by a reduced flow of grain a smaller resistance or ballast weight N is employed, whose weight is opposed to that of the main weight prior to the beginning of "drip" of the column of grain. This weight N is carried on a lever 55, pivoted at 56 to some part of the frame-work, and whose downward



movement is limited by some fixed stop. As shown in the drawings, the stop 52 serves this purpose. The main beam B has a part, as 57, which strikes said lever 55 or some part thereof, as the adjusting-screw 58, and thus lifts weight N, as in Fig. 3, when the bucket G is raised. When the bucket is gradually filled, as in practice, it first goes down until the lever 55 rests on stop 52, having then received a weight of grain equal to the difference between the effective weights of the weights W and N. Next it stands in this mid-stroke position until the load fully equals the effective weight of the weight W, when it descends and discharges its load.

The valve mechanism for reducing and for cutting off the flow of grain to the bucket is actuated from and by the main beam. The reducing-valve 60 is carried by arms 62, which are suspended from pivots 61. This valve closes under the outlet 65 of the chute H, usually somewhat more than half the width thereof, and is limited in said movement by an adjustable stop 66, whereby the quantity of drip is regulated. The operation of this valve and of the means for actuating the same will be best understood from Figs. 2 and 3.

The arm 62 has a cam-shaped part at 67, which is acted on by the cam or actuator 66, that is carried by the main beam. When this beam is down, as in Figs. 5 and 6 of said prior application, No. 338,544, the valve is closed; but when it rises, as in Fig. 2, the actuator 68 forces out the arm 62 and opens the valve, as there shown. The faces of said cams 67 and 68 are inclined to their line of movement, so that the movement of the beam is not materially obstructed by the moderate force required to work the valve. The proper degree of said inclination is readily determined in any particular case experimentally. The cut-off valve 70 is similarly suspended by arms 72 from the said pivots 61, or from some point near thereto. The arm 72 has a cam-shaped part 77, which is acted on by the shiftable valve-actuator 78, that is carried by the beam B. When this beam is down, as aforesaid, the valve 70 is closed and (the valve 60 being also closed) cuts off the flow of grain; but when the beam rises, as in Fig. 2, the actuator 78 strikes cam 77 and forces back arm 72, thus opening the valve 70. Thus the rising of the beam opens both valves, as in Fig. 2, and leaves the flow of grain unobstructed. In practice the two cams or actuators 68 and 78 are or may be made in a single piece, as shown, it being fitted to act on each valve-arm independently of the other arm. The said actuators are not, according to my present invention, fixed directly to the main beam by which the same are carried, but are carried by a supplemental beam or lever that is fitted to be shifted on said main beam, whereby the actuator or actuators are thrown into an inoperative position, whether or not the main beam stands in its upper or in its lower position, this shifting movement being derived from

regulator devices. For this purpose I provide a supplemental beam or lever J, which may be variously constructed within the scope and limits of my invention. As shown in said Figs. 1 to 5, inclusive, said lever consists in an arm 90, carrying the valve-actuator, the shaft or journal 91, journaled in a bearing 92, formed on the arm 19 of the main beam B, and the arm 94, which extends to carry a pivot 93, that when the valve-actuators are in a working position stands in substantial alignment with knife-edges 24, as in Fig. 2. The pivot 93 is connected by a rod 95 to the weight-arm 10 of the hopper P, so that the downward movement of said hopper will shift the beam J on the beam B, as illustrated in Fig. 3, and throw the actuator down below its working position, thus permitting the valves to close and stop the machine, though the beam-arm 19 be standing in its uppermost position. The grain being sufficiently lowered in hopper P, this is overbalanced by its weight or weights 11 and rises, as in Fig. 1, thus reshifts the actuator-carrier J and its actuator or actuators, and again opening the valve or valves, and thereby starting the machine.

It is not essential to my improved machine that both of the valves 60 and 70 shall be actuated by the particular actuators hereinbefore described therefor, nor that said valves shall be the particular ones above described.

In Figs. 6, 7, and 8 I have shown my improvements in connection with the valves and valve-actuating devices shown and described in Letters Patent No. 302,136, granted to J. W. Hill July 15, 1884. In this modification the beam J is pivoted at one end to the main beam B, and is connected to rod 95 through the intermediate lever 100 and link 101. Both the pawl L and stop M are carried on said supplemental beam. In Figs. 6 and 7 the parts stand in their usual relative working positions, the beam B being down in Fig. 7 and standing up in Fig. 6. In Fig. 8 the supplemental beam is shifted to throw the pawls and stop into their lower or inoperative position, wherein the valves remain closed, though the main beam be raised. On the rising of hopper P the connections described raise the supplemental beam relative to main beam and from the position in Fig. 7 to that in Fig. 6, thus opening the valves and starting the machine.

Other regulators than the hopper P are adapted to be used for shifting the valve-actuator on the scale-beam. One such regulator is shown and described in my application, Serial No. 342,297, filed March 1, 1890, to which reference may be had.

Having thus described my invention, I claim—

1. In a grain-weigher, the combination, with the supply-chute, the main beam, and a valve arranged to close under said chute, of the supplemental beam on said main beam, the cam 78 on the supplemental beam for actuat-



ing the valve, and means for making inoperative said cam by shifting the supplemental beam on the main beam, all substantially as described.

5 2. In a grain-weigher, the combination, with the supply-chute, the main beam, and one or more valves arranged to close under said chute, of valve-actuating devices, substantially as described, carried by the main beam, and  
10 the regulator-hopper connected to shift said devices on said beam, the connection between the beam and the regulator-rod being substantially coincident with the beam-axis when the valve-actuator is in its operative position,  
15 substantially as described.

3. In a grain-weigher, the combination, with the chute, the main beam, and the supplemental beam J, carrying the valve-actuator,

of the valve 70, having a cam or arm actuated by said actuator to open said valve, and regulator devices, substantially as described, for shifting said actuator relative to said main beam, all substantially as described. 20

4. In a grain-weigher, the combination, with the counterweighted main beam, the chute, 25 and a cut-off valve therefor, of the lever or beam J, pivoted on the main beam and having at one end a cam for actuating said valve and having its other end in substantial alignment with the axis of the main beam, said 30 other end being connected with regulator devices, all substantially as described.

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Witnesses:

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