

Nov. 18, 1924.

C. H. VON GLAHN

1,516,165

BOX MAKING MACHINE

Filed July 20 1923

2 Sheets-Sheet 1

Fig. 1.

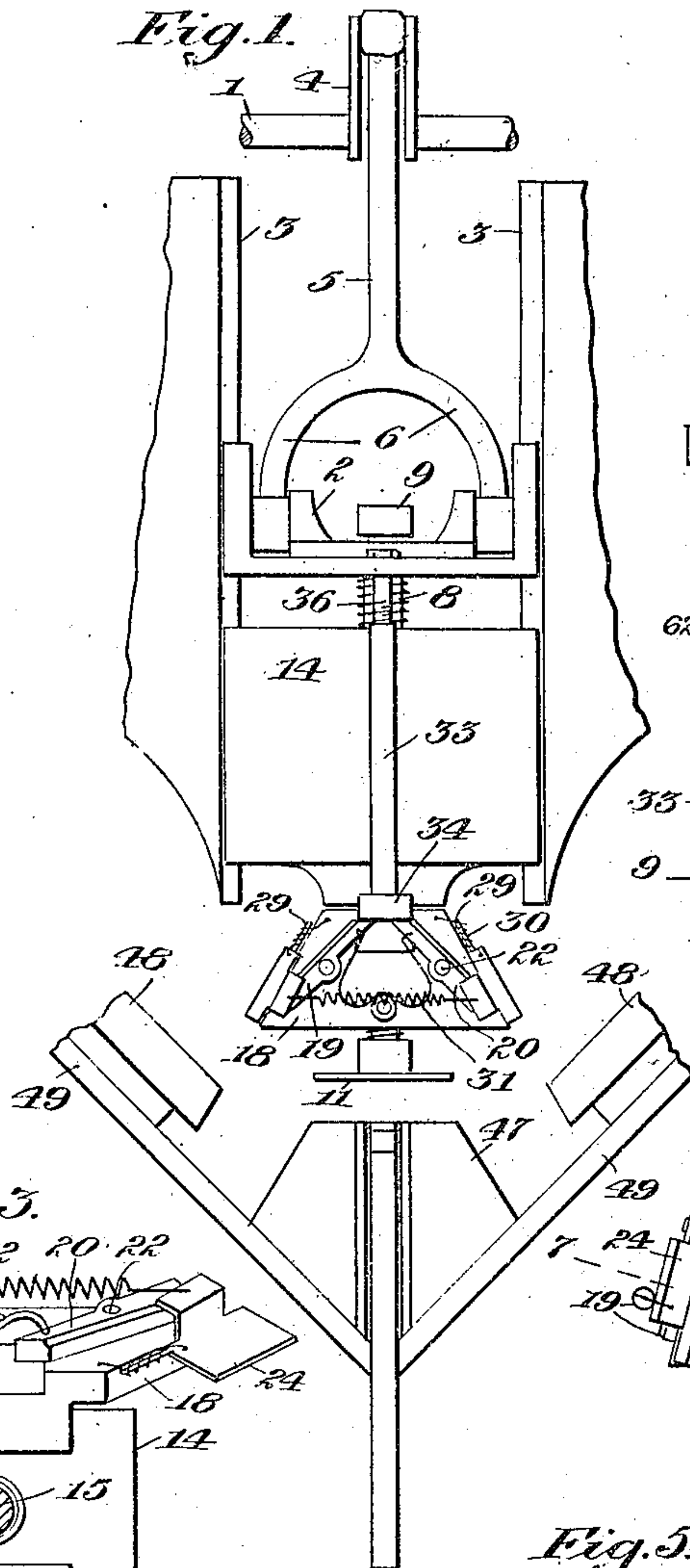


Fig. 2.

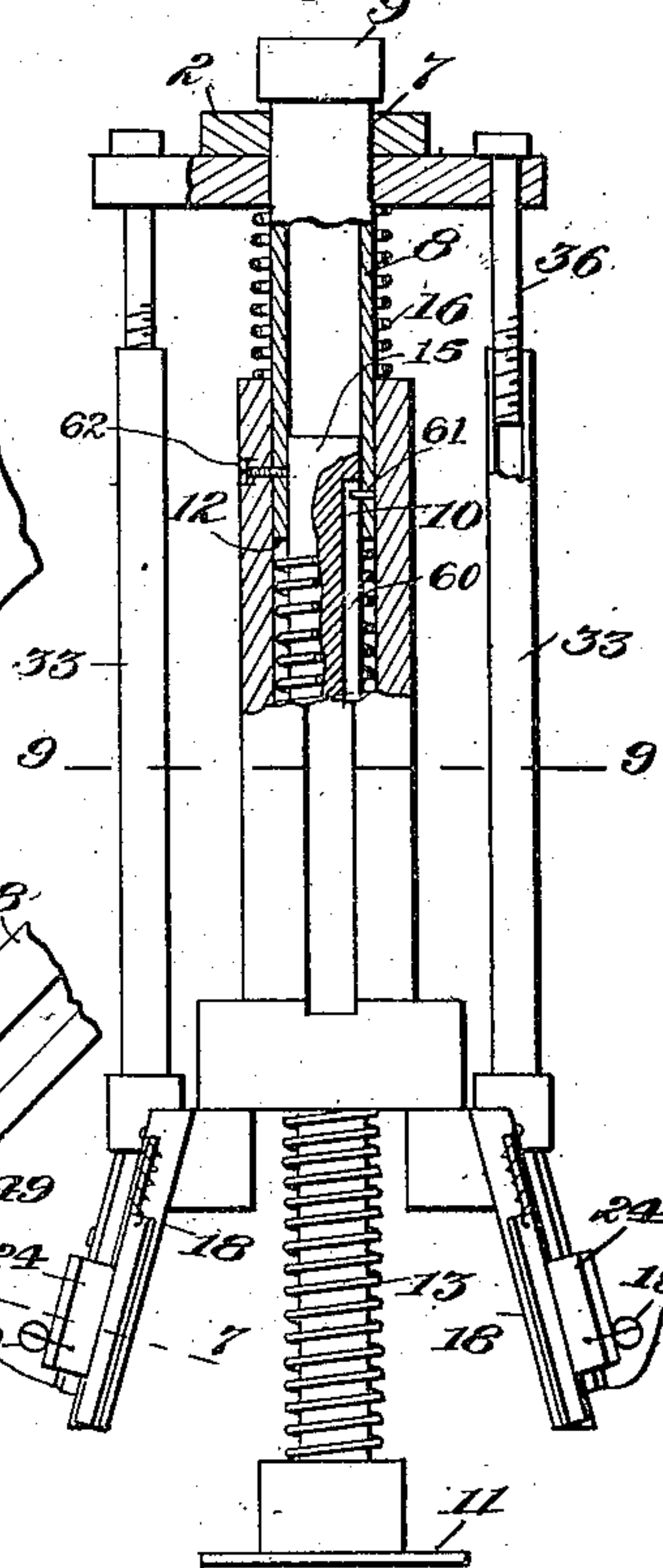


Fig. 3.

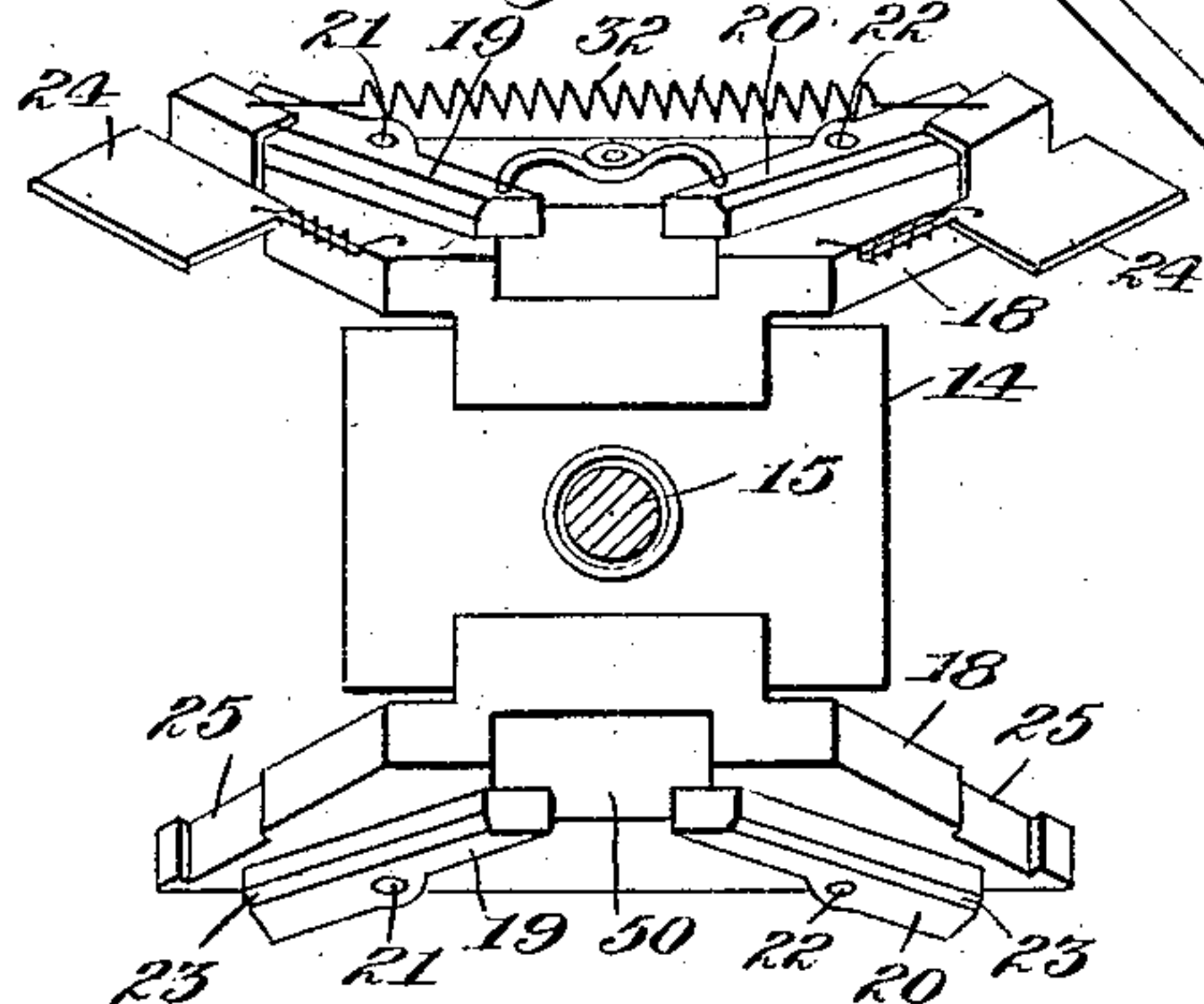


Fig. 4.

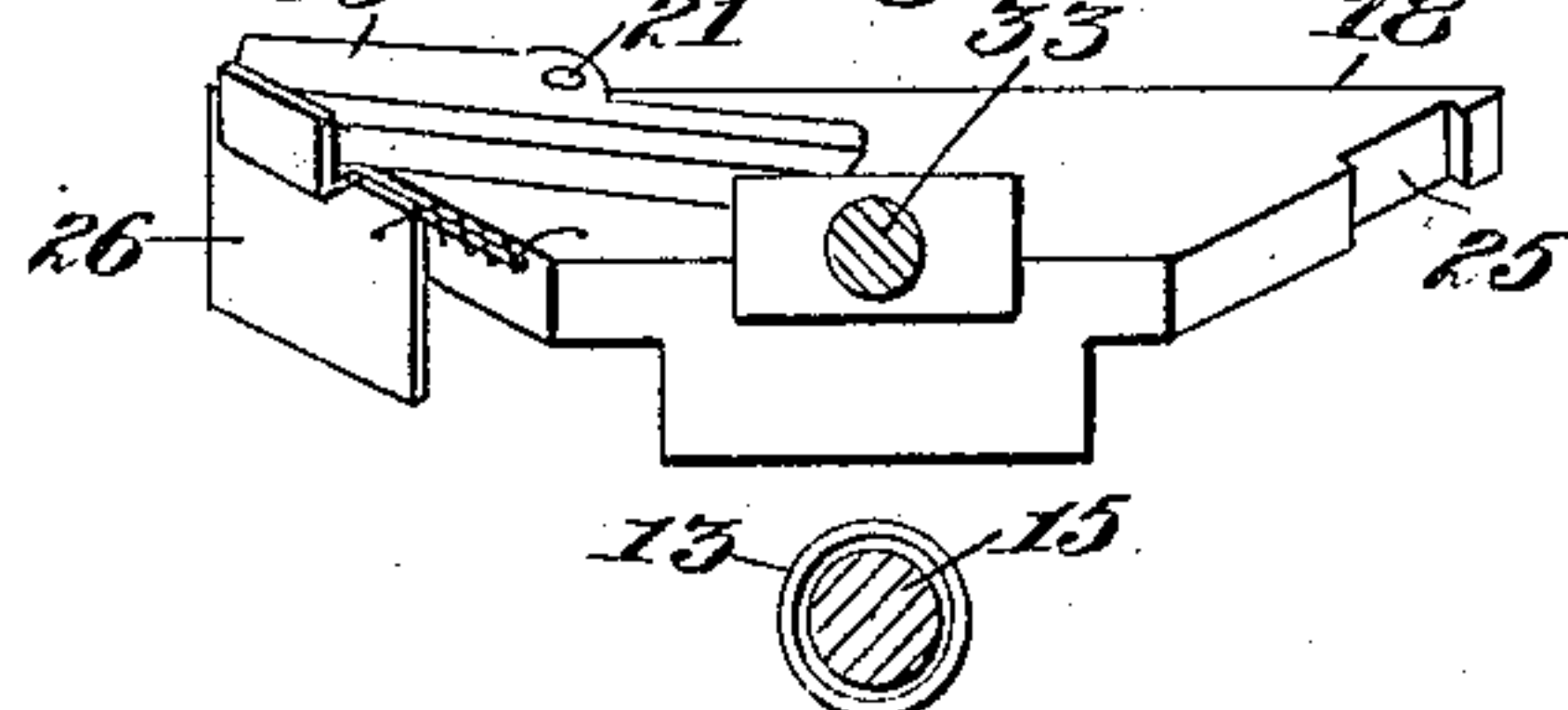
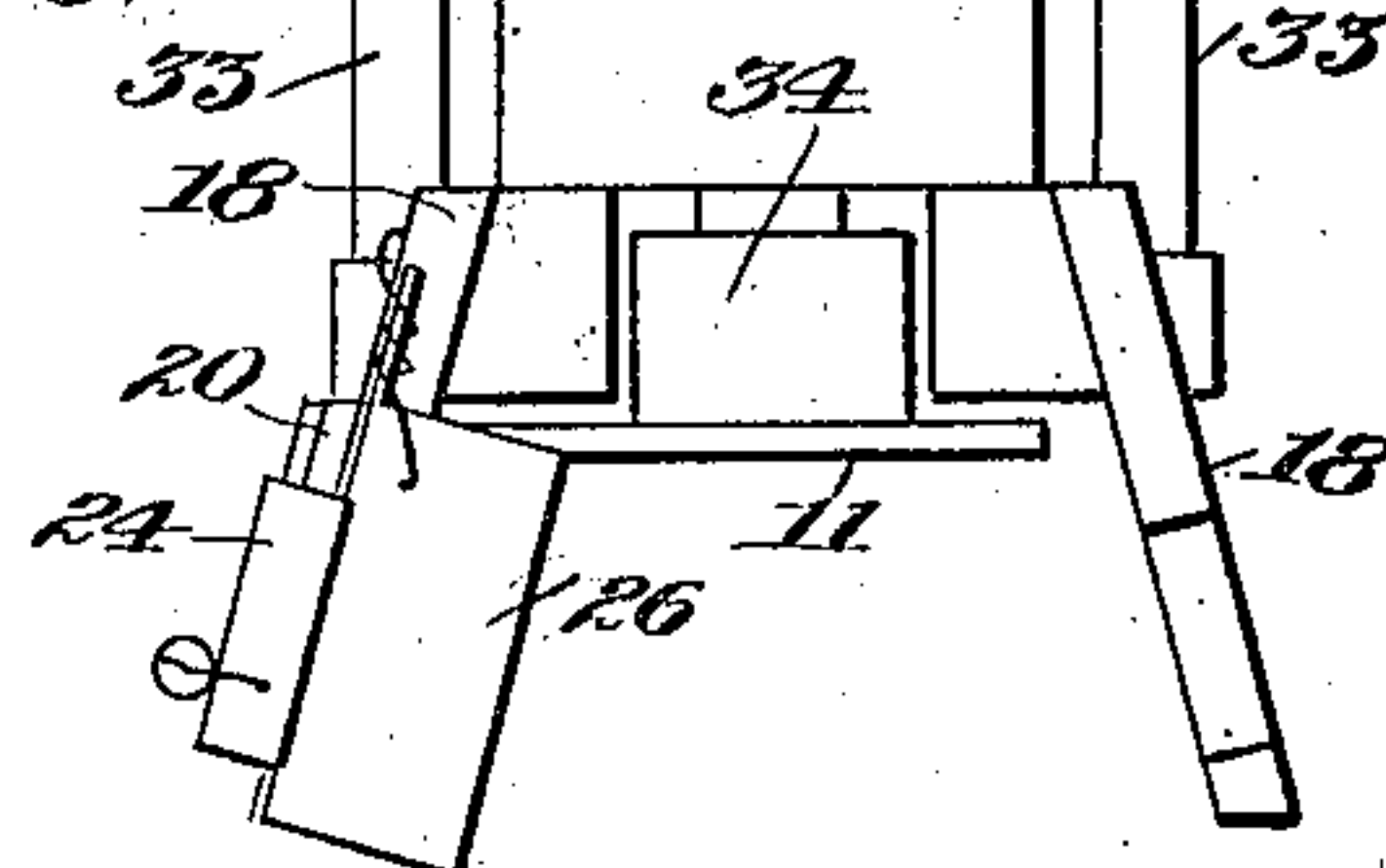


Fig. 5.



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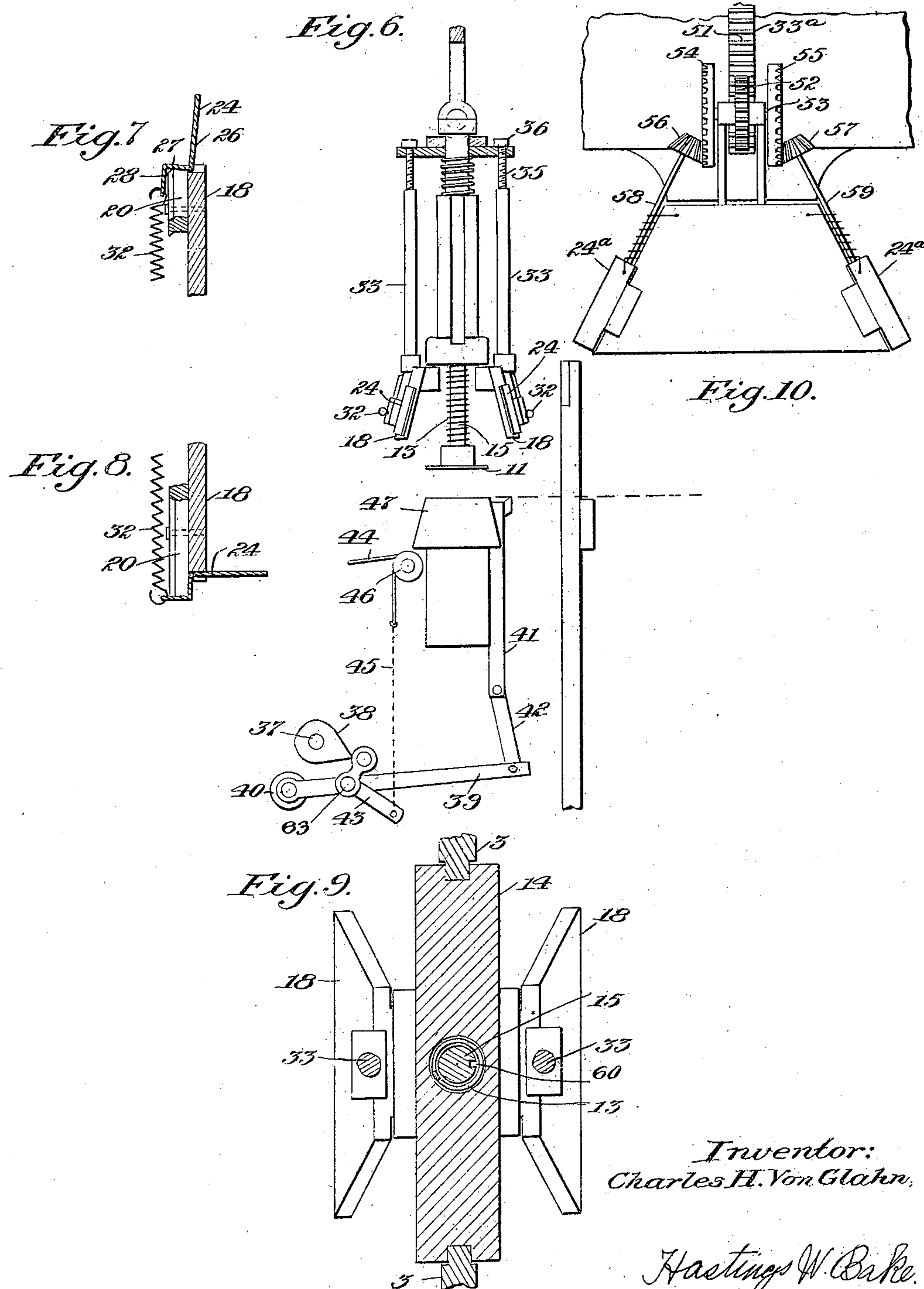
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2 Sheets-Sheet 2



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Patented Nov. 18, 1924.

1,516,165

UNITED STATES PATENT OFFICE.

CHARLES H. VON GLAHN, OF RICHMOND HILL, NEW YORK.

BOX-MAKING MACHINE.

Application filed July 20, 1923. Serial No. 652,716.

To all whom it may concern:

Be it known that I, CHARLES H. VON GLAHN, a citizen of the United States, residing at Richmond Hill, in the county of Queens and State of New York, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a specification.

The object of my invention is to provide a simple mechanism for holding a blank in position while it is being folded into box form, means for holding the box in folded position and means for ejecting the finished product from the machine.

A further object of my invention is to provide means whereby a blank may be folded on an anvil into the shape of a box adapted to receive food products and means whereby said box after being formed may be removed from the anvil automatically.

A further object of the invention is to provide means whereby the blank may be yieldably held in position on the anvil while it is being folded.

Other objects and advantages will appear in the specification.

Referring to the drawings forming a part of this application,

Figure 1 is a front elevation of my improved box making machine.

Figure 2 is a side elevation thereof partly in section.

Figure 3 is a plan view of the box folding mechanism in which view the folding arms are on only one side thereof.

Figure 4 is a fragmentary view of the folding mechanism.

Figure 5 is a fragmentary elevation of the lower portion of the structure shown in Figure 2 showing the folded arms in folded position.

Figure 6 is a side elevation view partly in section of the folding mechanism and the ejector mechanism by which the box is ejected from the anvil.

Figure 7 is a sectional view on the line 7—7 of Figure 2 showing the folding arm in unfolded position.

Figure 8 is a fragmentary sectional view on the line 7—7 of Figure 2 showing the folding arms in folded position.

Figure 9 is a plan sectional view on line 9—9 of Figure 2 and Figure 10 is a front elevation of a modification.

Referring more particularly to the drawings a shaft 1 is driven from any suitable

source of power and reciprocates a cross-head 2 in a guide-way 3 by means of a crank 4 and pitman 5. The lower end of the pitman is bifurcated forming arms 6 suitably journaled in the cross-head 2 by any conventional means. The cross-head 2 is provided with an opening 7 through which slides a sleeve 8 terminating in a large head 9 above the cross-head 2. The sleeve 8 is connected to a plunger 10 by means of a pin 61 carried in the sleeve 8 and slidable in a slot 60 in the plunger 10. The plunger terminates in a square or rectangular pressor foot 11. The lower end of the sleeve 8 is provided with a shoulder 12 and a helical spring 13 is interposed between the shoulder 12 and the pressor foot 11 which spring serves as a means to yieldably press the pressor foot 11 downwardly. A second cross-head 14 slidable in a guide-way 3 is provided with a bore 15 in which are placed the sleeve 8, plunger 10 and spring 13. The cross-head 14 is connected to the sleeve 8 by means of a screw 62 or other conventional means. A spring 16 is interposed between the cross-heads 2 and 14 which spring tends to press the cross-head 14 downwardly. Any suitable means may be provided to prevent the rotation of the pressor foot 11 of the plunger 10 such as a keyway 60 as shown in Figure 2.

Rigidly connected to the cross-head 14 are a pair of folding devices. The two folding devices are duplicates of each other and a description of one will suffice for both.

The folding mechanism consists of flat sheets of metal 18 which sheets of metal are attached to the cross-head 14 in an inclined position. Each sheet of metal is in the shape of a rhombus, the sloping sides of which diverge downwardly and are provided, in their upper portion, with a cut away part 50 adapted to receive the head 34 of the rod 23. Levers 19 and 20 are fulcrumed on the sheet of metal 18 at 21 and 22. The levers are preferably bevelled at their lower ends on the upper sides as indicated by the reference character 23 and are adapted to actuate folding arms 24, which folding arms are preferably formed of angle irons and would serve as levers journaled in cut away portions 25 of the metal sheet 18. The folding arms 24 are formed of a flat plate 26 adapted to contact with the blank of paper in the folding proc-

ess, and arm 27 at right angles to the flat plate 26 and an arm 28 at right angles to the arm 27. The fulcrum point of the folding arm 24 is at the angle between the flat plate 26 and the arm 27. The folding arm 24 is provided with an upwardly extending spindle 29 which has a spring 30 coiled about the same, having its ends attached to the metal plate 18 and with a folding arm 24 and serving as a means to return the folding arm from the position shown in Figure 8 to that shown in Figure 7. A second spring 31, carried by the metal plate 18, serves as a means to push the upper ends of the levers 19 and 20 apart so as to withdraw the lower ends thereof from the folding arms so that the spring 30 may be free to return the folding arms to their unfolded position. If desired a third spring 32 may be interposed between the arms 28 which spring serves as an additional means to retract the folding arms into their unfolded position.

Lever actuating rods 33 are interposed on opposite sides of the cross-head 14. Each of these rods terminates in a head 34 adapted to contact with and actuate the levers 19 and 20. The upper ends of the rods 33 are provided with a core having threads adapted to receive the threads 35 of an adjusting rod 36 carried by the cross-head 2. As the rod 36 is rotated the lever actuating rods 33 are raised or lowered so as to vary the amount of effective movement of the levers 19 and 20.

A shaft 37 is rotated at the same rate of speed as the shaft 1. The shafts 1 and 37 may be rotated by independent sources of power or by the same source of power. In practice I prefer to actuate both of the shafts from the same source of power by a suitable system of gearing adapted to insure the rotation of the two shafts at the same velocities. A cam 38 is carried by the shaft 27. A lever 39 is fulcrumed at 63 to any suitable support and at one end is operatively connected to a reciprocating rod 41 by means of a link 42. A roller 40 is provided at the other end of the lever 39, which roller is adapted to be depressed by the point of the cam thereby raising the link 42 and reciprocating the rod 41.

Journalled on the lever 39 is a bell crank lever 43. Both of the levers 39 and 43 are actuated by the cam 38. The lever 43 actuates a gate 44 by means of a chain 45. Of course I do not confine myself to the use of a chain in this connection for it is obvious that a wire, chain, rope, rod or what not might be used to pull the gate 44 downwardly. The chain 45 is connected to and passes over a spool 46 on which the gate 44 is mounted so that as the lever 43 moves downwardly the gate 44 is moved outwardly.

In operation, as the pitman 5 moves downwardly by the rotation of the shaft 1, the cross-head 2 likewise moves downwardly until the pressor foot 11 comes in contact with blank paper shown in dotted lines in Figure 6 and presses the same against the anvil 47 which anvil is, considering its upper portion alone, in the shape of a frustrum of a pyramid. As the pressor foot 11 presses the blank on the anvil 47 the cross-head 2 continues its descent compressing the spring 13 and forcing the rod 10 through the bore of the sleeve 8. The cross-head 14 likewise descends carrying the diverging plates 18 and pressing the sides of the box against the sides of the anvil 47. While the sides of the box are being folded the cross-heads 2 and 14 and the lever actuating rods 33 are traveling at substantially the same rate but when the cross-head 14 is stopped, the cross-head 2 continues its movement compressing the spring 16 and actuating the rods 33 which in turn press downwardly on the beveled levers 19 and 20 sliding apart their lower ends and pushing them against the arms 27 of the folding arms 24, thereby turning the folding arms on their pivots and folding the ends of the box against the anvil.

The box now being in folded position, a stapling mechanism 48 moves downwardly on slideways 49 and inserts a staple in the flaps of the folded box. The stapling mechanism 48 and the folding mechanism now recede above the anvil 47 and the finished box is left reposing on the anvil. The cam 38 now engages the roller 40 on the lever 39 pressing the end of the lever carrying the roller downwardly and the rod 41 is forced upwardly against one edge of the finished box lifting that edge above the anvil. The cam 38 is now engaging the bell crank lever 43 and pulling downwardly on the chain 45 which moves the gate 44 into the position shown in Figure 6 thereby ejecting the finished box from the anvil. The rod 41 is normally pulled down by means of a spring or other suitable means. After the cam 38 passes beyond the lever 43 the gate 44 is moved back against the face of the anvil by any suitable means such as a spring.

It is obvious that the metal sheets 18 might be connected by other metal sheets not shown so that the folding mechanism would be substantially a hollow frustrum of a pyramid.

In Fig. 10 I show a modification in which I have provided teeth 51 on the bar 33^a which corresponds to the rod 33 shown in Fig. 1. The teeth 51 are in mesh with a gear 52 rigidly mounted on a shaft 53 mounted on any suitable support carried by the cross head 14. Beveled gears 54 and 55 are rigidly mounted on the shaft 53 which beveled gears intermesh with beveled gears

56 and 57 carried on spindles 58 and 59 respectively which spindles operate a folding mechanism 24^a similar to the folding mechanism 24 as shown in the remaining figures of the drawings. As the bar 33^a reciprocates, the teeth 51 engage the pinion 52 thereby alternately rotating the gears 54, 55, 56 and 57 and thereby opening and closing the folding mechanism 24^a. When using the modified form, the remaining parts function as heretofore described.

Throughout the specification the word box has been used in its broadest sense and is not limited to a closed box. In fact the principal use of the machine is to make paper trays such as are used in delicatessen stores. These trays consist of a flat bottom having diverging side and end walls, the top being open. The word box, therefore, as used in this specification is intended to mean trays, especially those capable of being made from paper, pasteboard or other materials which are readily foldable into box form.

Obviously many other changes may be made in such a machine without departing from the spirit of this invention. I, therefore, do not wish to limit myself to the specific embodiment shown except as I may limit myself in the annexed claims.

I claim:

1. In a tray making machine, means whereby the blank is held, plates whereby the sides thereof are folded, levers pivoted to said plates and movable in a plane parallel to said plates, folding arms carried by said plates, and means carried by said arms and adapted to be actuated by said levers whereby the arms are moved to a position at right angles to said plates to fold the ends of the blank.

2. In a tray making machine, resilient means whereby the blank is held, side plates, folding arms and levers carried by said side plates, means whereby said levers are actuated, projections carried by said arms and extending into the path of movement of said levers whereby the arms are turned about the ends of said plates to fold the ends of the tray, and means whereby said levers are actuated.

3. In a box making machine, a folding mechanism including diverging side plates, folding arms pivoted to said side plates, levers pivoted to said side plates, means whereby said levers are actuated, means operatively connecting the levers and folding arms, and means whereby said folding arms are returned to inoperative position.

4. In a folding mechanism, plates adapted to fold the sides of a tray, levers and folding arms carried by the plates, means whereby said levers actuate said arms so as to fold the ends of the tray, means whereby said plates are moved downwardly on the

tray, and means adapted to actuate said levers in planes respectively parallel to said plates.

5. In a folding mechanism, plates adapted to fold the sides of a tray, levers and folding arms carried by the plates, means whereby said levers actuate said arms so as to fold the ends of the tray, means whereby said plates are moved downwardly on the tray, and a reciprocating rod adapted to actuate said levers.

6. In a box making machine, an anvil in the shape of the frustrum of a pyramid, a box folding die of the shape of the anvil and adapted to press the sides and ends of a blank against the sides and ends of the anvil, said box folding mechanism including folding arms pivoted to the sloping edges of the sides of the folding mechanism so that said arms may swing around the ends of said die, and means movable in planes parallel to the sides of the die and adapted to actuate said arms.

7. In a box making machine, a folding mechanism including diverging side plates, said plates being in the form of a rhombus, folding arms pivoted to the sloping edges of said plates so that said arms may spring around the ends of a box folding die so as to fold the sloping end wall of the box, levers whereby said folding arms are actuated, and means operatively connecting said folding arms and levers.

8. In a box making machine, a folding mechanism including diverging side plates, folding arms pivoted to said side plates, levers pivoted to said side plates, means whereby said levers are actuated and means operatively connecting the levers and the folding arms.

9. In a folding mechanism, plates adapted to fold the sides of a tray, levers and folding arms carried by the plates, means whereby said levers actuate said arms so as to fold the ends of the tray, means whereby said plates are moved downwardly on the tray, and a rod adapted to actuate said levers, and means whereby the effective length of said rod may be varied.

10. In a folding mechanism, plates adapted to fold the sides of a tray, levers and folding arms carried by the plates, means whereby said levers actuate said arms so as to fold the ends of the tray, means whereby said plates are moved downwardly on the tray, means adapted to actuate said levers, and means to hold the tray in position while the same is being folded.

11. In a box making machine, a folding mechanism including side plates, folding arms pivoted to said side plates, levers pivoted to said side plates, projections carried by said folding arms extending into the path of movement of the said levers and adapted to be actuated by the said levers, a

reciprocating rod adapted to actuate the said levers and means whereby the effective length of said rod may be varied.

12. In a box making machine, a folding
5 mechanism including side plates, folding
arms pivoted to said side plates, levers pivoted to said side plates, projections carried by said folding arms extending into the
10 path of movement of the said levers and adapted to be actuated by the said levers, and a reciprocating rod adapted to actuate the said levers.

13. In a box making machine, a folding
15 mechanism including side plates, folding
arms pivoted to said side plates, levers having beveled upper surfaces pivoted to said

side plates, projections carried by said folding arms extending into the path of movement of the said levers and adapted to be actuated by the said levers, a reciprocating
20 rod adapted to actuate the said levers, and means whereby the effective length of said rod may be varied.

14. In a folding mechanism, a plate, folding arms pivoted at opposite edges of said
25 plate, oppositely extending levers pivoted to said plate, means operatively connecting the outer ends of said levers with said arms, and a common means to actuate both of said
30 levers.

In testimony whereof I affix my signature.
CHARLES H. VON GLAHN.