Jan. 2, 1923.

1,440,856

V. S. WESTCOTT.
LABELING MACHINE.
FILED MAR. 16, 1921.

6 SHEETS-SHEET 1

Fig. 1

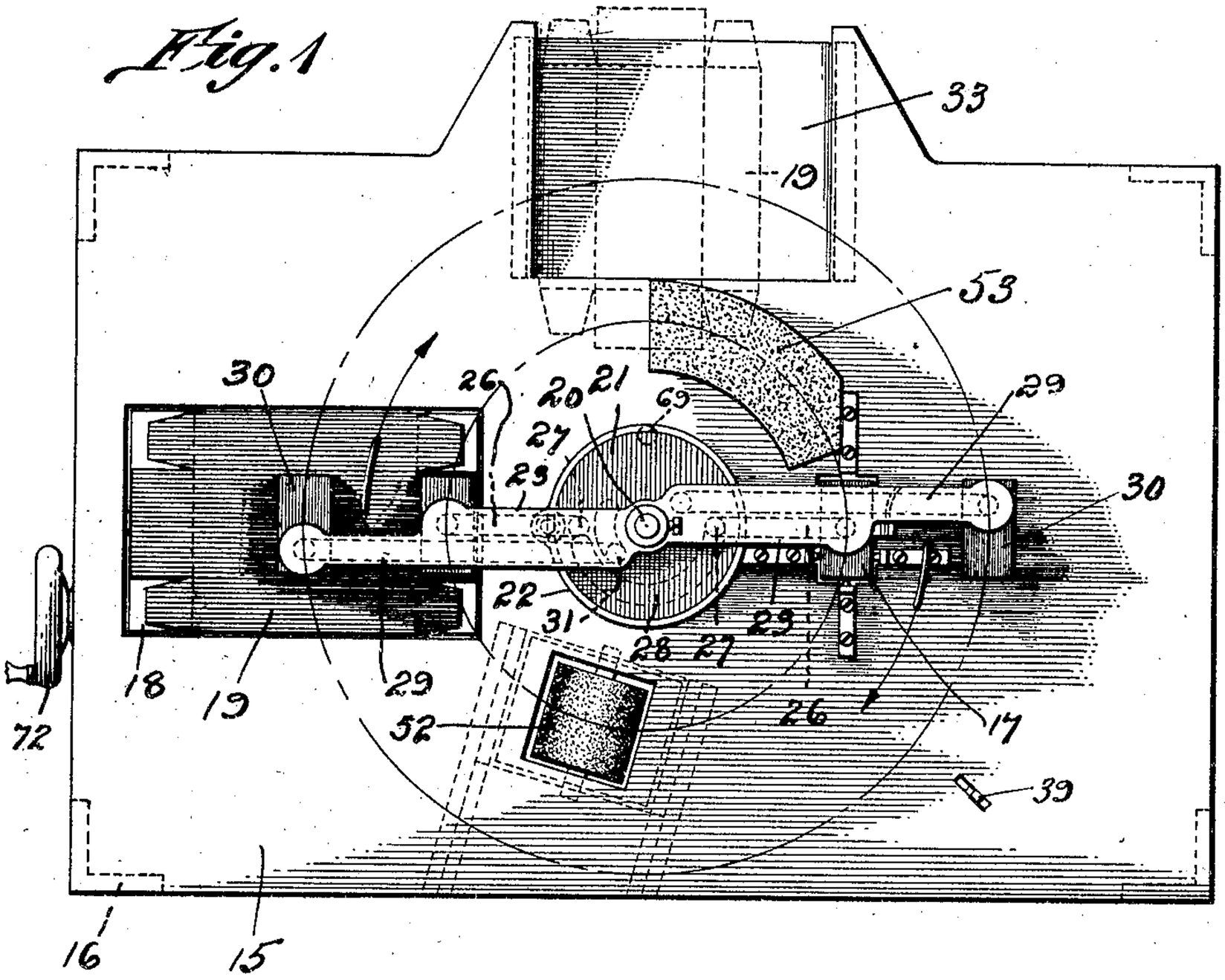
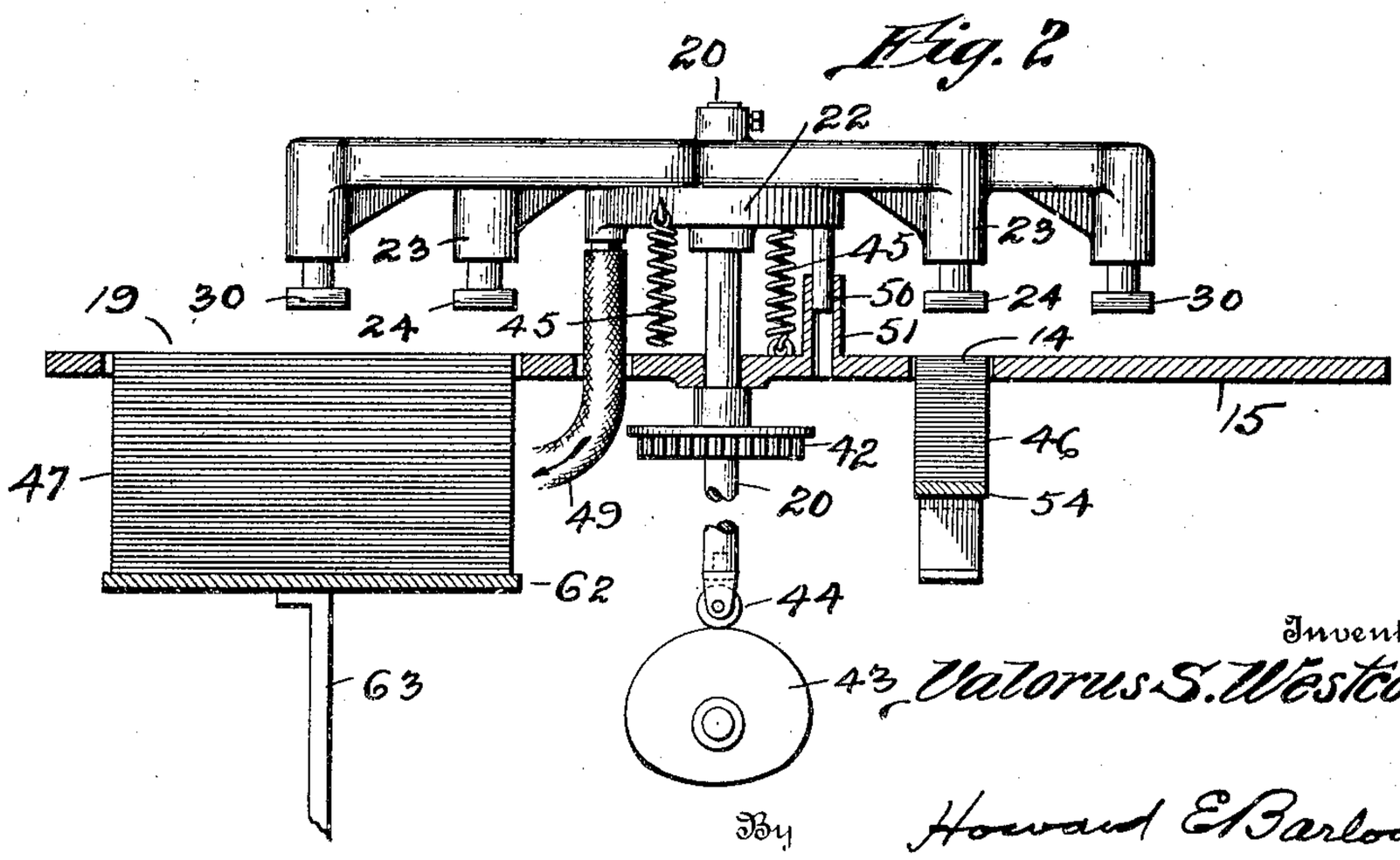


Fig. 2



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By Howard E. Barlow
Attorney

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6 SHEETS-SHEET 2

Fig. 3

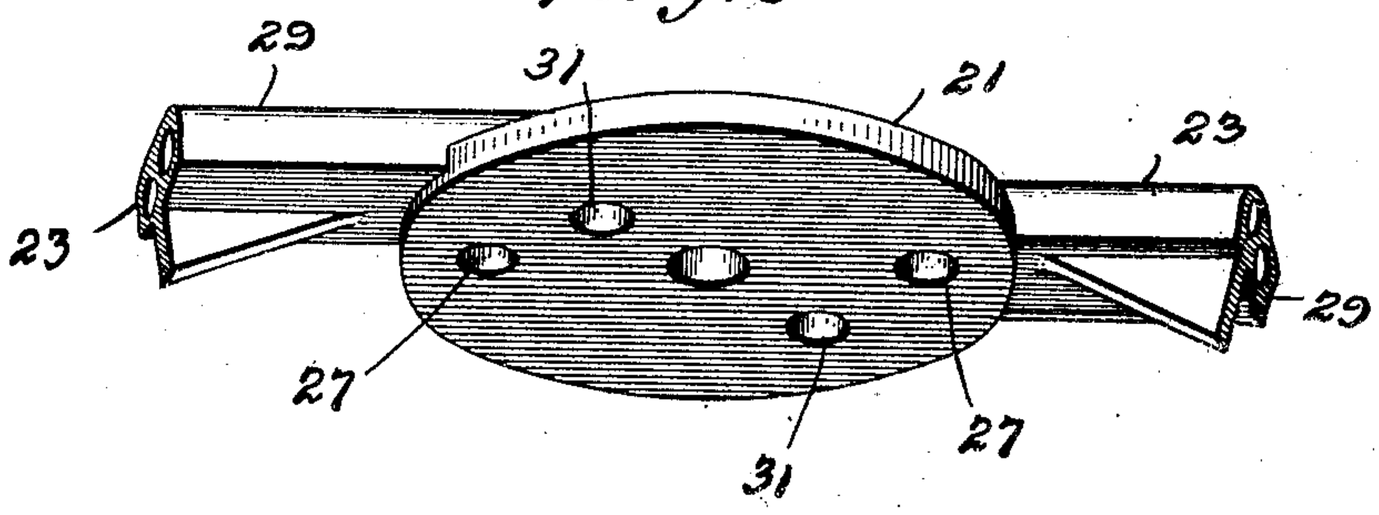


Fig. 4

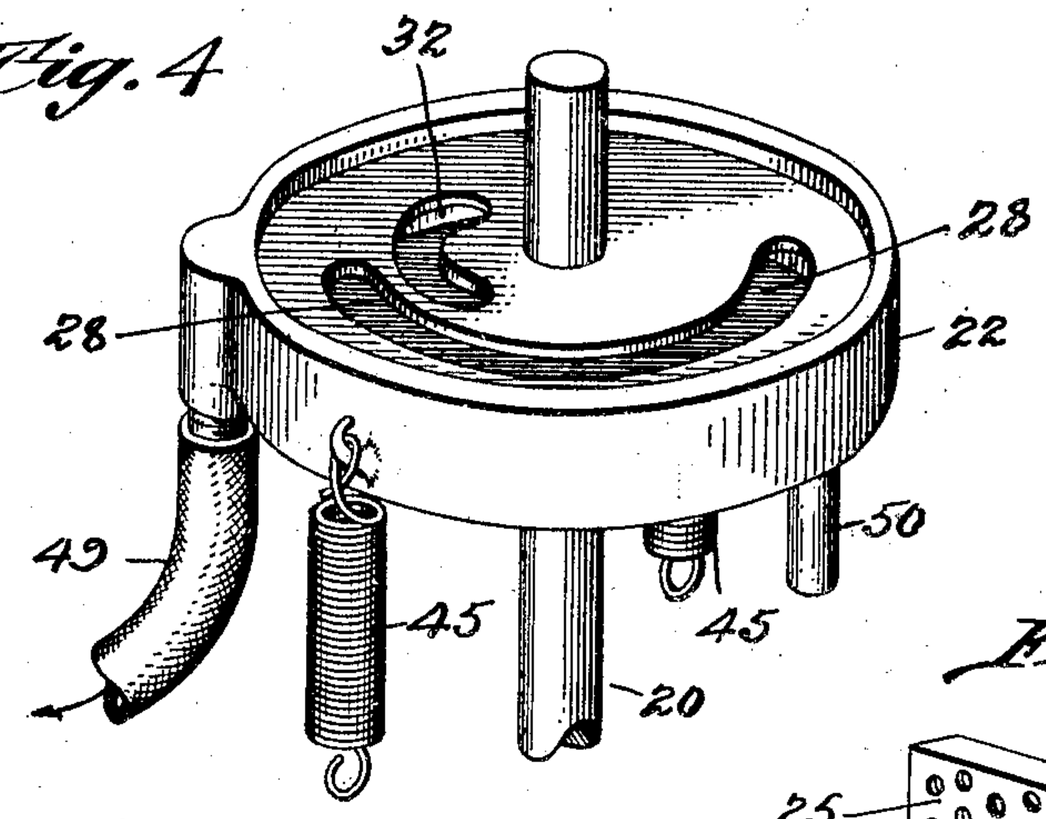


Fig. 6

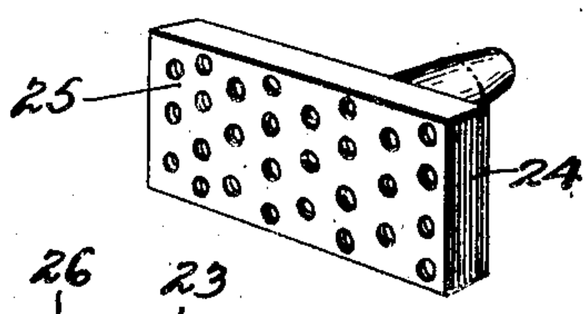
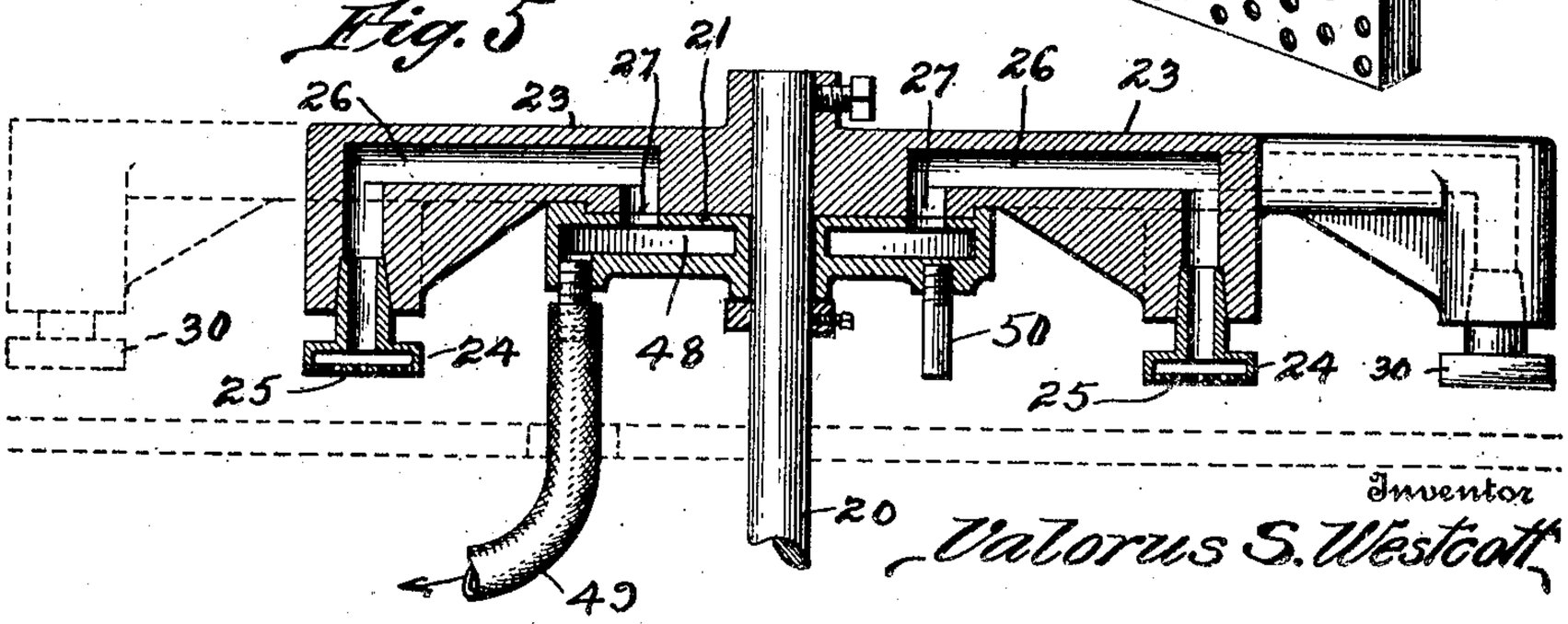


Fig. 5



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6 SHEETS-SHEET 3

Fig. 7

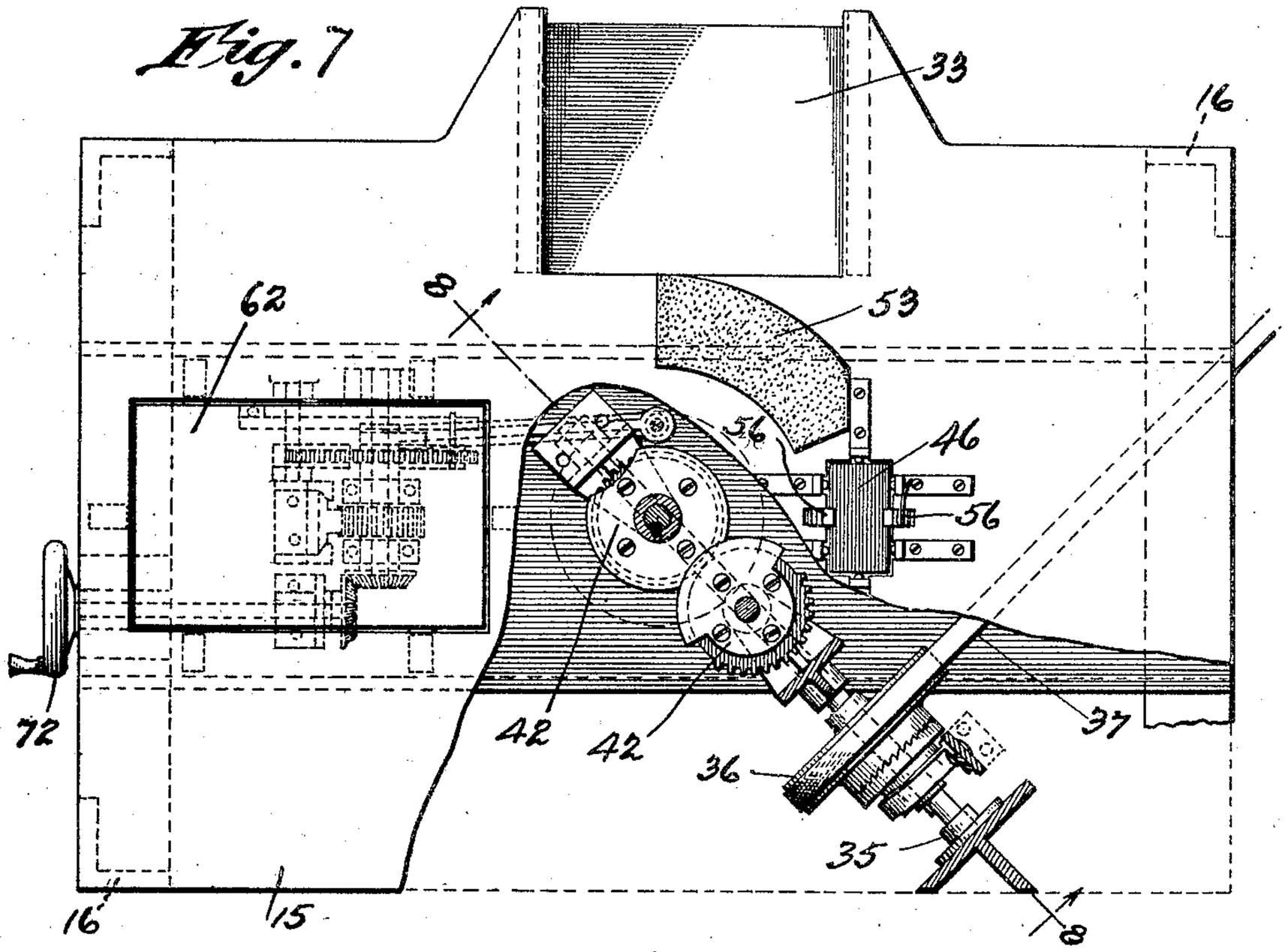
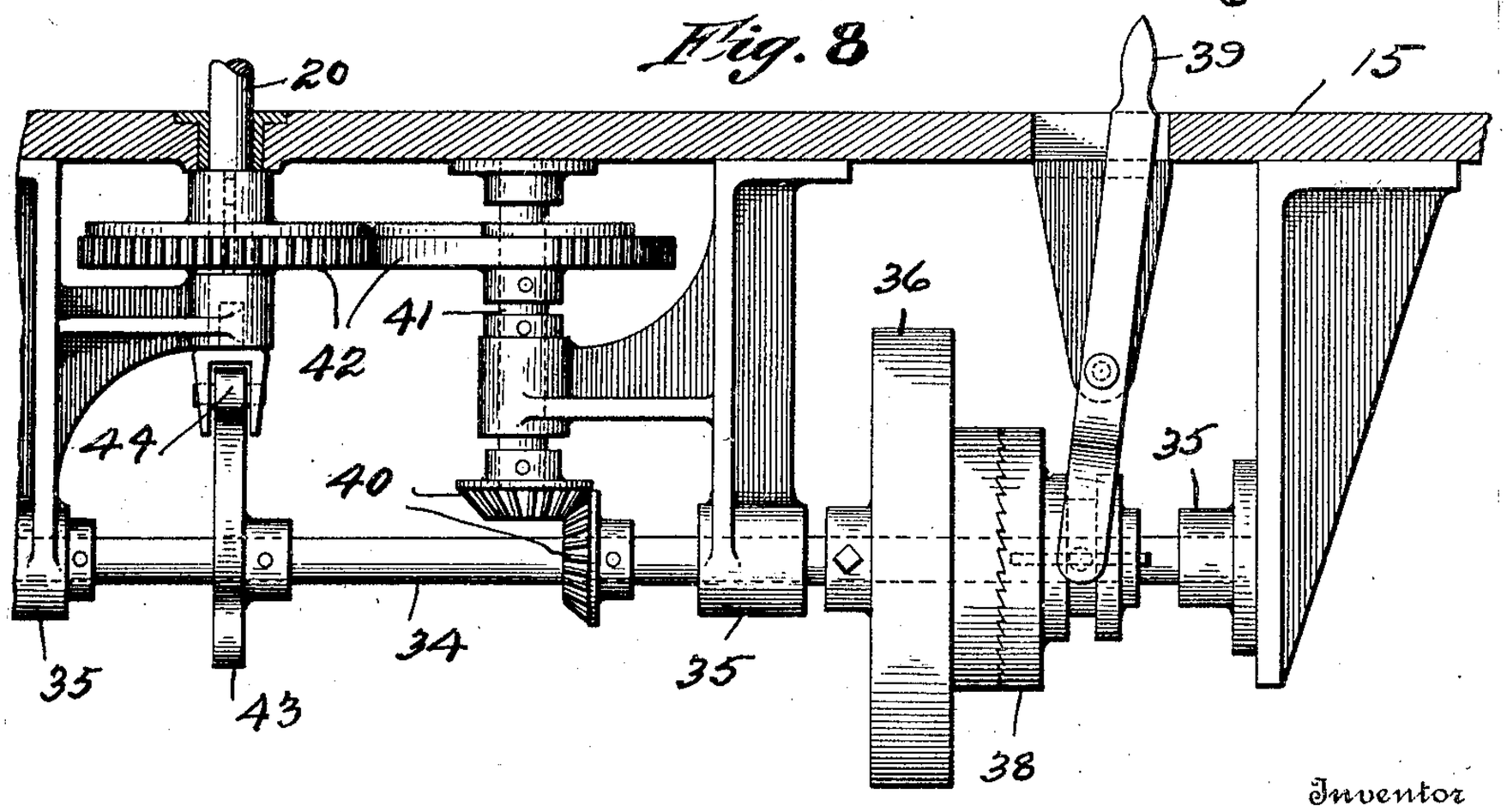


Fig. 8



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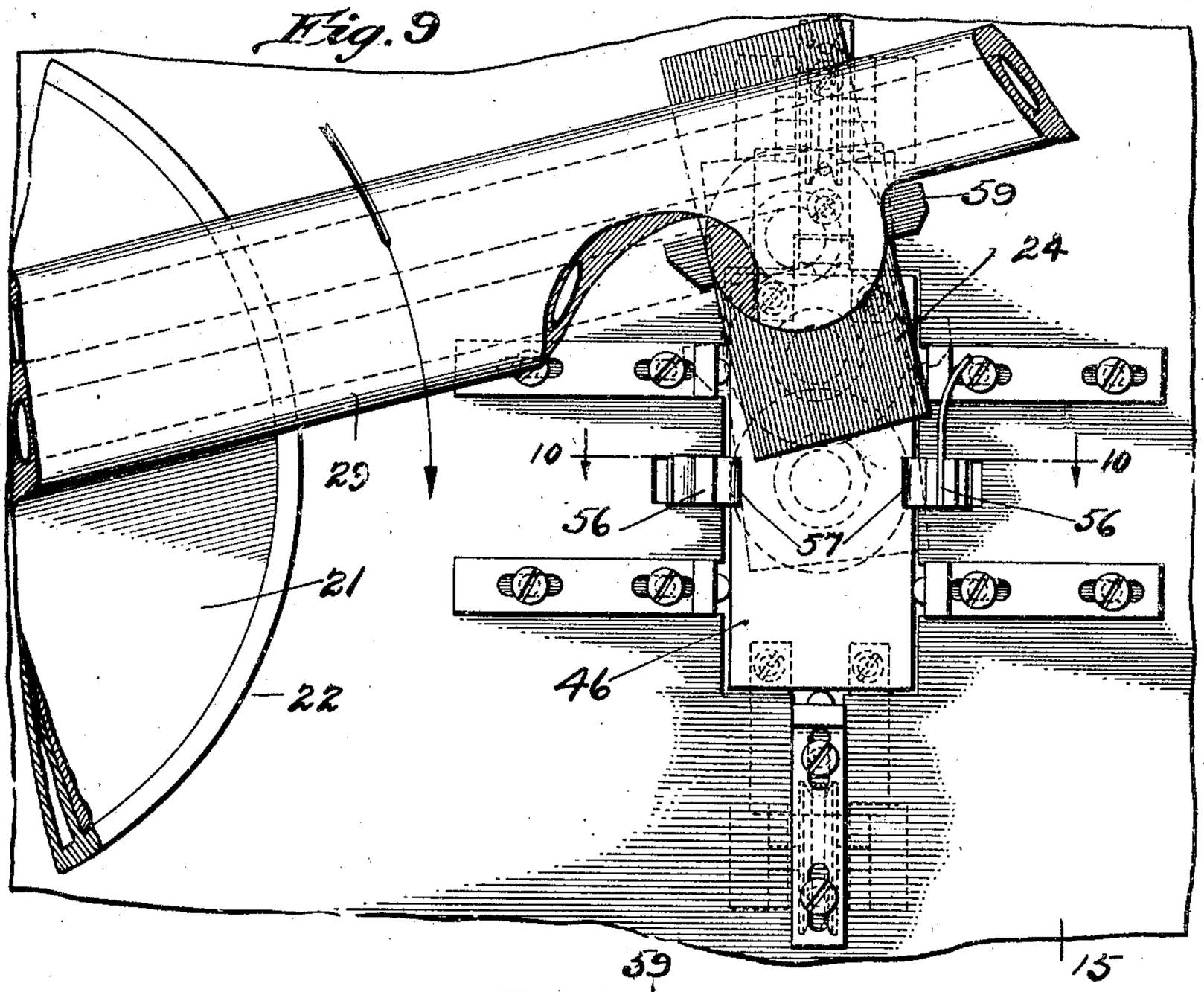
6 SHEETS-SHEET 4

Fig. 9



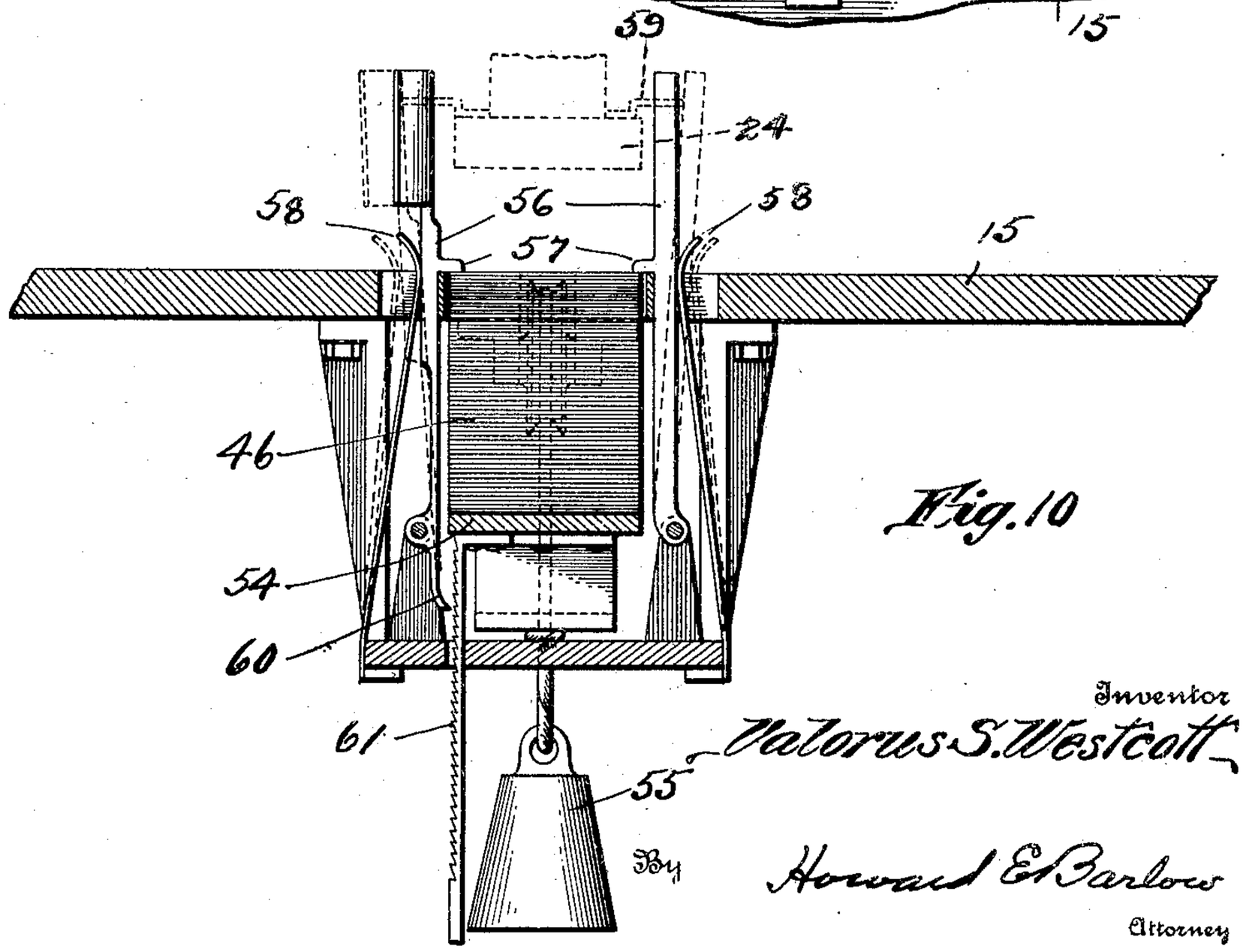


Fig. 10

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6 SHEETS-SHEET 5

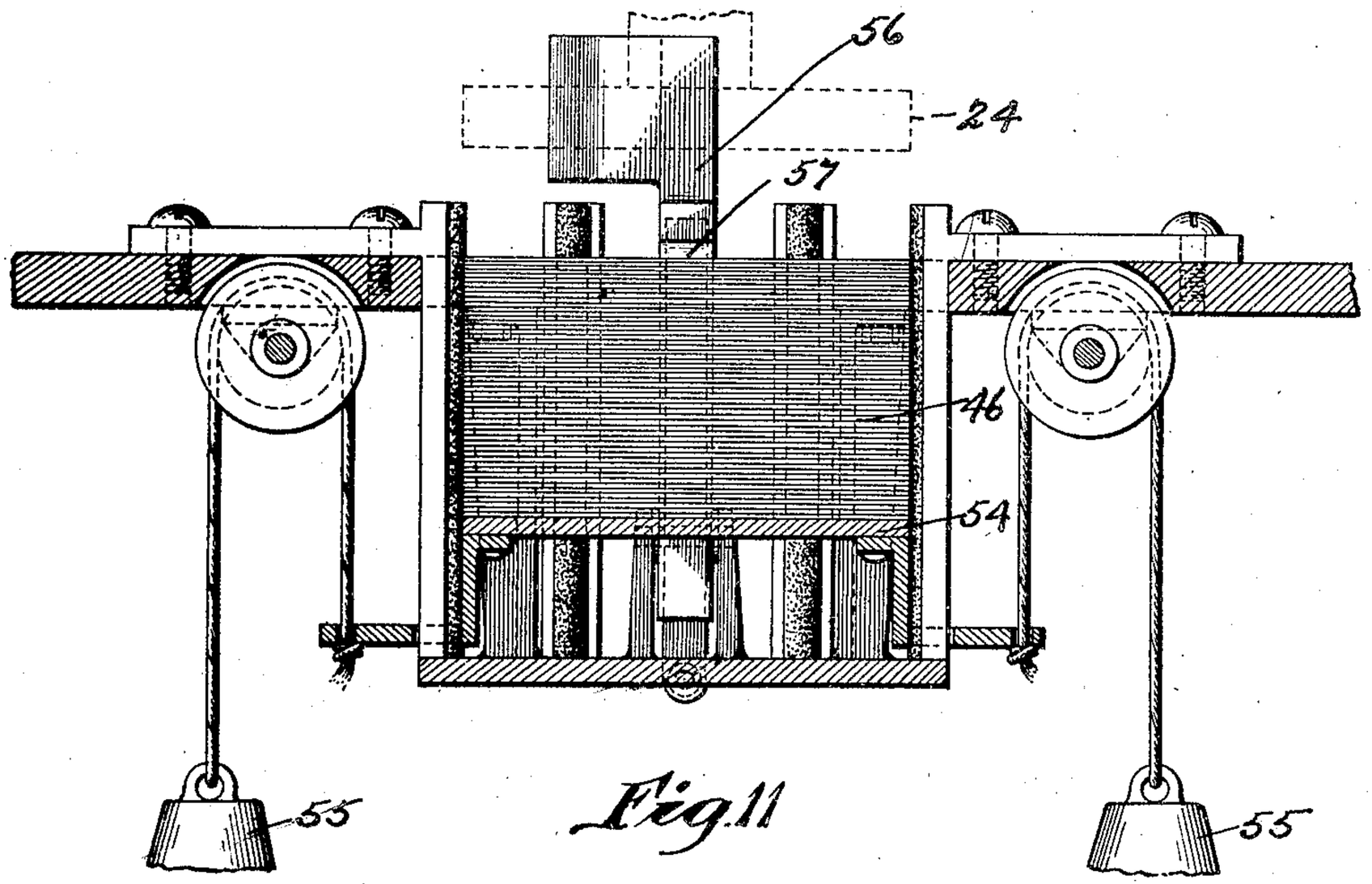

Fig. 11

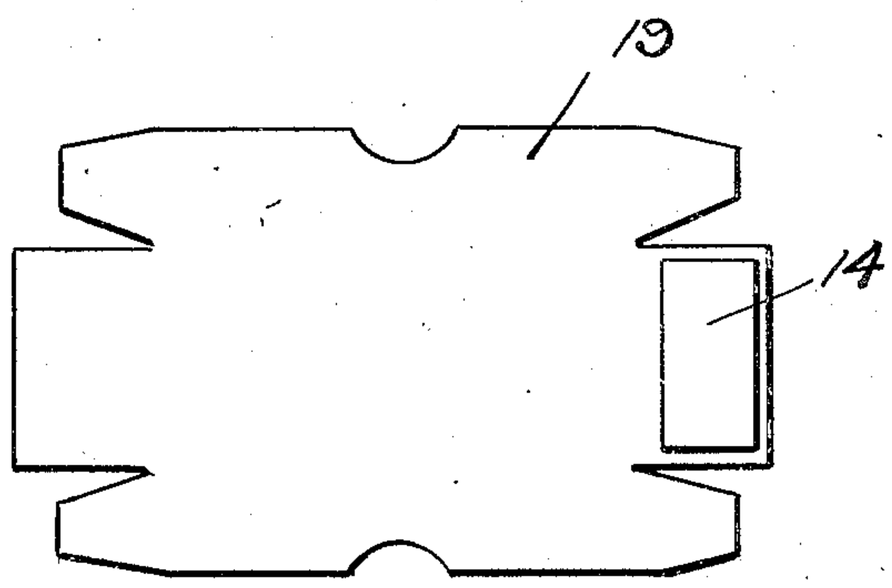

Fig. 14

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6 SHEETS-SHEET 6

Fig. 12

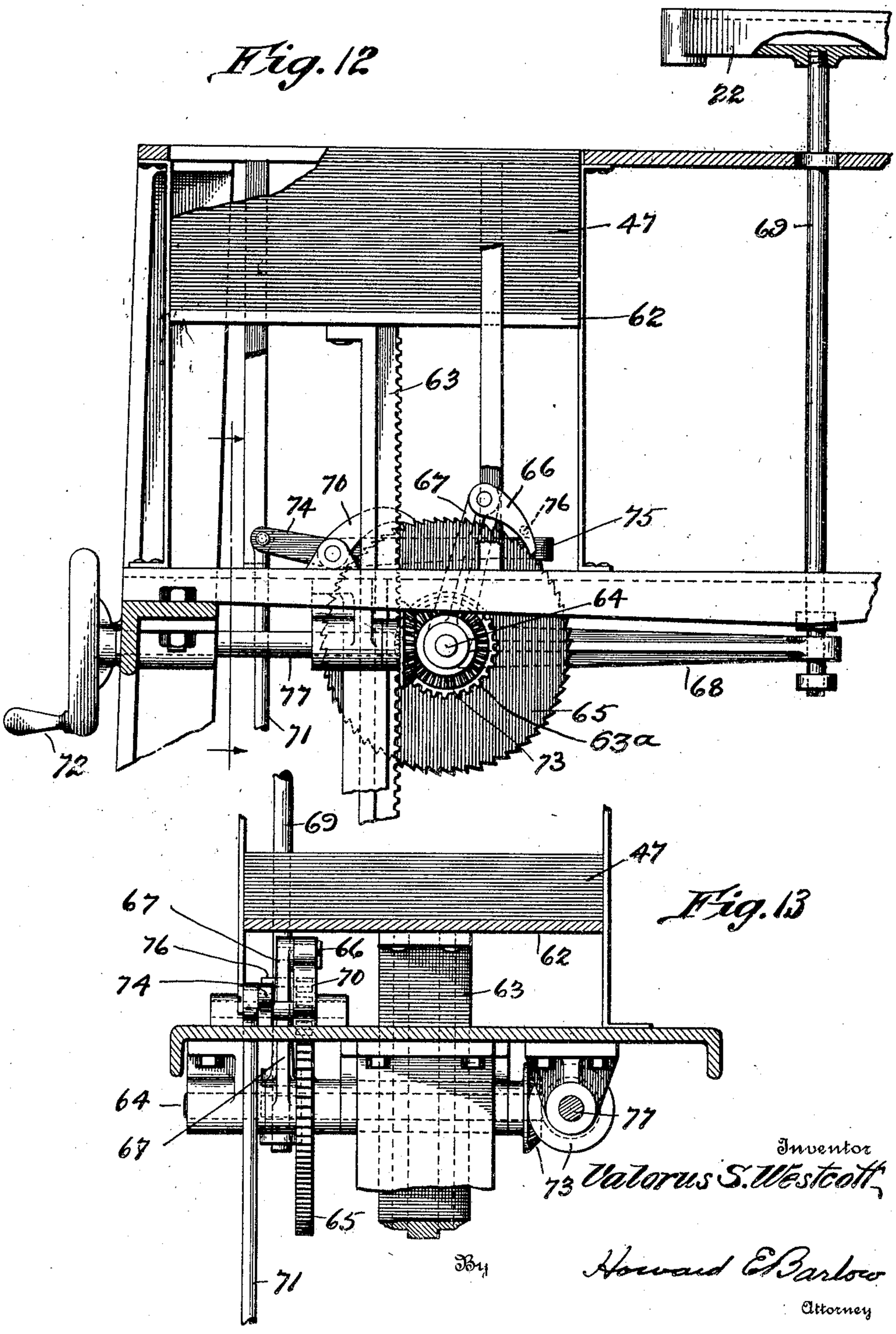

Fig. 13

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Patented Jan. 2, 1923. 1,440,856

UNITED STATES PATENT OFFICE.

VALORUS S. WESTCOTT, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO J. & P. COATS (R. I.) INC., OF PAWTUCKET, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

LABELING MACHINE.

Application filed March 16, 1921. Serial No. 452,683.

To all whom it may concern:

Be it known that I, VALORUS S. WESTCOTT, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Labeling Machines, of which the following is a specification.

This invention relates to an improvement in the construction of labeling machines, and has for its object to provide a machine of this character which will automatically engage and carry a label and apply the same to the work.

A further object of the invention is the provision of a so-called suction head on the machine for engaging and lifting the label from a pile, the action of the head in engaging and releasing the label being controlled by vacuum mechanism.

The invention further consists in the provision of a valve mechanism for controlling the vacuum action upon the suction heads.

The invention still further consists in constructing and operating said suction heads in pairs, whereby the downward stroke of said heads causes one to engage a label on the pile while the other is applying and pressing its label to the work and means being provided for reversing the positions and actions of said heads.

The invention further consists in the provision of means for automatically feeding the labels to be engaged by the heads and also in providing mechanism for automatically feeding the work to which the labels are to be applied and also for removing the work after having been labeled.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a plan view illustrating the relative arrangement of the label magazine, the work magazine and the revoluble suction heads for transferring a label from its pile or magazine and applying it to the work; also for removing the suction heads.

Figure 2 is a side elevation showing the suction heads, the label magazine and the work magazine.

Figure 3 is a perspective view showing the under side of the upper valve plate with portions of its suction arms.

Figure 4 is a perspective view showing the valve seat member and the arrangement of ports by which the vacuum is controlled in its action upon the suction heads.

Figure 5 is a sectional view through the label suction heads, arms and valve; also showing one of the work suction heads in elevation and one in dotted line.

Figure 6 is a perspective view of one of the suction heads, showing the openings in its working face.

Figure 7 is a plan view of the machine with the top or table partially broken away to better illustrate the driving mechanism.

Figure 8 is a sectional elevation on line 8—8 of Figure 7, through the table illustrating the driving mechanism.

Figure 9 is an enlarged top view illustrating a portion of the suction arm as approaching the label magazine to effect a feeding operation of the elevator upon moving into position to engage the top label of the pile.

Figure 10 is a section on line 10—10 looking in the direction of the arrow showing the label elevator and the mechanism for controlling the upward feed of the label pile.

Figure 11 is a side elevation of the label elevating mechanism.

Figure 12 is a side elevation showing the mechanism for operating the work pile elevator to feed the work or box blanks.

Figure 13 is an end elevation of the work elevator mechanism.

Figure 14 is a plan of a box blank with a label applied thereto.

With reference to the drawings, 15 designates the table of the machine, which is preferably supported on corner legs 16 and provided with an opening 17 for the label magazine and an opening 18 for the work magazine.

In this particular case I have shown the work as being in the form of box blanks 19 to which the label is applied while in its knock-down or extended form before being folded, but it is obvious that the labels may be applied to any class of work adapted to be handled by the machine.

Located between the label opening and the work opening in the table I have mount-

ed a vertically-disposed rotatable shaft 20 to which is fixed a valve plate 21 designed to set into the vertically movable but non-rotatable valve seat member 22.

To this valve plate 21 I have connected a pair of oppositely extending hollow cross arms 23 to the outer ends of each of which is connected a suction head 24, which heads are provided with a perforated outer label engaging plate 25. One end of each of the channels 26 in these arms extends through the inner face of this valve plate 21 forming ports 27, see Figures 3 and 5, which ports are arranged to communicate with an elongated port 28 in the valve seat 22, whereby the action of the suction heads 24 is controlled so as to engage and lift a label from the pile at 17, transfer it to the work 19, and then release it to be applied thereto all as hereinafter described.

In some instances it is found desirable to engage and lift the work from its pile and carry it a predetermined distance and drop the same, to which end I have mounted a separate pair of hollow arms 29, in the outer end of each of which is mounted a suction head 30 similar to the head 24 which engages the label. The inner ends of these arms are provided with ports 31 which are adapted to alternately register with a slightly elongated port 32 in the valve seat 22 whereby the vacuum in the valve head 30 is caused to lift and carry the work a predetermined distance whereby when this port 31 is moved out of communication with the elongated port 32 the action of the vacuum upon the head is broken and the work is released thereby being permitted to fall into the inclined chute 33 in the table to be conducted away.

In order to impart the necessary motions to the label applying devices and to the operations of the rest of the machine, I have mounted a main drive shaft 34 in bearings 35 beneath the table 15. On this shaft I have loosely mounted the main drive pulley 36 which receives its power from the belt 37 and in order to readily connect and disconnect this pulley to the shaft I have provided a clutch 38 which may be operated by the hand lever 39 to start and stop the machine when desired but any other suitable means may be employed for this purpose.

An intermittent rotating motion is imparted to the valve plate 21 and its arms and suction heads, from the main shaft 34, through the miter gears 40, short shaft 41, pair of intermittent drive gears 42 and upright shaft 20, and a lifting motion is imparted to both the valve seat, its plate and heads in unison, through action of the cam 43 which engages the roller 44 on the lower end of shaft 20, the return or downward motion of these parts being effected by gravity and the action of the tension springs 45, by which motions it will be seen that the two suction heads 24 may be caused to drop, one to engage the topmost label 46 and the other to press against and apply its label to the work 19 on its pile 47, and at the same time it will be noted that the port 27 leading to the label pile is open, producing a vacuum in the suction head to lift the label upon coming in contact therewith, while on the opposite side that port leading to the head that is applying the label has passed beyond the end of elongated port 28 thus closing off the suction action on its head and so permitting the label carried by this head to adhere to the work upon being pressed and forced thereonto. After this operation of affixing the label with one head and engaging a label from the pile with the opposite head, the cam 43 then raises the valve members with its arms and suction heads which latter are rotated through the action of the intermittent gears 42 causing the heads to change places, that is, reversing their positions and actions which operation is repeated intermittently or at close intervals during the operation of the machine.

In some instances I have found it advisable to attach the second pair of suction heads 30 to the valve mechanism above described, which are adapted to move simultaneously with those acting upon the label, so that at the same time that the label is being affixed to the work the port 31 of the arm 29 which is over the work has presented itself, as shown in Figure 1, to the short port 32 in the valve seat, thus permitting the vacuum in the valve head to act through the suction head upon the work to lift the same when the arms are raised and so carry the topmost box blank or piece of work from its pile as shown in Figure 1, one quarter of a revolution, in which position the port 31 in the arm has passed the end of the port 32 in the valve seat thus cutting off the effect of the vacuum upon the suction head permitting this box blank to drop into the chute 33 as illustrated in dotted lines in Figure 1, from whence it is conducted away.

A partial vacuum is produced in the hollow portion 48 of the valve head by a suction pump (not shown) connected to the end of the flexible tube 49.

It will be noted that the valve seat member is permitted to move vertically but is held against rotation by the guide pin 50 which works vertically in the fixed tube 51.

In some cases I may use labels which have been previously gummed, in which case I employ a moistened roll 52 located in the path of travel of the label so that in passing from the pile to the work it engages this moistener to render its gummed surface adhesive when presented to the work, but I do not wish to be restricted to the use of labels which have been previously gummed as this roll instead of being a

moistener may carry glue or cement to be applied to the face of the label as it passes thereover, if desired. I also in some cases provide a wiper pad 53 for engaging the surface of the label carrying suction heads in moving from the work to the label pile, so as to remove any moisture or foreign matter from their contacting surfaces to prevent soiling or discoloring the exposed surface of the label.

In order to render this machine automatic in its action I have provided an elevator mechanism for the labels as best shown in Figures 9 and 10, whereby a pile of labels 46 may be placed upon the elevator platform 54 the same being adapted to be raised through action of the weights 55, the raising motion being controlled by the rotating movement of the suction head carrying arms 23; one form of such mechanism being shown which is that of an escapement mechanism 56 including arms having inwardly-extending lips 57 pressed inwardly by spring 58 to normally engage opposite edges of the uppermost label of the pile.

The swinging suction head carrying arm 23 is provided with a release bar 59 which engages the escapement arms 56 causing them to spread and so release the top label of the pile and simultaneously move a detent pawl 60 inwardly to engage the ratchet 61 on the elevator platform to prevent the pile from rising during the time that it is disengaged by the lips 57.

The suction head is now free to descend upon the pile and remove the uppermost label therefrom and after the head is again raised and moved forward these arms 56 are permitted to again move their lips inwardly over the label pile thus releasing the pawl from the ratchet 61, and under action of the weights 55 the pile will move upward into contact with the lips 57 thus maintaining the top of the pile at the proper working level.

After one supply of labels has been exhausted from the elevator the platform 54 may be pressed downward and another supply placed therein by the attendant.

In some cases it is also found desirable to provide an automatic feed for the work, and when this work is in the form of paper boxes in flat form I also provide an elevator having a platform 62 on which the pile 47 is mounted.

On the bottom of this platform I have fastened a rack 63 the teeth of which are engaged by a spur gear (63^a) mounted on the shaft 64. On this shaft is also mounted a ratchet wheel 65 engaged by the pawl 66 which pawl is mounted on the arm 67 pivoted on the shaft 64. This arm 67 is rigidly connected to the inwardly-extending arm 68, the outer end of which latter arm is connected to the vertically disposed rod 69, whereby a vertical motion of the valve head 22 imparts a step by step rotating motion to the shaft 64 through said pawl and ratchet wheel for the purpose of lifting the elevator to feed the pile of work to be labeled.

A detent pawl 70 is also in engagement with the ratchet wheel 65 to prevent a backward movement of the same as the pawl 66 is reciprocated.

When it is desired to quickly lower the platform 62 for the reception of another batch of box blanks, it is only necessary to pull down on the rod 71 which, through the arm 74 and lever 75, which latter engages pin 76 on pawl 66, lifts both the pawl 66 and the detent 70 from engagement with the ratchet wheel 65 then by a rotation of the hand wheel 72 on shaft 77, the shaft 64 is rotated through the miter gears 73 to cause the rack 63 and its elevator platform to be drawn downward into starting position.

By this construction the machine is made fully automatic requiring only the attention of the attendant to keep the machine supplied with work blanks and labels as the magazines become exhausted.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In a labeling machine, a rotatable carrier, having suction pick-up heads rigid therewith, a suction chamber mounted against rotation and positioned adjacent said carrier, means whereby said suction heads may be placed in communication with said suction chamber in different positions of said heads, and means for moving said heads axially with a reciprocating movement at intervals during the rotating movement of said carrier.

2. In a labeling machine, a rotatable carrier, having suction pick-up heads rigid therewith, a suction chamber mounted against rotation and positioned adjacent said carrier, means whereby said suction heads may be placed in communication with said suction chamber in different positions of said heads, said means including passages extending from said head to said chamber and an elongated port with which said passages communicate during a portion of the rotating movement of said carrier, and means for moving said carrier and chamber axially with a reciprocating movement at intervals during the rotation of said carrier.

3. In a labeling machine, a suction chamber mounted against rotatable movement, a

rotatable shaft extending through the chamber, a label carrier mounted on said shaft to rotate therewith and positioned in juxta-relation with said chamber, suction heads radiating from the carrier and rigid thereon, the surface of said chamber opposing said carrier having an elongated port therein, said carrier having passages therein communicating said heads with said port alternatively during the rotation of said carrier, label and work supports arranged coincident with the path of movement of said heads, and means for moving said carrier and chamber axially with a reciprocating movement at intervals during the rotation of the carrier.

4. In a labeling machine, a suction chamber mounted against rotatable movement, a rotatable shaft extending through the chamber, a label carrier mounted on said shaft, to rotate therewith and positioned in juxta-relation with said chamber, suction heads on the carrier and rigid thereon, the surface of said chamber opposing said carrier having an elongated port therein, said carrier having passages therein communicating said heads with said port alternatively during the rotation of said carrier, said chamber having connection with said shaft to move longitudinally with the shaft, means for rotating said shaft, and means for intermittently shifting said shaft longitudinally whereby said chamber and carrier are raised and lowered.

5. In a labeling machine, a rotatable member having radiating arms, suction heads mounted on the end portions of the arms, supports arranged in the path of movement of said arms for holding piles of labels and articles on which the labels are to be placed, said supports being spaced apart along the path of movement of said arms, a suction chamber positioned in juxta-relation with said rotatable member and mounted against rotatable movement, an elongated slot in said chamber extending for a distance in the rotation of said member substantially equal to the distance between said label support and said article support, passages in said member to connect each suction head with said port during the movement of said head from the label support to said article support, means whereby the labeled articles are removed from the pile by the suction through said heads and subsequently released from said heads before each head is brought in its rotation to the label support.

6. In a labeling machine, a rotatable member having radiating arms, suction heads mounted on and rigid with the end portions of the arms, supports arranged in the path of movement of said arms for holding piles of labels and articles on which the labels are to be placed, said supports being spaced apart along the path of movement of said arms, a suction chamber positioned in juxta-relation with said rotatable member and mounted against rotatable movement, an elongated slot in said chamber extending for a distance in the rotation of said member substantially equal to the distance between said label support and said article support, passages in said member to connect each suction head with said port during the movement of said head from the label support to said article support, and means for raising and lowering said member when each head is positioned over said label support and said article support for purposes described.

7. In a labeling machine, a rotatable shaft, a suction chamber having said shaft extending therethrough, said chamber being loose on said shaft and resting on a shoulder on the shaft, a label carrier mounted on said shaft to rotate therewith and positioned in juxta-relation with said chamber, an expansible rigid connection between said chamber and a stationary portion of the machine, whereby the chamber is held against rotation, suction heads rigid with the carrier, an air connection between said chamber and heads, and means for intermittently shifting said shaft longitudinally at points in its rotation, whereby said chamber, carrier and heads are raised and lowered.

8. In a labeling machine, a rotatable shaft, a suction chamber having said shaft extending therethrough, said chamber being loose on said shaft and resting on a shoulder on the shaft, a label carrier mounted on said shaft to rotate therewith and positioned in juxta-relation with said chamber an expansible rigid connection between said chamber and a stationary portion of the machine, whereby the chamber is held against rotation, suction heads rigid with the carrier, an air connection between said chamber and heads, means for intermittently shifting said shaft longitudinally at points in its rotation, whereby said chamber, carrier and heads are raised and lowered, and springs connecting said chamber with a stationary portion of the machine and normally under tension to lower the chamber.

9. In a labeling machine, a rotatable member having radiating arms, suction heads mounted on the end portions of the arms, supports arranged in the path of movement of said arms for holding piles of labels and articles on which the labels are to be placed, said supports being spaced apart along the path of movement of said arms, a suction chamber positioned in juxta-relation with said rotatable member and mounted against rotatable movement, an elongated slot in said chamber extending for a distance in the rotation of said member substantially equal to the distance be-

tween said label support and said article support, passages in said member to connect each suction head with said port during the movement of said head from the label support to said article support, means for raising and lowering said member when each head is positioned over said label support and said article support for purposes described, and an auxiliary suction head on each of said arms to align with the articles on said article support, and means into which labeled articles are discharged, said chamber having a second elongated port therein extending for a distance in the rotation of said member equal to the distance between said article support and said discharge means, said member having a passage therein to communicate said auxiliary head with said second port during the rotating movement of said member.

10. A labeling machine comprising a pair of label carrying suction heads, means for causing one of said heads to engage and lift a label from a pile and simultaneously cause the other of said heads to deposit its label upon the work, means for automatically feeding the label pile to said engaged head, means for intermittently reversing the positions and actions of said heads, means whereby each suction head is caused to remove the labeled work from its pile upon further movement of said heads, and means for automatically advancing the work into position to be labeled after each work removing action of said heads.

11. In a labeling machine, means for engaging and lifting a label from a pile, means for causing said lifting means to carry and apply its label to the work, and means whereby said lifting means is caused to again operate to lift and remove the work from the pile after the label has been applied thereto.

12. In a labeling machine, means for engaging and lifting a label from a pile, means for causing said lifting means to apply its label to the work, and other lifting means connected to and arranged to operate simultaneously with said first lifting and applying means for engaging and removing the work after being labeled.

13. In a labeling machine, means for engaging and lifting a label from a pile, means for causing said lifting means to carry and apply its label to the work, means for removing the work after the label has been applied thereto, and means operated by said applying means for feeding the work into labeling position after each work removing action.

14. In a labeling machine, means for supporting a stack of labels in the machine comprising a movable base to support the stack of labels and normally urged to rise, a pair of spaced movable members on opposite sides of said base and normally urged inwardly to engage with the top of the stack, and a label pick-up means to move between and contact with said members to separate the latter whereby the latter are moved out of the path of the stack.

15. In a labeling machine, means for supporting a stack of labels in the machine comprising a movable base to support the stack of labels and normally urged to rise, a pair of spaced movable members on opposite sides of said base and normally urged inwardly to engage with the top of the stack, a label pick-up means to move between and contact with said members whereby the latter are separated and moved out of the path of the stack, and means for automatically locking said base against upward movement when the members are moved out of the path of said stack.

16. In a labeling machine, means for supporting a stack of labels in the machine, said support comprising a pair of spaced pivoted members, a movable base positioned between the members and adapted to support the stack of labels, inwardly extending projections on said members to normally engage with the top of the stack, means normally urging said base to rise, and means normally urging said members toward each other, whereby the projections thereon are moved in the path of the stack, and a label pick-up means to move between and separate said members, whereby said projections are moved out of the path of the stack.

17. In a labeling machine, means for supporting a stack of labels in the machine, said support comprising a pair of spaced members, a movable base positioned between the members and adapted to support the stack of labels, inwardly extending projections on said members to normally engage with the top of the stack, means normally urging said base to rise, and means normally urging said members toward each other, whereby the projections thereon are moved in the path of the stack, a label pick-up means to move between and separate said members, whereby said projections are moved out of the path of the stack, a rack on said base, and a pawl on one of said members adapted to be moved into engagement with said rack by the separating movement of said members, whereby the base is held against upward movement while the projections on the members are out of the path of the stack.

18. In a labeling machine, a rotatable label carrier and applying device, label and work supports disposed along the path of travel of said carrier for supporting a stack of labels and articles to be labeled, means whereby said carrier is reciprocated in a direction relative to its rotating axis, when opposite said supports, said work support comprising a movable base to be raised and

lowered, means operated from said carrier to raise said base with a step by step movement upon the reciprocating movement of said carrier in one direction.

19. In a labeling machine, the label carrier and applying device having a reciprocating movement, a base for supporting a stack of articles to be labeled adapted to be raised and lowered, a shaft, a pinion on the shaft, the rack bar connected to said base and in engagement with said pinion, a ratchet wheel fast on said shaft, a pawl in operative engagement with said ratchet wheel, and a lever connection between said pawl and said carrier, whereby said pawl is operated to move the ratchet wheel in one direction upon a reciprocating movement of the carrier.

20. In a labeling machine, the label carrier and applying device having a reciprocating movement, a base for supporting a stack of articles to be labeled adapted to be raised and lowered, a shaft, a pinion on the shaft, the rack bar connected to said base and in engagement with said pinion, a ratchet wheel fast on said shaft, a pawl in operative engagement with said ratchet wheel, a lever connection between said pawl and said carrier, whereby said pawl is operated to move the ratchet wheel in one direction upon a reciprocating movement of the carrier, a latching detent in normal engagement with said ratchet wheel, means for releasing said detent and pawl for the ratchet wheel, and manually operable means for actuating said shaft to quickly adjust said base.

In testimony whereof I affix my signature.

VALORUS S. WESTCOTT.