

Sept. 4, 1928.

1,682,980

H. M. OSTERTAG

MACHINE FOR PLANING SUCTION BOXES

Filed July 29, 1927

4 Sheets-Sheet 1

Fig. 1

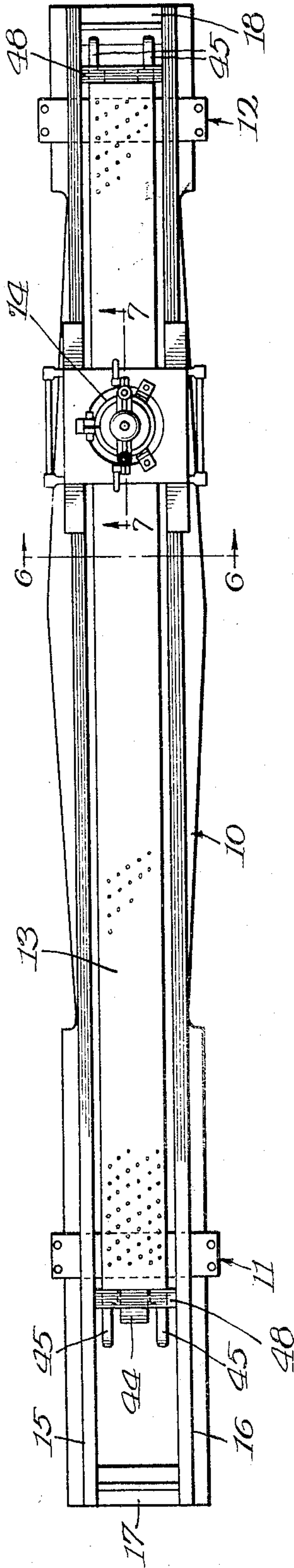
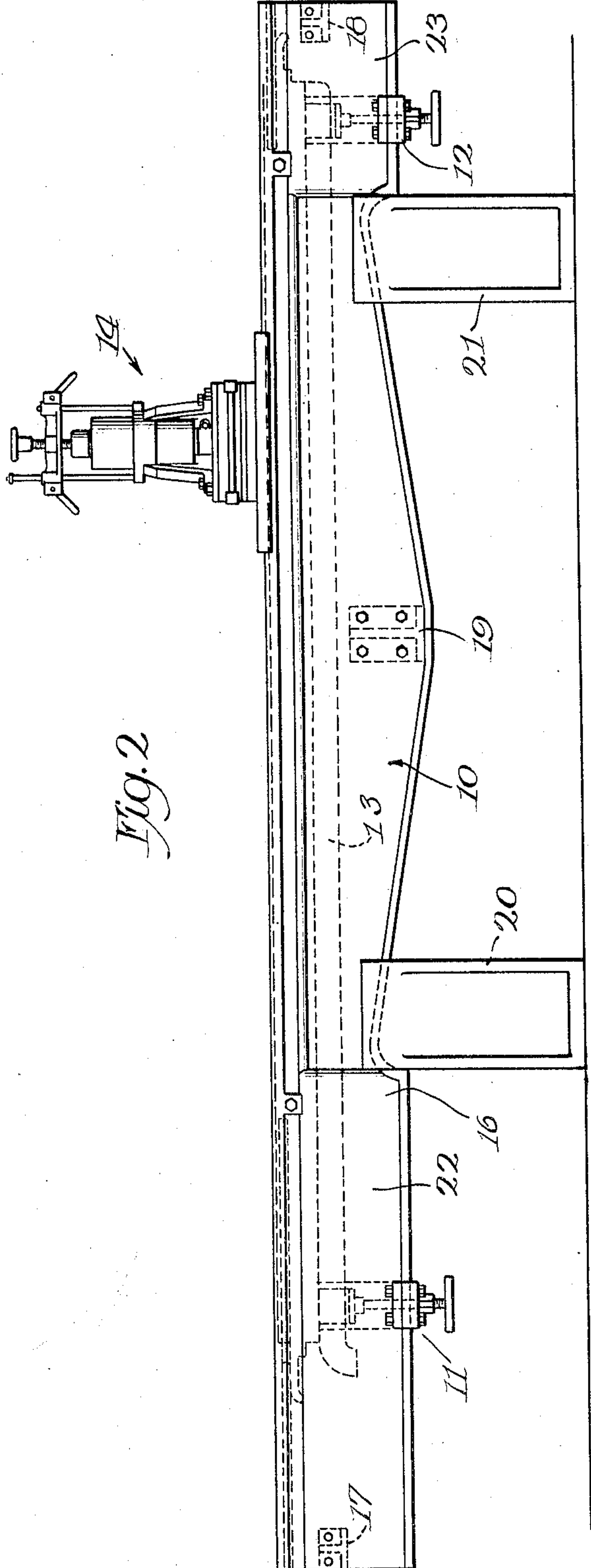


Fig. 2



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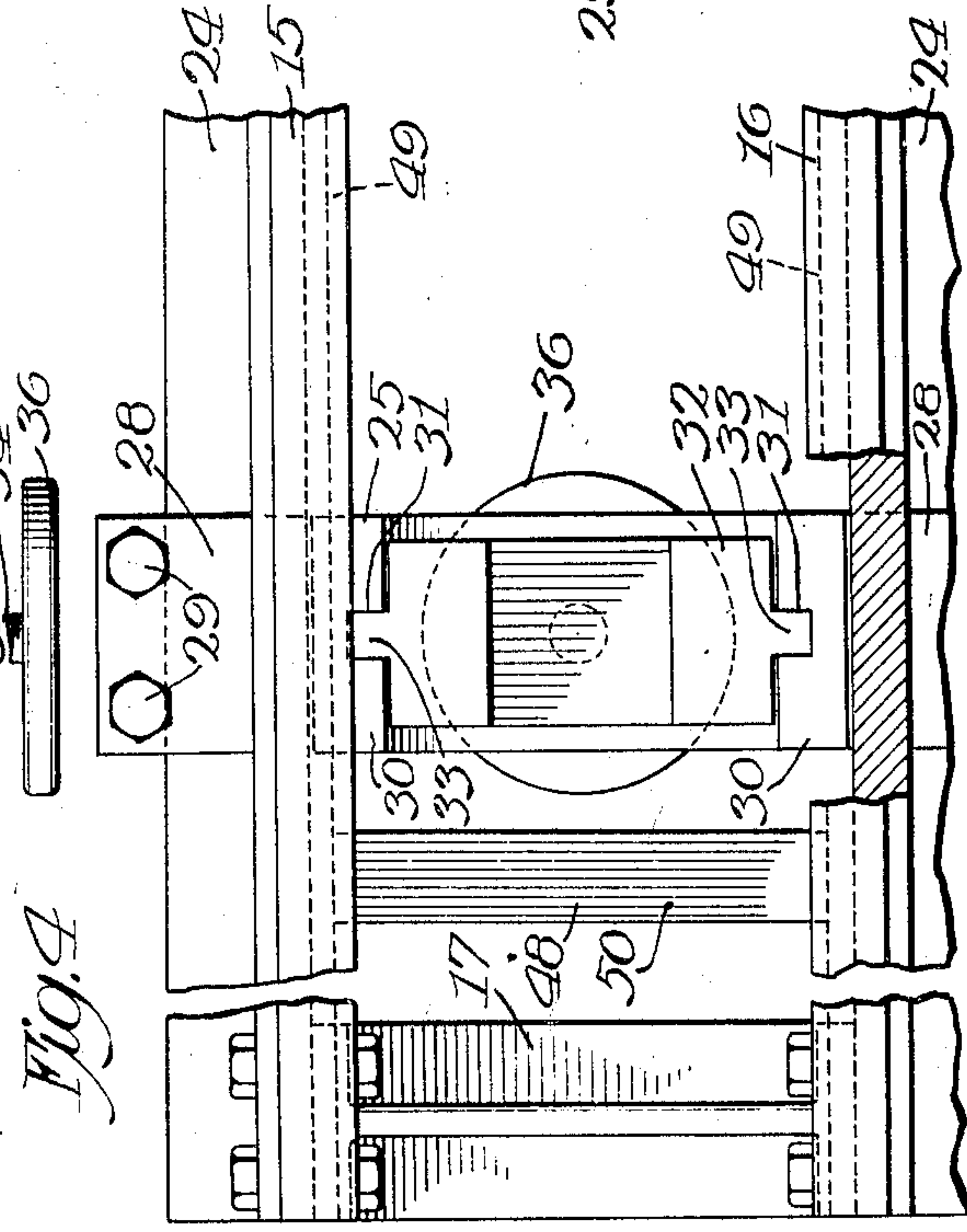
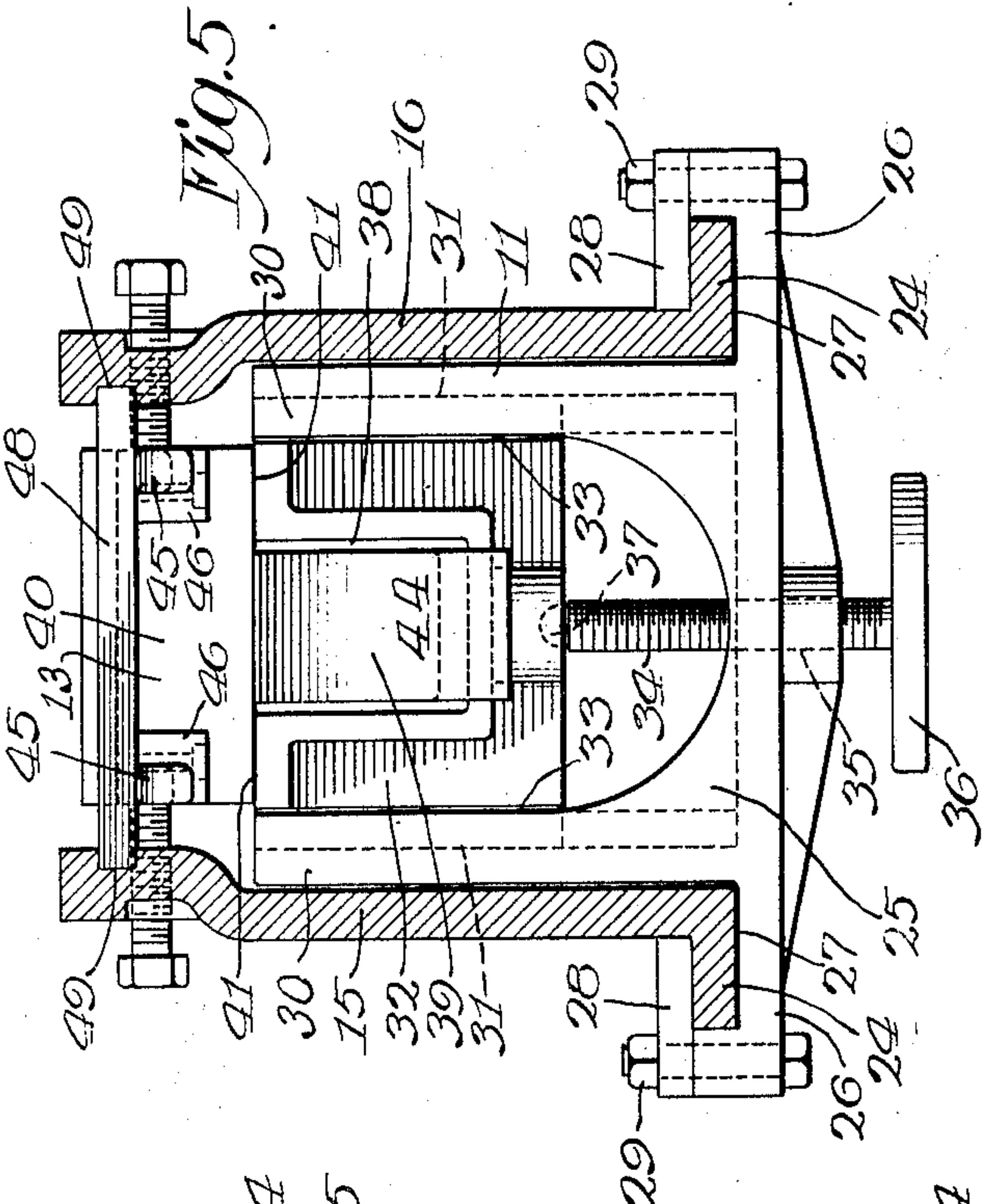
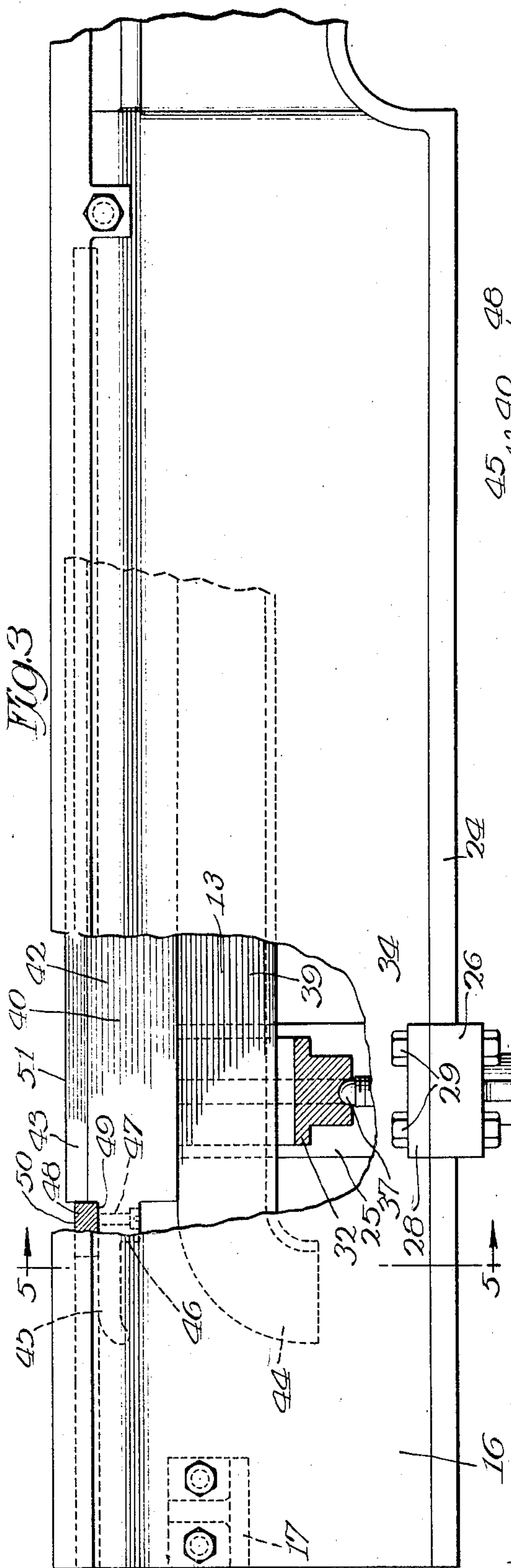
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4 Sheets-Sheet 3

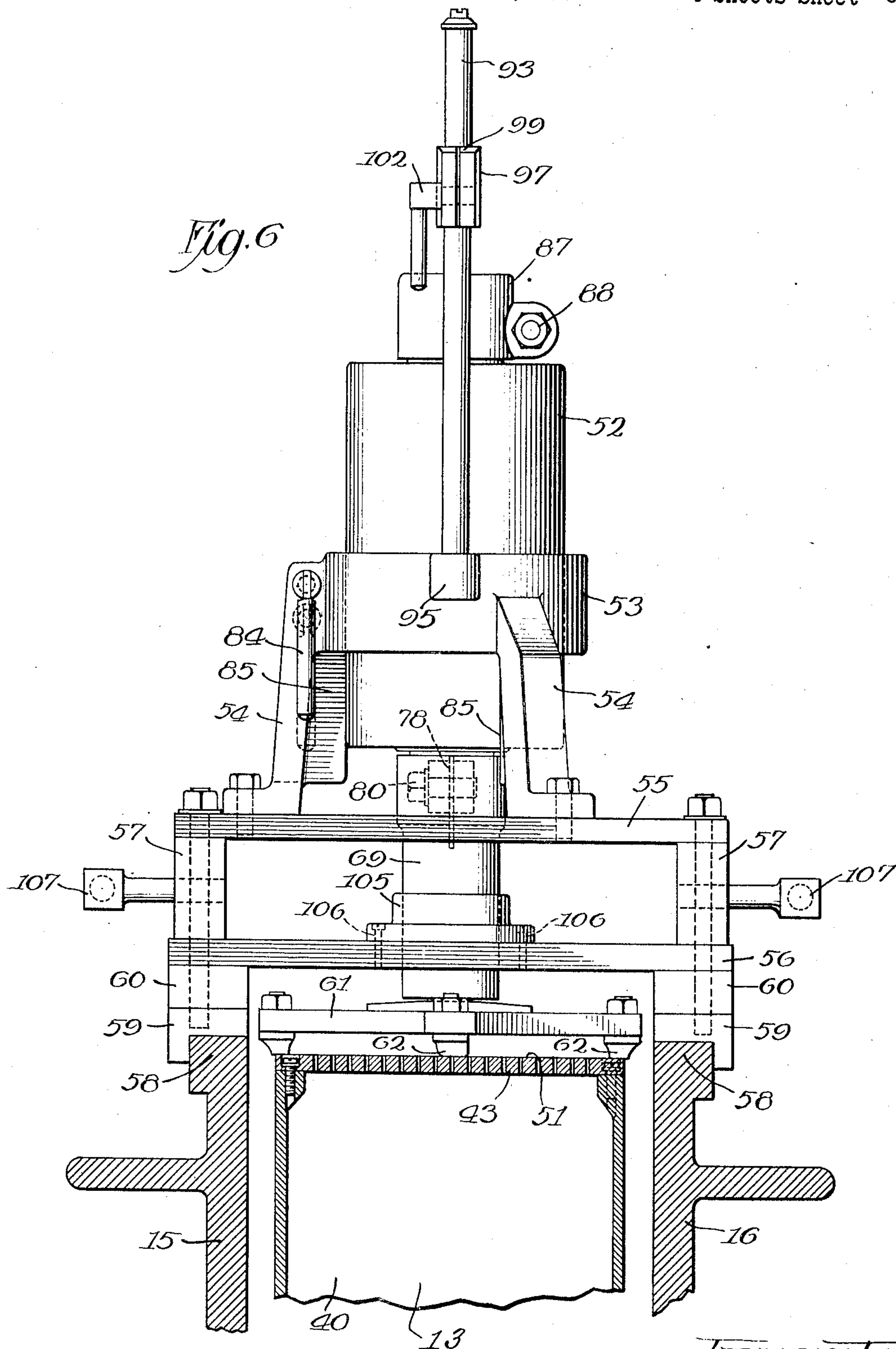


Fig. 6

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Fig. 7

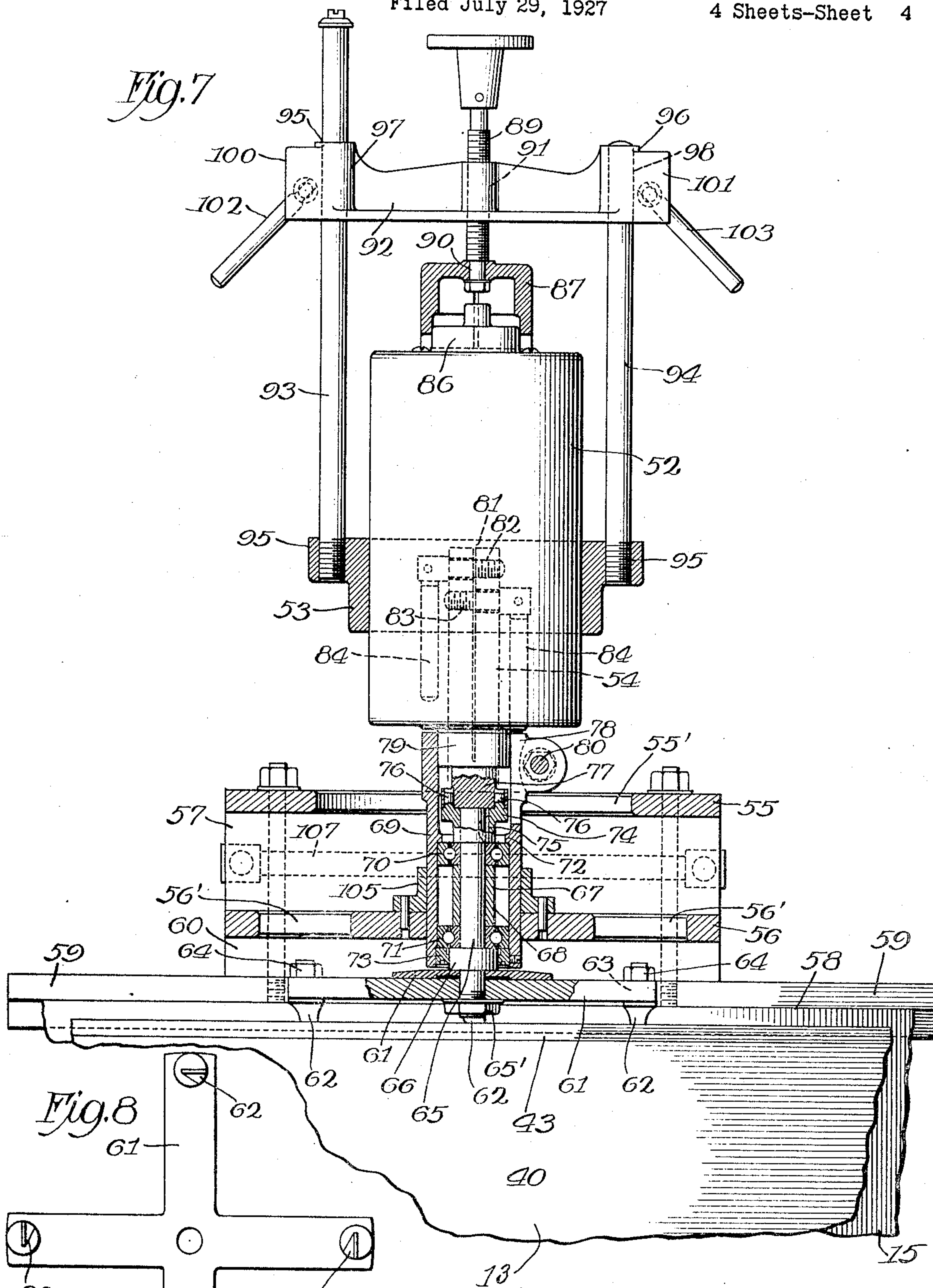
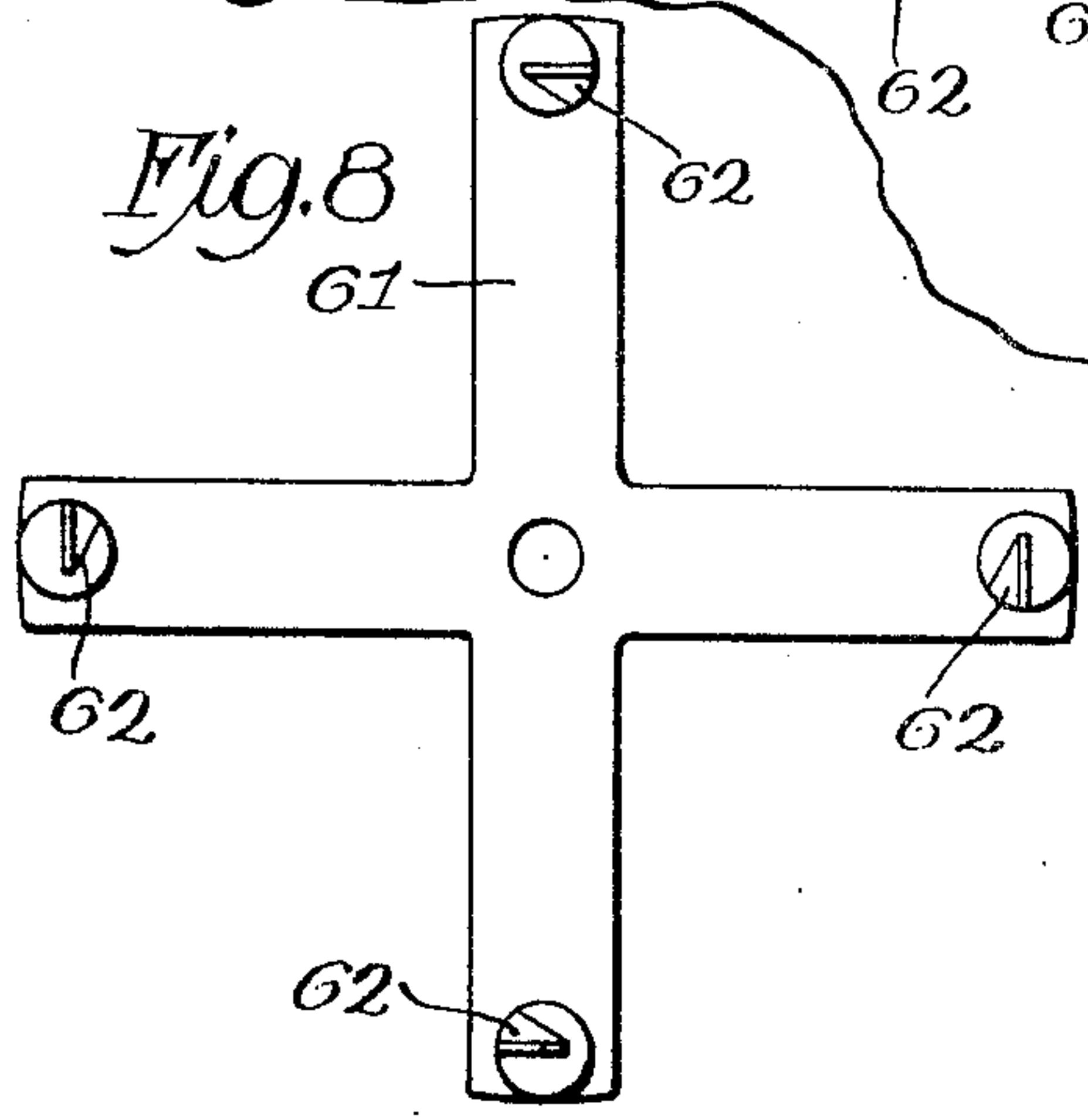


Fig. 8



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UNITED STATES PATENT OFFICE.

HARRY M. OSTERTAG, OF APPLETON, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PAPER PATENTS COMPANY, OF NEENAH, WISCONSIN, A CORPORATION OF WISCONSIN.

MACHINE FOR PLANING SUCTION BOXES.

Application filed July 29, 1927. Serial No. 209,271.

This invention relates to machines for planing suction boxes of the type usually employed in paper mills in connection with machines for making paper. Such suction boxes are provided for drawing out excess water from the layer of paper pulp which has previously been deposited upon the screen of, for instance, a Fourdrinier paper making machine.

Suction boxes are usually made of brass, cast iron or other suitable material and are covered on the top with a wooden cover provided with a large number of small holes communicating with the interior of the box. The box is connected by means of a conduit, to an exhaust pump so that water will be drawn through the small holes from the wet paper stock on the top of the Fourdrinier wire which passes over the top of the box.

The Fourdrinier wire passes over the top or cover of the suction box in sliding engagement therewith, and preferably weaves back and forth a fraction of an inch from side to side or crosswise of the machine. It has been found to be very important that in order to permit freedom of movement of the wire, both in its normal direction of travel and in its crosswise weaving movement, the top or cover of the suction box must be provided with an absolutely true surface, i. e., one which is smooth and in a plane parallel to the plane of the wire on the paper machine.

It is therefore the principal object of my invention to provide a machine for planing or refinishing the covers of suction boxes so that an absolutely true surface will be provided.

Other objects of the invention are; to provide means for guiding a planing device over the top of a suction box; to provide means for adjusting the cutting effect of the planing device on the suction box cover; and in general, to provide an improved machine of the class described.

Other objects and advantages of the invention will be understood by reference to the following specification and the drawings accompanying the same, and in which drawings I have illustrated a machine for planing suction box covers, which machine embodies a selected form of the invention.

In the drawings:

Figs. 1 and 2 are plan and side elevations respectively.

Fig. 3 is an elevation corresponding to a

portion of Fig. 2 but on an enlarged scale and showing a portion broken away to better illustrate the invention.

Fig. 4 is a plan of a portion of Fig. 3, the suction box being omitted so as to more clearly illustrate the mechanism.

Fig. 5 is a section on the line 5—5 on Fig. 3.

Figs. 6 and 7 are sections on the lines 6—6 and 7—7 respectively on Fig. 1.

Fig. 8 is a bottom plan of the cutter element.

Referring now to the drawings, my improved machine includes a frame member 10 provided with supports 11 and 12 at its opposite ends for supporting a suction box 13 within the frame and a planing device 14 which is slidably mounted on the upper edges of the frame member 10 so as to be movable lengthwise of the frame over the surface of the suction box 13.

The frame member 10 preferably consists of a pair of side rails 15 and 16 which are connected together by means of end spacers 17 and 18 and an intermediate spacer 19. The spacer members 17, 18 and 19 are fixedly connected to the side rails by riveting or other suitable means and serve to maintain the side rails permanently spaced apart. Suitable supports 20 and 21 may be provided for supporting the frame 10 on the floor.

The side rails 15 and 16 constitute right and left hand members as shown in Fig. 5, and each is provided with end portions 22 and 23, which end portions are provided with means for adjustably receiving and supporting suction box supporting members which will presently be described. The opposite end portions of the side rails and the suction box supports 11 and 12 mounted in opposite ends of the frame are similar in construction, and hence, only the structure at the left hand end of the frame as shown in Figs. 1 and 2 will be described in detail.

Each end portion of the side rails is provided with an outwardly extending flange 24 and these flanges are adapted to receive and support the box support 11. The box support 11 consists of a guide member 25 having outwardly extending portions 26 at its opposite ends provided with recesses 27 for receiving the respective outwardly extending flanges 24 of the side rails 15 and 16. Clamping plates 28 are bolted to the outwardly extending portions 26 of the guide

by means of bolts and nuts indicated at 29. It will be apparent that by tightening the bolt and nut 29, the outwardly extending flanges 24 of the side rails will be clamped
 5 between the clamping plates 28 and the opposite portions of the outwardly extending members 26 so that the guide 25 will be fixedly held in place between the side rails. It will also be apparent that the guides may
 10 readily be adjusted from one position to another, lengthwise of the side rails by loosening the clamping plates 28 and then sliding the guides to the desired position where they may again be clamped into such position.

15 The guides 25 are provided with upwardly extending legs 30—30, each provided with a guideway 31 for receiving a saddle member 32 which is slidably mounted in a vertical direction in the guide members by
 20 means of tongues 33—33 which fit into the guide ways 31—31. An adjusting screw 34 threadedly engages an aperture 35 in the guide member 25 and is provided with a hand wheel 36 whereby the adjusting screw
 25 may be turned so as to move inwardly or outwardly as desired. The upper end of the adjusting screw engages the bottom of the saddle 32, and is preferably provided with a rounded upper end portion which engages
 30 a complementary seat in the saddle member, and the saddle member is thereby adapted to be moved upwardly in the guide member 25, or lowered, according to the movement of the screw 34. The saddle 32 is provided
 35 with a recess 38 for receiving the drain portion 39 of a suction box 40, which suction box is adapted to be seated on the top faces 41—41 of the saddle member.

40 As best shown in Fig. 3, the suction box 40 consists of the box body proper, 42, a cover 43 of wood or like material and the drain trough portion 39 which terminates at one end in a downwardly extending mouth
 45 44, which is connected by suitable means to an exhausting pump. The body portion 42 of the box is usually provided with handle portions 45 at its ends and shoulder portions 46. The shoulder portions 46 are usually each provided with an aperture 47
 50 through which a bolt is passed into engagement with a side rail on a paper machine for fastening the box in place. Both ends of the suction box are similarly secured to the frame, and it will be apparent that the
 55 suction box will sag slightly intermediate its ends, since in usual practice there is no intermediate support provided. It will be noted that the means so far described for supporting the suction box is adapted to support the box adjacent its opposite ends in
 60 substantially the same position in the planer frame as when mounted in the paper making machine.

65 For limiting upward movement of the suction box 40 and saddle 32, and for posi-

tively positioning the box, I provide a stop bar 48 which is preferably slidably mounted in grooves 49—49 provided adjacent the upper edges of the side rails 15 and 16. It will be apparent that the stop bar 48 can be moved in the grooves 49—49, lengthwise of the frame 10 so as to permit proper positioning thereof with respect to the adjacent support 11 and adjacent end of the suction box. It is contemplated that the stop bar will be so positioned in the frame that it will engage the tops of the shoulder portions 46, as best shown in Fig. 3. The tops of the said shoulder portions are usually recessed somewhat as indicated at 49 so that the top surface 50 of the stop bar will be lower than the top surface 51 of the suction box cover 43 for a purpose which will presently appear.

In the present embodiment of my invention I have shown both ends of the frame 10 as being provided with longitudinally adjustable supporting members 11 and 12 of similar construction, but it will be understood that I may provide fixed supporting means at one end and adjustable means at the other end. By providing both ends with adjustable supporting members I have found that adjustment of the mechanism to receive suction boxes of different lengths is greatly facilitated.

Planing mechanism for use in connection with the above described frame preferably includes a power driven cutting element mounted on the frame so as to be movable lengthwise thereof with the cutting element in operative engagement with the suction box cover. As best shown in Figs. 6 and 7, the planing mechanism includes a suitable power unit 52 which may conveniently be an electric motor, mounted by means of an annular member 53 and supporting legs 54 on a table member 55. The table member 55 is provided with a central aperture 55' and is mounted on a sub-table member 56, spacers 57—57 being provided to space the two tables apart. The sub-table 56 is provided with apertures 56' to reduce its weight, and is slidably mounted on the upper edges 58—58 of the side rails 15 and 16 by means of shoe members 59—59, filler bars 60—60 being interposed to elevate the sub-table member 56 above the top of the suction box as may be necessary. The upper edges 58—58 of the side rails 15 and 16 constitute guides or tracks along which the shoes 59 of the planer may be slid to carry the planer mechanism from one end to the other of the suction box while the planer operates on the suction box cover to refinish the same.

The cutting element of the planer mechanism consists of a cross member 61 as clearly shown in Fig. 8, provided with cutters 62 adjacent the end of each arm of the cross member. The cutters are preferably remov-

ably mounted so that they may be removed and replaced by other cutters when required, the cutters being provided with studs 63 which extend through suitable apertures in the ends of the arms and nuts 64 which engage threaded portions of the studs 63 to clamp the cutters in fixed position. The cutter cross is carried by the lower end of a rotating shaft 65 which is provided with a collar 66 and a sleeve 67 secured thereto by means of a pin 68 which extends through the shaft 65 and collar 68. A supporting plate 61' is mounted on the shaft 65 beneath the collar 66 and the cutter cross 61 is disposed immediately under the said supporting member 61'. A nut 65' threadedly engages the lower end of the shaft 65 and clamps the cutter cross 61 and support 61' tightly against the collar 66.

The shaft 65 is rotatably mounted within a sleeve 69 by means of ball bearing members 70 and 71. The ball bearing members 70 and 71 are spaced apart by means of the sleeve 67 and the upper bearing member 70 engages an inwardly projecting annular flange 72 in the sleeve 69, and a nut 73 threadedly engaging the lower end of the sleeve 69 is provided for forcing the bearing members 70 and 71 upwardly until the bearing member 70 engages the said inwardly projecting flange 72 to positively position the bearing members and the shaft carried thereby in the sleeve.

The upper end of the shaft 65 is keyed to a coupling member 74 by means of a key 75 and the coupling member is provided with a plurality of upwardly extending pins 76 which engage complementary apertures in a coupling member 77 which is secured to or forms a part of the shaft of the motor 52. The sleeve 69 is provided with a slit portion at its upper end as indicated at 78 and the upper end is adapted to be clamped on a boss or bearing portion 79 of the housing of the motor 52. A clamping bolt 80 extending through suitable ears on the sleeve 69 is provided for tightly clamping the sleeve on the said portion 79 of the motor housing.

It will be readily understood that by means of the above described structure, the shaft 65 and the cutter element carried thereby at its lower end is rotatable by means of the motor and that the cutting element is fixedly connected to the motor so as to prevent axial movement or end play of the shaft 65 and cutting element with respect to the motor.

The cutting effect of the planing device is regulated by raising or lowering the motor and the cutting element therewith, and to facilitate such raising or lowering of the motor, I have provided the following structure:

The annular member 53 is supported on the table member 55 by the legs 54, and the

annular member is split as indicated at 81 so as to permit clamping thereof about the body of the motor 52. I prefer to split the member 53 along a line extending substantially along the center line of one of the legs 54 so as to retain as much strength as possible in the member 53, and clamping bolts 82 and 83 are provided for clamping the ring tightly on the motor. It will of course be understood that the clamping bolts 82 and 83 are screw threaded and engage suitably threaded apertures in one portion of the split ring and pass freely through apertures in the other portion. Each of the clamping bolts is preferably provided with a handle 84 which is pivotally connected to the head of the respective bolt so as to facilitate turning thereof. The legs 54 are each provided with an inwardly extending flange 85 which serve as guides for accurately positioning the motor in the annular member 53.

The upper end of the motor is provided with a boss or bearing portion 86, and a cup shaped clamping member 87 is clamped thereon by suitable means such as a clamping bolt 88. An adjusting screw 89 is fixedly connected to the cup shaped clamping member 87 by suitable means such as indicated at 90 and the adjusting screw threadedly engages a suitable aperture 91 in the cross head 92 which is supported by means of upright rods 93 and 94. The upright rods 93 and 94 are fixedly mounted on the annular member 53 by being seated in bosses provided on the annular member as indicated at 95.

The cross-head 92 is provided with bosses 95 and 96 at its opposite ends which are apertured as indicated at 97 and 98 to slidably receive the upright rods 93 and 94. The bosses 95 and 96 are split as indicated at 99 in Fig. 6 and are provided with ears 100 and 101 respectively, which are adapted to receive clamping members 102 and 103 respectively, for clamping the cross-head on the respective upright bars 93 and 94.

It will be apparent that by turning the adjusting screw 89, the motor member 52 and the cutter which is carried thereby will be raised or lowered according to the direction of the rotation of the screw 89. As above noted, the shaft 65 and the cutter are connected by means of the sleeve structure 69 to the motor so that there can be no relative axial movement of the shaft and motor. When the motor is moved either upwardly or downwardly, it is therefore necessary for the sleeve 69 and the parts therein to move with the motor and in order to maintain the sleeve and its contained parts in accurate position, I provide an annular guide member 105 which is provided with a bore for snugly receiving the sleeve 69 so as to permit axial movement thereof through

the annular guide member 105. The member 105 is fixedly mounted by suitable means such as screws 106 on the sub-table 56.

In order to facilitate adjustment of the mechanism, the cross-head 92 is provided with the above described arrangement for permitting clamping thereof on the rods 93 and 94 whereby the cross-head may be moved upwardly or downwardly, on the said rods which serve as guides, and clamped in the desired position. It will be further noted that the rod 93 is somewhat longer than the rod 94 whereby the cross-head may be raised sufficiently on the rod 93 to disengage the rod 94. By loosening the cup member 87 so that it may be removed from the portion 86 of the motor, the above described guide rod arrangement permits the cross-head 92 and the parts carried thereby to be raised independently of the motor and swung about the rod 93 to one side of its normal position. The motor itself may then be removed from the annular member 53 with great facility, it being merely necessary to loosen the clamping bolts 82 and 83 and to loosen the clamping bolt 80 of the sleeve 69 so that the motor may be disengaged therefrom. The above described form of coupling between the motor and the shaft 65 which consists of the coupling member 74 and pins 76 which engage apertures in a similar coupling member 77, serves to permit separation of the motor from the said shaft 65.

The handle members 107—107 are provided and secured to each of the spacers 57—57 on opposite sides of the planer mechanism whereby the operators of the machine may move the planing device lengthwise over the frame 10, to plane the surface of the suction box cover. By an inspection of Fig. 6 it will be readily seen that the cutter 61—62 is disposed between the side rails 15 and 16 of the frame 10 and is capable of rotating therebetween. Hence, it is possible for the planing device to plane suction box covers even when they have been previously planed down to almost their minimum useful thickness as represented in the said Fig. 6.

The above described details of my invention are merely illustrative of a preferred embodiment thereof and the scope of the invention should therefore be determined by reference to the following claims which should be construed as broadly as possible consistent with the state of the art.

I claim as my invention:

1. In a machine of the class described, the combination of means for supporting a suction box at substantially the same points at which it is supported when operatively mounted in a paper making machine, a planing device and means for guiding the planing device over the top of said suction box,

thereby to control the planing effect of said device on the suction box cover.

2. In a machine of the class described, the combination of means for supporting a suction box adjacent its ends, a planing device, and means for supporting the planing device over the top of the suction box, said planing device being mounted on said supporting means so as to be movable over said suction box top, and said supporting means being provided with a guide for guiding the planing device in its movement over said suction box top and thereby to control the planing effect of said device on said suction box.

3. In a machine of the class described, the combination of vertically adjustable means for supporting a suction box adjacent its ends, a guide frame, and a planing device mounted on said frame so as to be movable over the top of said suction box for planing the cover of the latter, said guide frame being effective to control the planing effect of said planing device on said cover.

4. In a machine of the class described, the combination of a frame including a pair of side rails and a pair of spaced supports between said side rails for receiving end portions of a suction box disposed between said side rails and thereby supporting the same, and a planing device for planing the top of said suction box, mounted on said side rails so as to be movable lengthwise over said suction box, said side rails serving to guide the planing device in its movement over said suction box, thereby to control the effect of said planing device on said suction box.

5. In a machine of the class described, the combination of a frame including a pair of spaced side rails, a pair of supports mounted between said side rails, for receiving opposite end portions of a suction box disposed between said side rails and thereby to support the suction box in fixed position relative to said side rails, and a planing device mounted on said side rails so as to be movable lengthwise over the top of the suction box to plane the cover of the latter, said side rails serving to guide the planing device in its movement and thereby to control the planing effect thereof on the suction box cover.

6. In a machine of the class described, the combination of a frame including a pair of spaced side rails, a pair of supports mounted between said side rails so as to be relatively adjustable towards or from each other, said supports being adapted to receive opposite end portions of suction boxes of various lengths between said side rails, thereby to support the box in fixed position relative to said side rails, and a planing device mounted on said side rails so as to be movable lengthwise over the top of the suction box to plane the cover of the latter, said side rails serving to guide the planing device in its move-

ment, and thereby to control the planing effect thereof on the suction box cover.

7. In a machine of the class described, the combination of a frame including a pair of spaced side rails, a pair of supports mounted between said side rails, for receiving opposite end portions of a suction box disposed between said side rails, said supports being vertically adjustable so as to permit vertical adjustment of the suction box supported thereby into the desired position of vertical adjustment relative to said side rails, and a planing device mounted on said side rails and movable thereon lengthwise over the top of the suction box to plane the cover of the latter, said side rails serving to guide the planing device in its movement and thereby to control the planing effect thereof on the suction box cover.

8. In a machine of the class described, the combination of a frame including a pair of relatively fixedly mounted and spaced side rails, a pair of vertically adjustable supports mounted between said side rails so as to be relatively adjustable towards or from each other, said supports being adapted to receive end portions of a suction box disposed between said side rails to support the suction box, said relative adjustment serving to adapt said supports to support suction boxes of various lengths and said vertical adjustment serving to permit vertical adjustment of the suction box to the desired position of vertical adjustment relative to the side rails, a planing device mounted on said side rails so as to be movable thereon lengthwise over the top of the suction box to plane the cover of the latter, said side rails serving to guide the planing device in its movement and thereby to control the planing effect thereof on the suction box cover.

9. In a machine of the class described, the combination of a frame including a pair of relatively fixedly mounted and spaced side rails, a pair of vertically adjustable supports mounted between said side rails so as to be relatively adjustable towards or from each other, said supports being adapted to receive end portions of a suction box disposed between said side rails to support the suction box, said relative adjustment serving to adapt said supports to support suction boxes of various lengths and said vertical adjustment serving to permit vertical adjustment of the suction box to the desired position of vertical adjustment relative to the side rails, means for limiting said vertical adjustment in an upward direction, a planing device mounted on said side rails so as to be movable thereon lengthwise over the top of the suction box to plane the cover of the letter, said side rails serving to guide the planing device in its movement and thereby to control the planing effect thereof on the suction box cover.

10. In a machine of the class described, the combination of a frame including a pair of spaced side rails, a pair of vertically adjustable supports mounted between said side rails, for receiving opposite end portions of a suction box disposed between said side rails and thereby to support the suction box, means for effecting vertical adjustment of said supports and the suction box supported thereby, a stop member mounted on said frame for limiting upward adjustment of said suction box, and a planing device mounted on said side rails so as to be movable thereon lengthwise over the top of the suction box to plane the cover of the latter, said side rails serving to guide the planing device in its movement and thereby to control the planing effect thereof on the suction box cover.

11. In a machine of the class described, the combination of a frame including a pair of fixedly mounted relatively spaced side rails provided with guide means adjacent their respective upper edges, a pair of vertically adjustable supports mounted between said side rails for receiving and supporting a suction box between said side rails, means for effecting vertical adjustment of said supports and the box carried thereby, stop bars extending between said side rails adjacent said supports for limiting upward movement of the suction box, said stop bars and supports serving to support the suction box in substantially the same manner in which it is supported when in operative position in a paper making machine, and a planing device slidably mounted on said guide means and adapted to be moved thereon lengthwise of the suction box to plane the cover of the latter.

12. In a machine of the class described, the combination of a frame including a pair of fixedly mounted relatively spaced side rails provided with guide means adjacent their respective upper edges, a pair of vertically adjustable supports mounted between said side rails for receiving and supporting a suction box between said side rails, means for effecting vertical adjustment of said supports and the box carried thereby, stop bars extending between said side rails adjacent said supports for limiting upward movement of the suction box, said stop bars and supports serving to support the suction box in substantially the same manner in which it is supported when in operative position in a paper making machine, a planing device slidably mounted on said guide means and adapted to be moved thereon lengthwise of the suction box to plane the cover of the latter, and means for effecting vertical adjustment of said planing device to thereby control the depth of its cut.

13. In a machine of the class described, the combination of means for supporting a

suction box adjacent its opposite ends substantially in the manner in which the box is supported when operatively mounted in a paper making machine, a planing device 5 for planing the cover of said suction box, means for mounting said supporting means and planer so as to permit relative horizontal movement thereof and means for effecting relative vertical adjustment of said suction 10 box and planer.

14. In a machine of the class described, the combination of a frame for receiving and supporting a suction box and comprising a pair of side rails fixedly mounted in relatively spaced relation, a pair of vertically 15 adjustable supports mounted between said side rails, one of said supports being ad-

justable towards or from the other, a pair of stop bars respectively mounted in said frame adjacent said supports for limiting 20 upward adjustment of the supports and the suction box carried thereby, and guide means adjacent the upper edges of said side rails; and a planing device comprising a rotatably 25 mounted axially vertically disposed shaft, a cutter secured to the lower end of said shaft to rotate therewith, means for rotating said shaft, means for slidably mounting said shaft and cutter on said guide means, and means for effecting vertical adjustment of 30 said cutter to vary the depth of cut thereof on said suction box cover.

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