

No. 875,526.

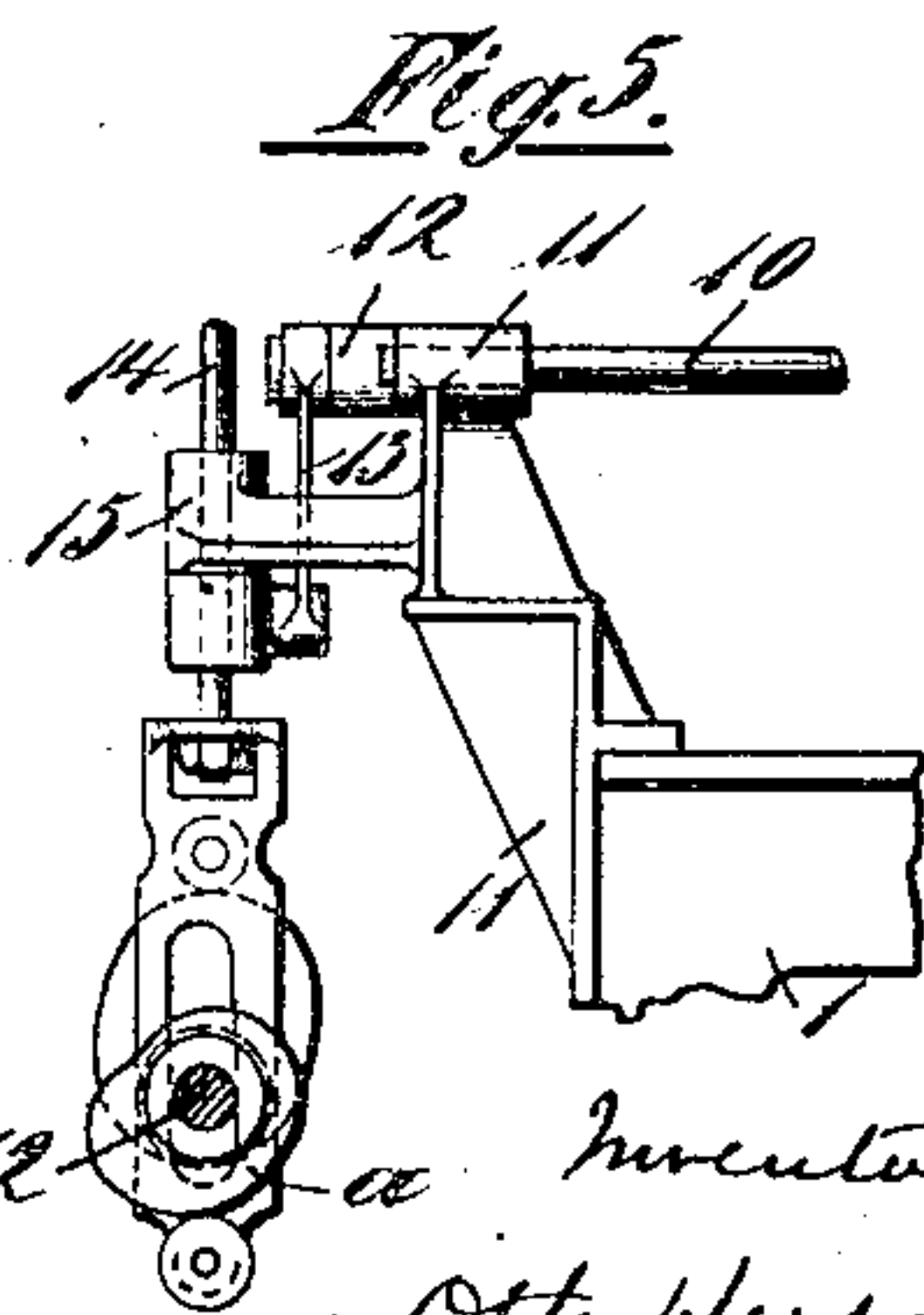
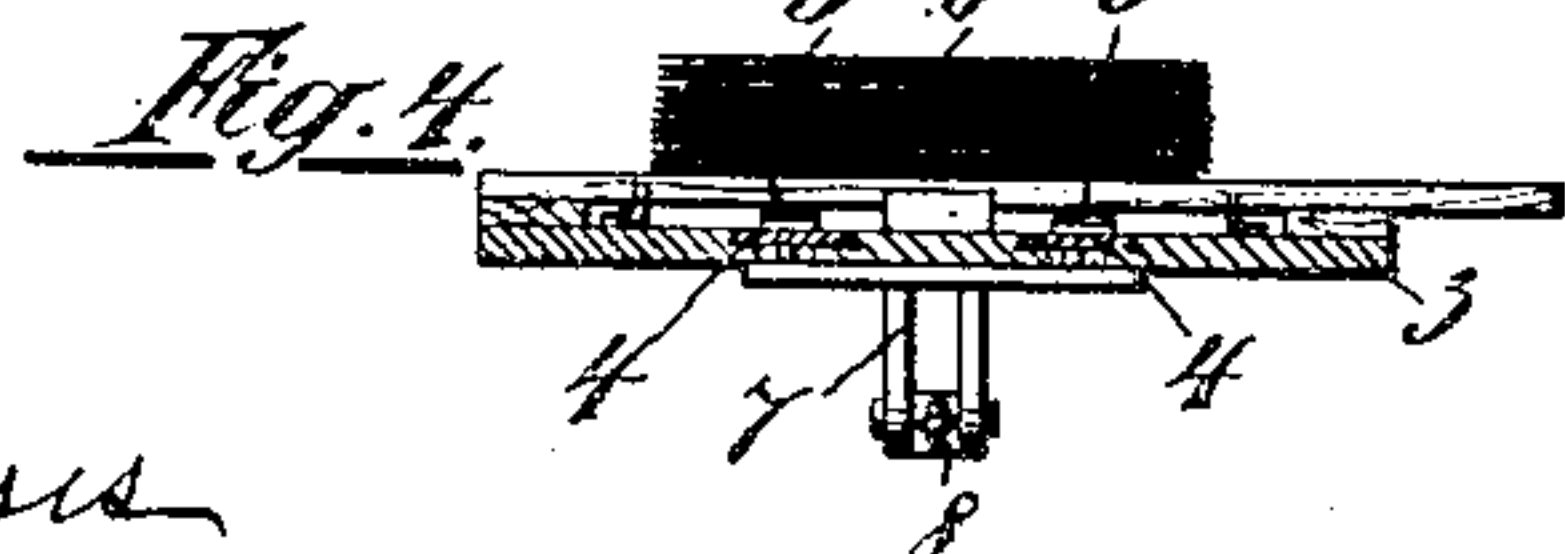
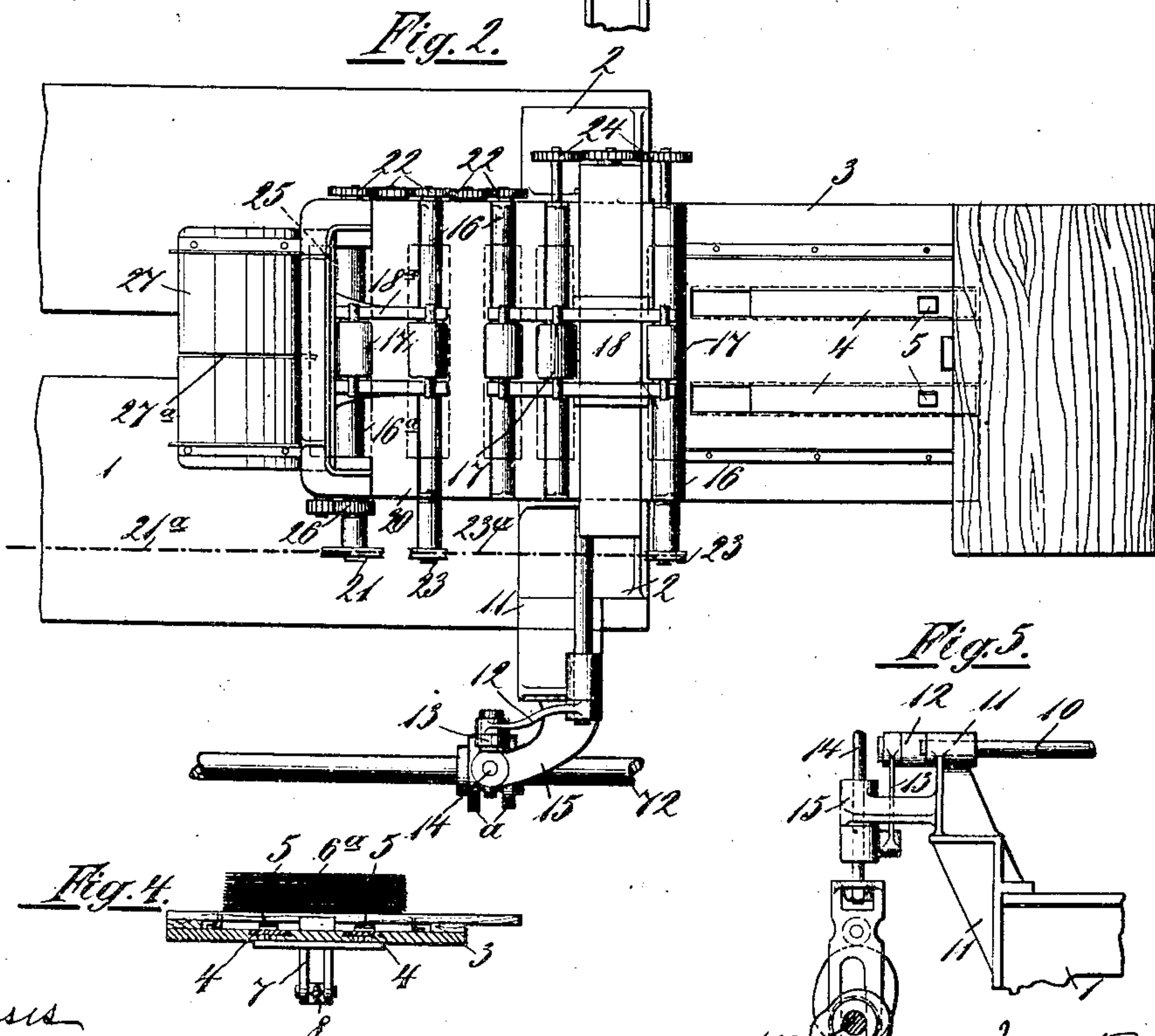
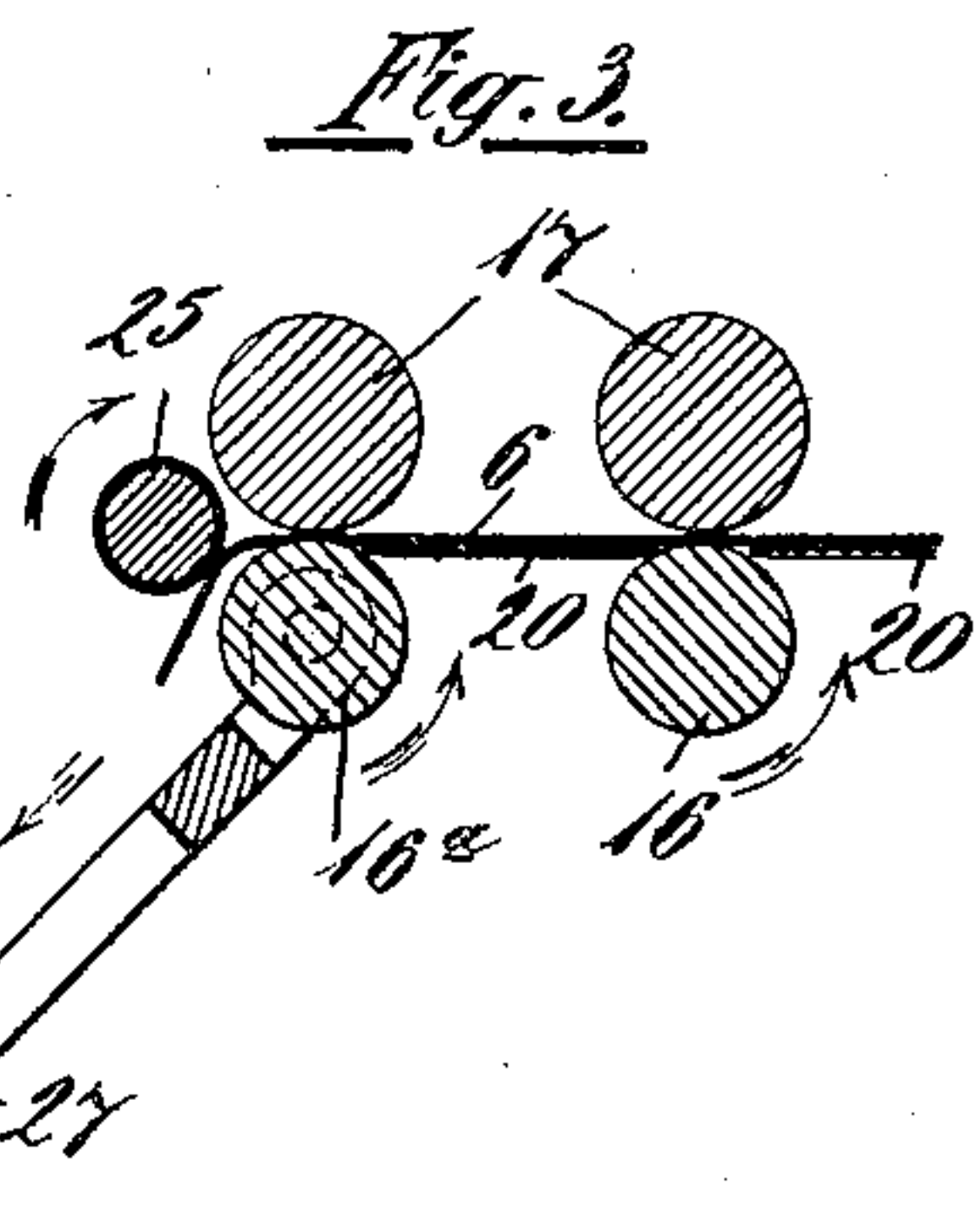
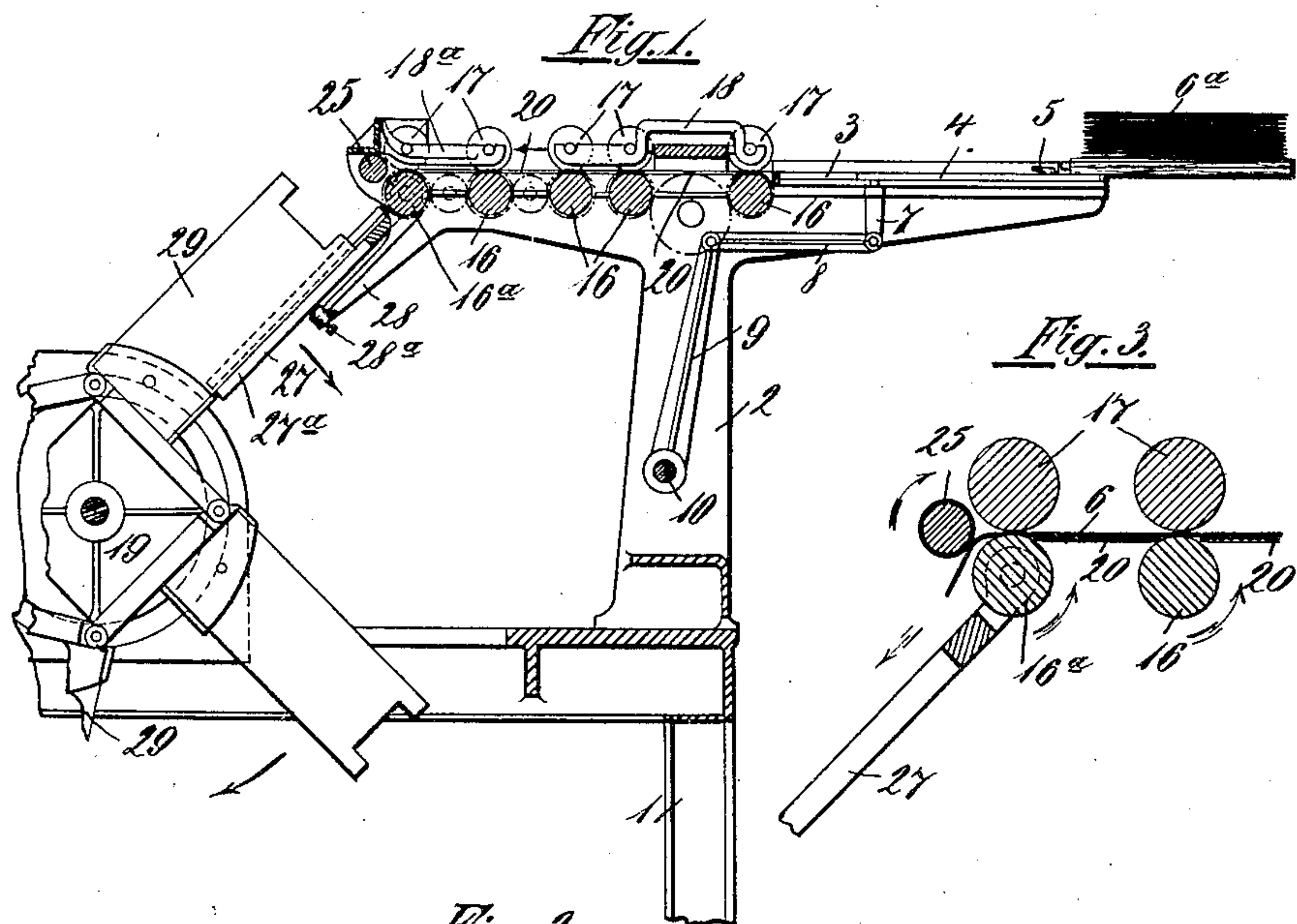
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 1.



Witness
Wm. J. Whallen
Albert P. Plummer

Inventor
Otto Hesser
by Shurtzant & Bailey
Attorneys

No. 875,526.

O. HESSER.

PATENTED DEC. 31, 1907.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 2.

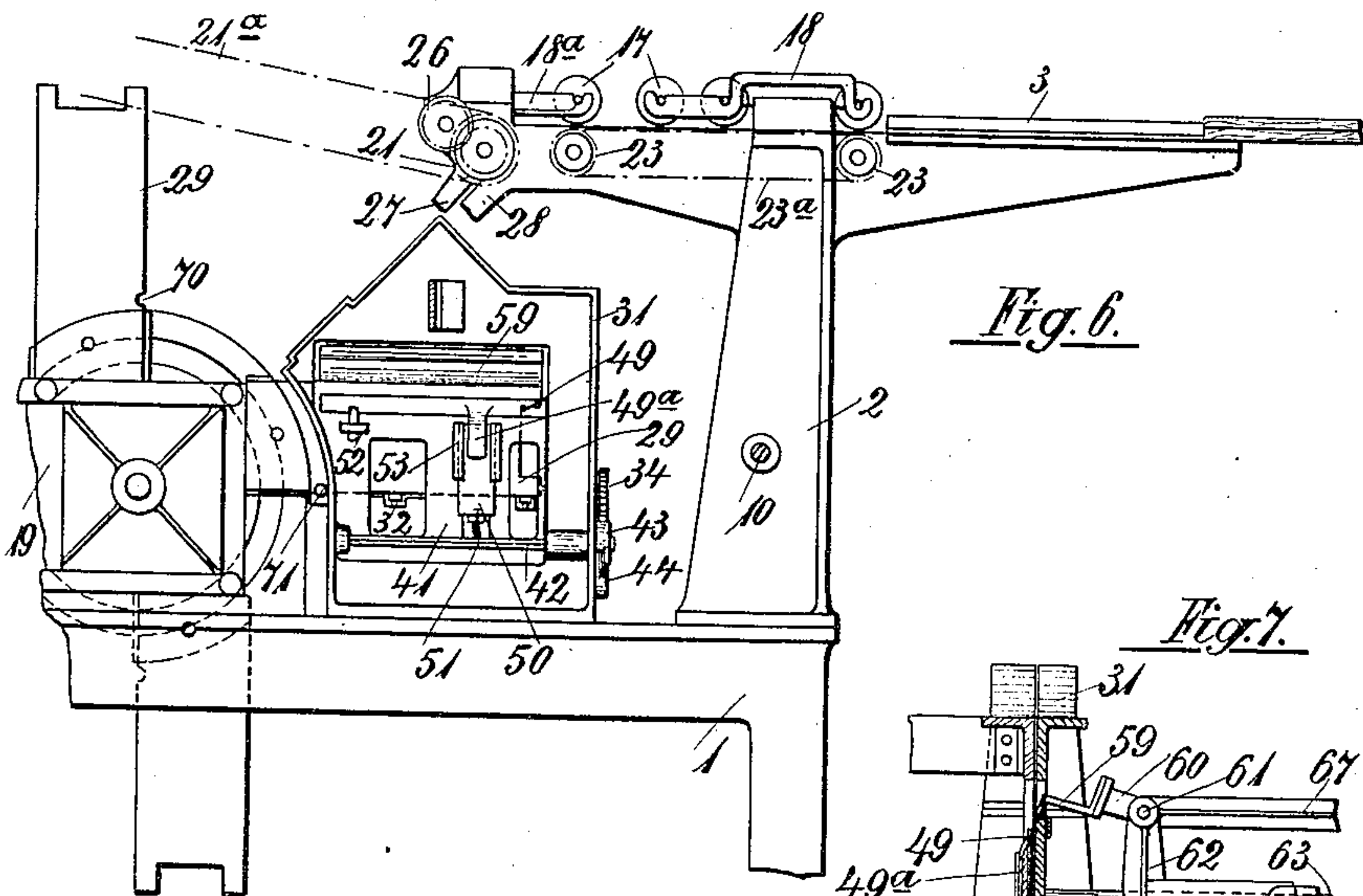


Fig. 6.

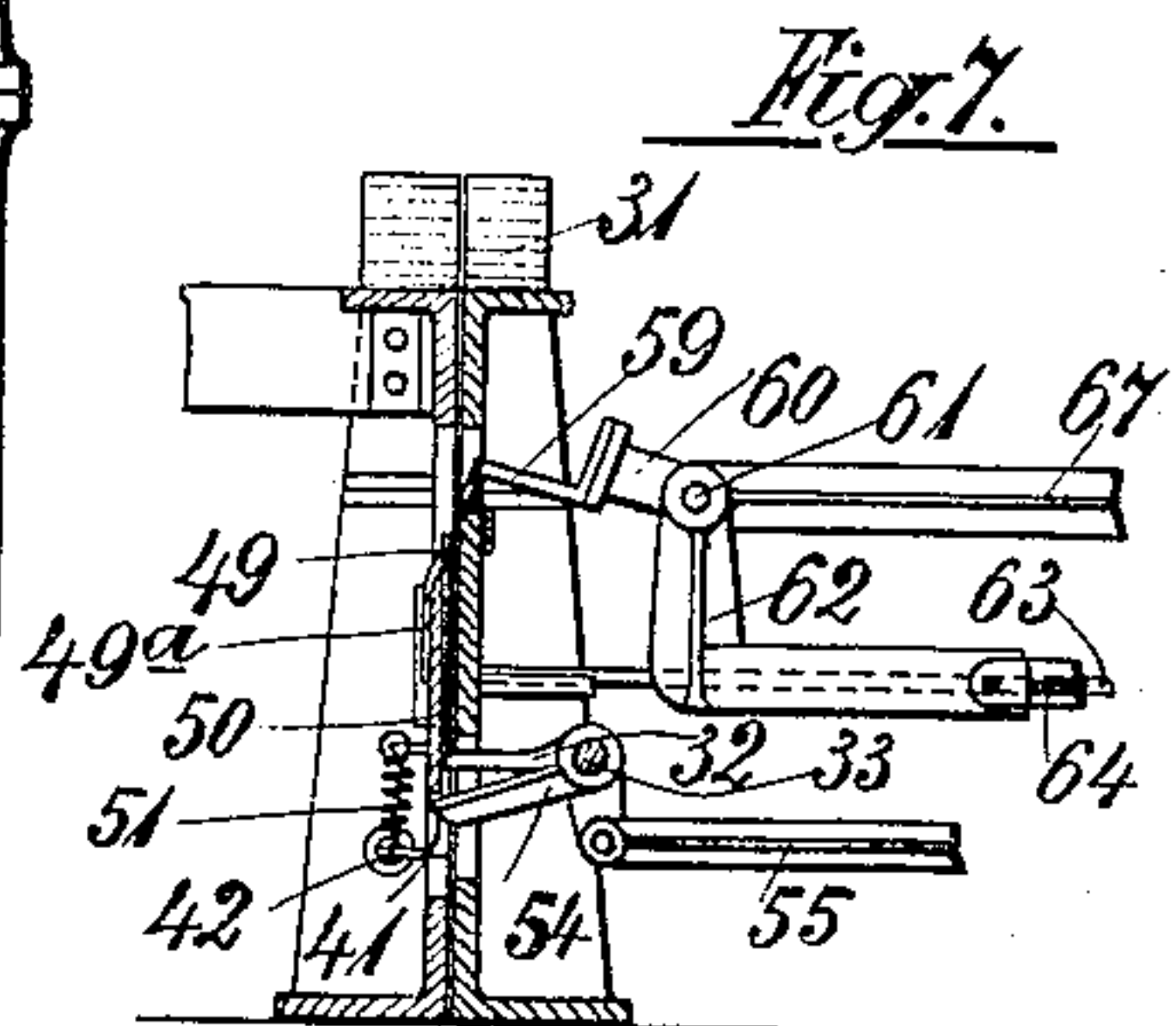


Fig. 7.

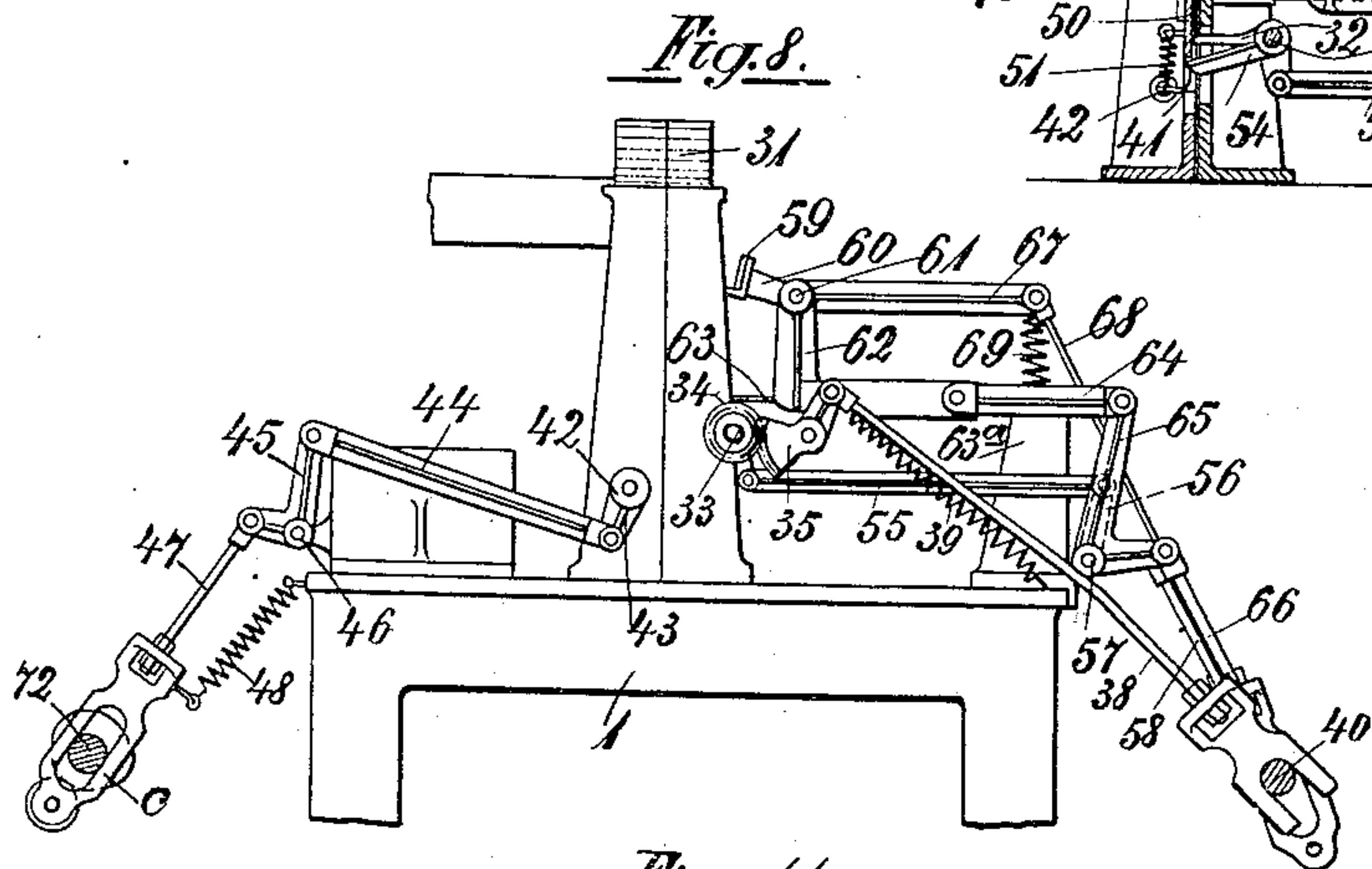


Fig. 8.

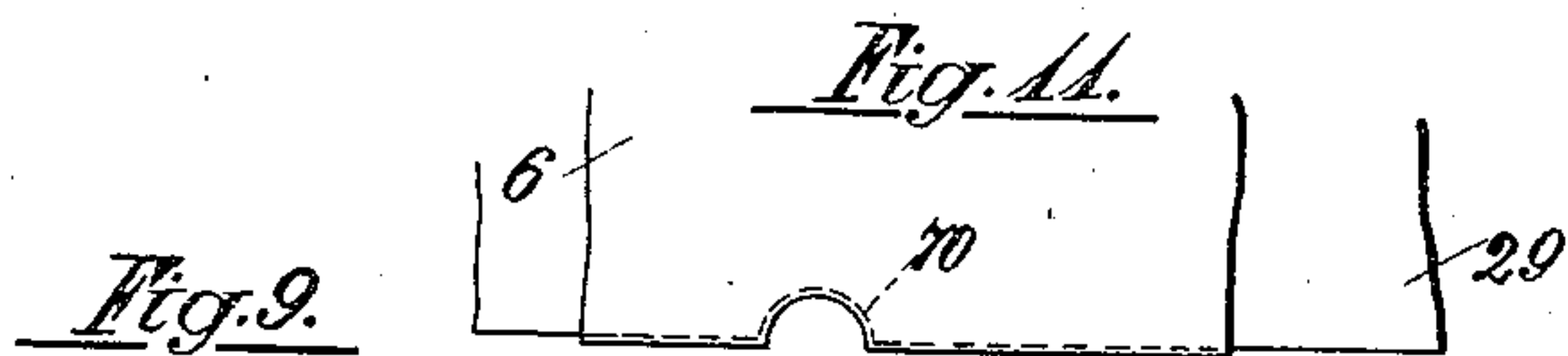


Fig. 9.

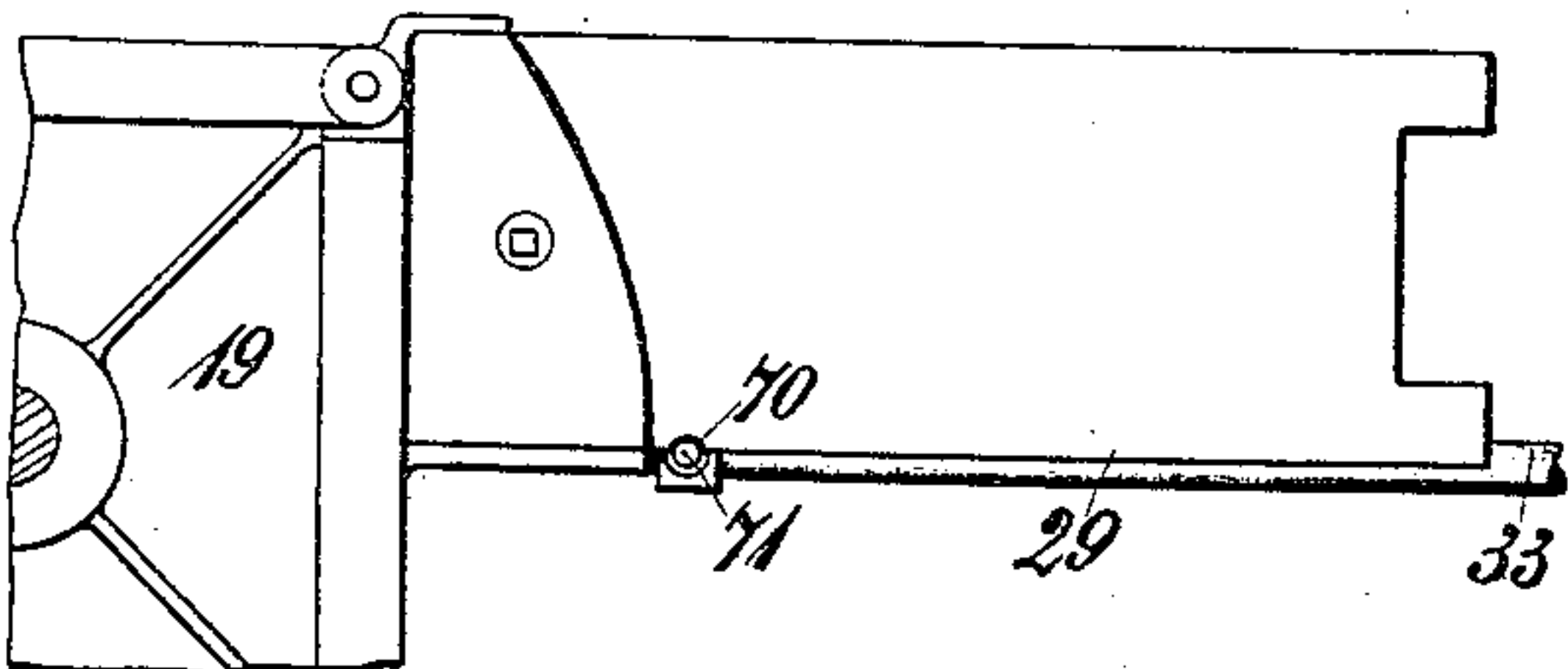
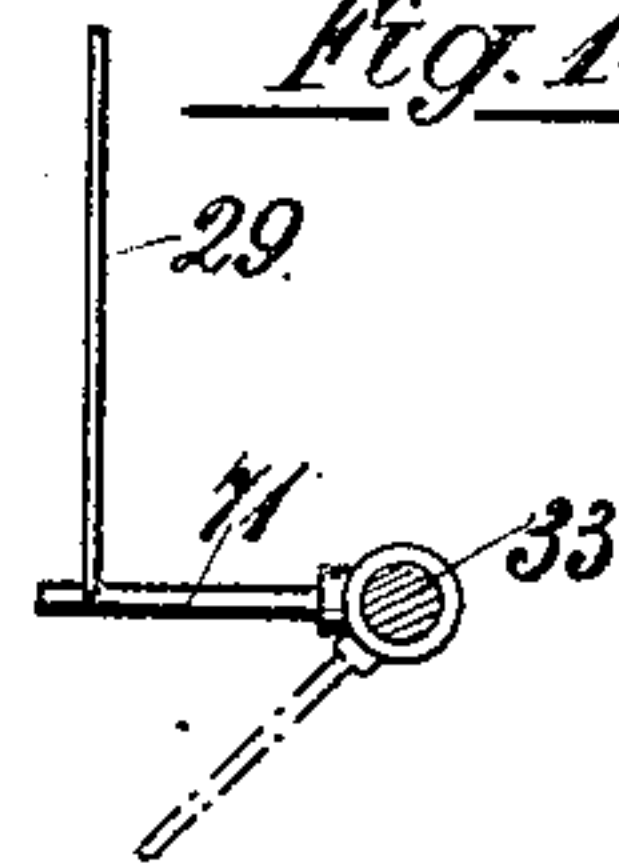


Fig. 10.



Inventor
Otto Hesser

by Shattuck & Krueger
Attorneys

Witness

Wm J. Whalley
Albert Copkins

No. 875,526.

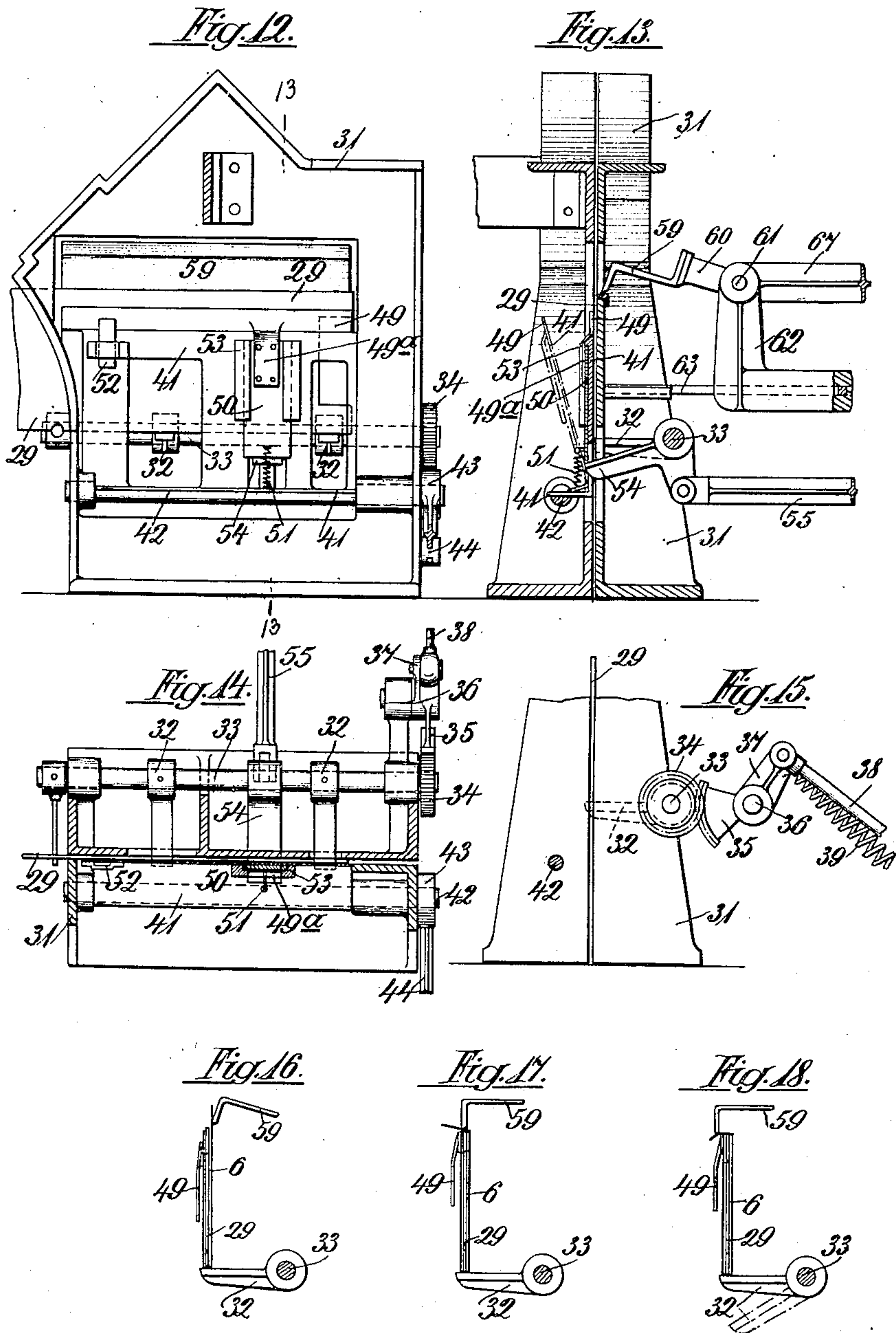
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 3.



Witness
 Wm J Whalley
 Albert Perkins

Inventor
 Otto Hesser
 by Shurtzess & Grady
 Attorneys

No. 875,526.

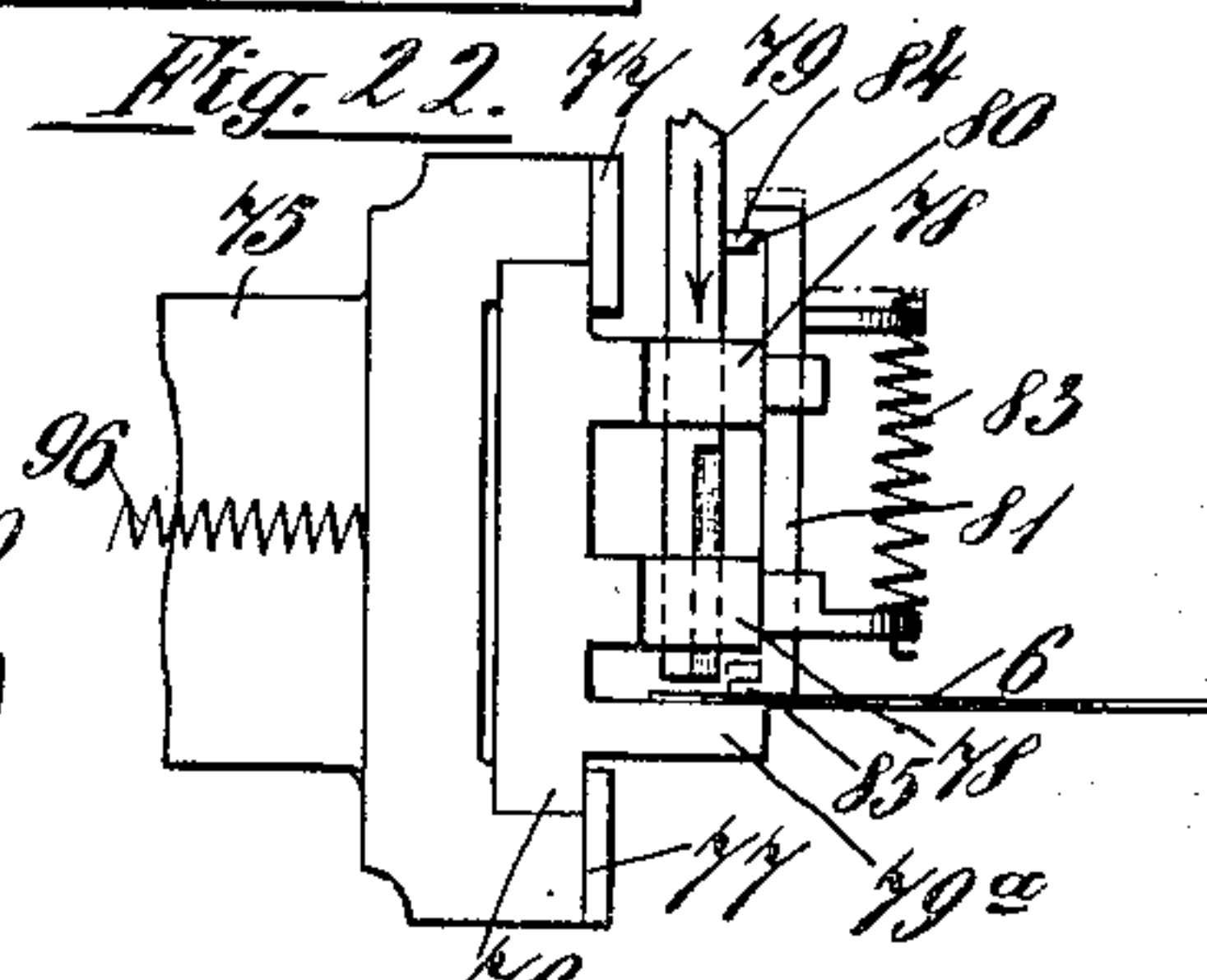
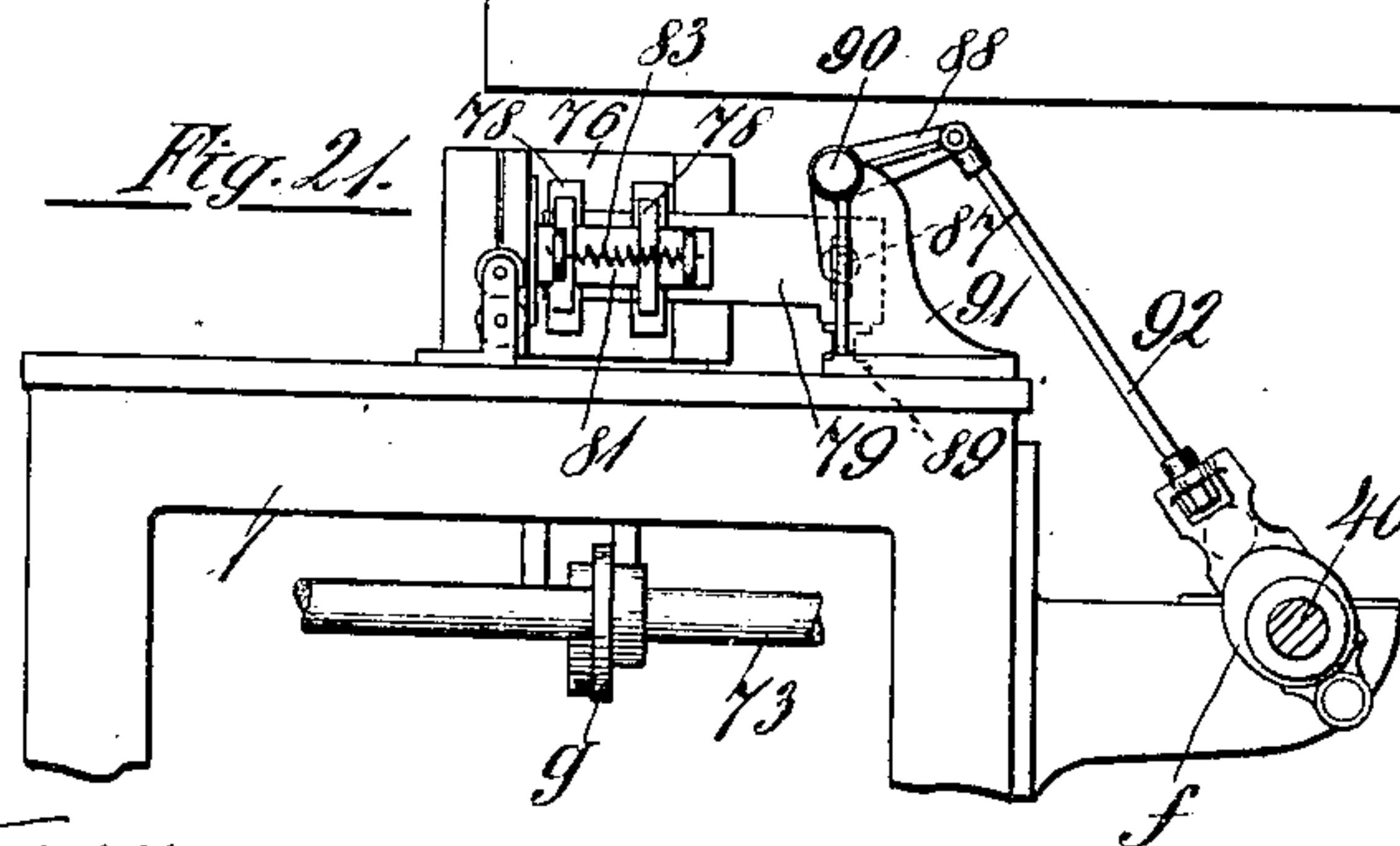
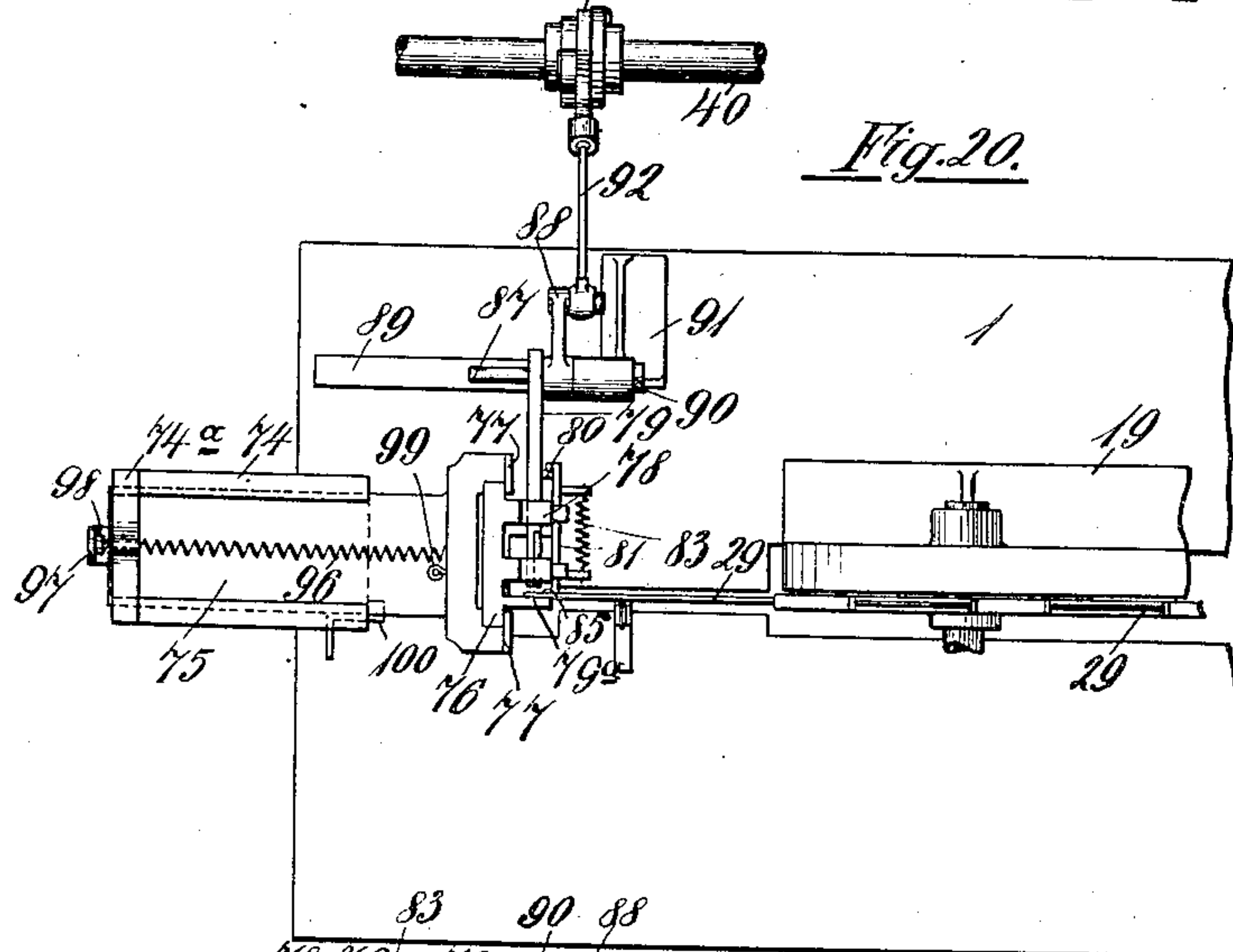
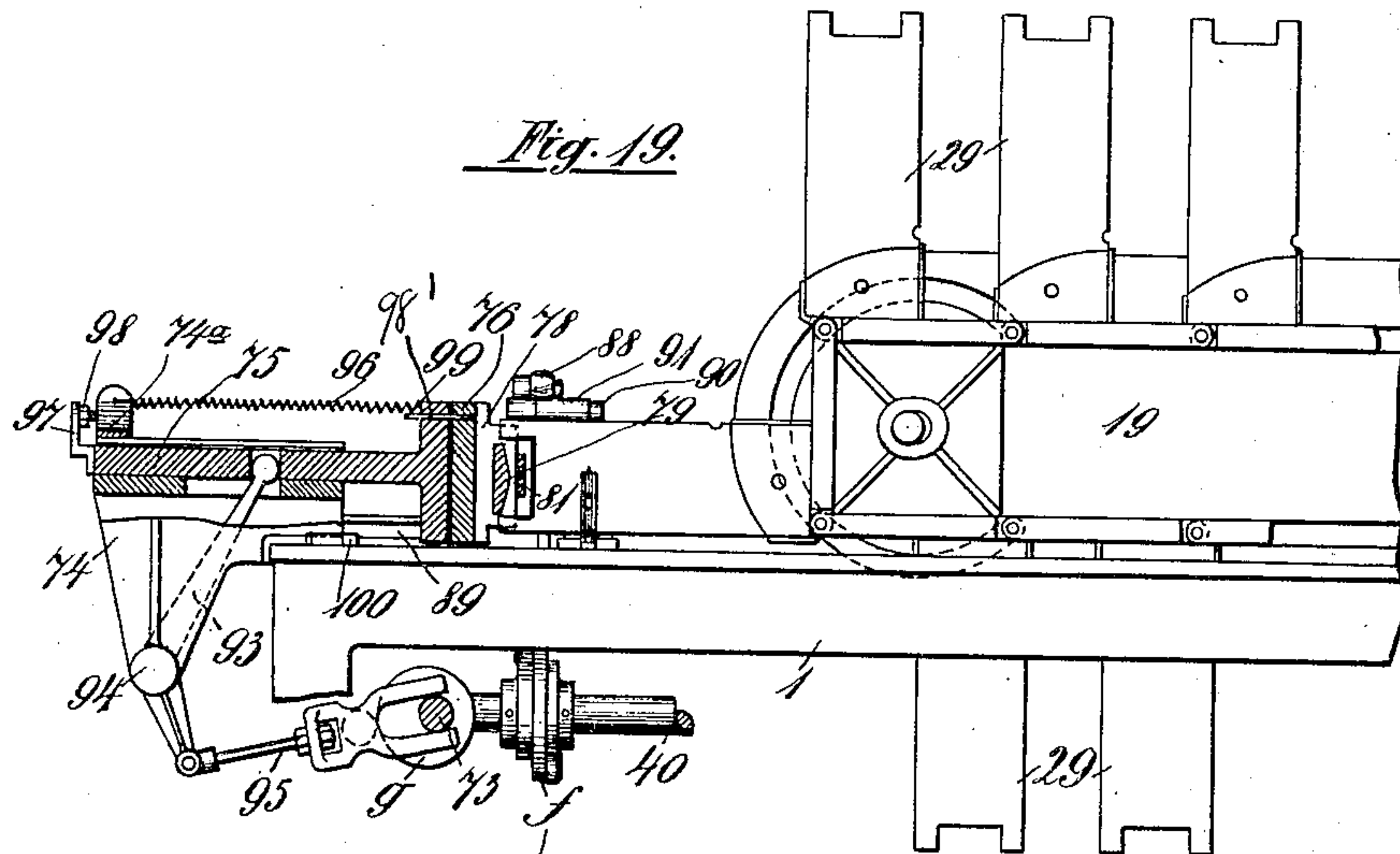
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 4.



Witness
Wm J Whalley
& Albert Popkin

Inventor
Otto Hesser
by Stuart & Greeley
Attorneys

No. 875,526.

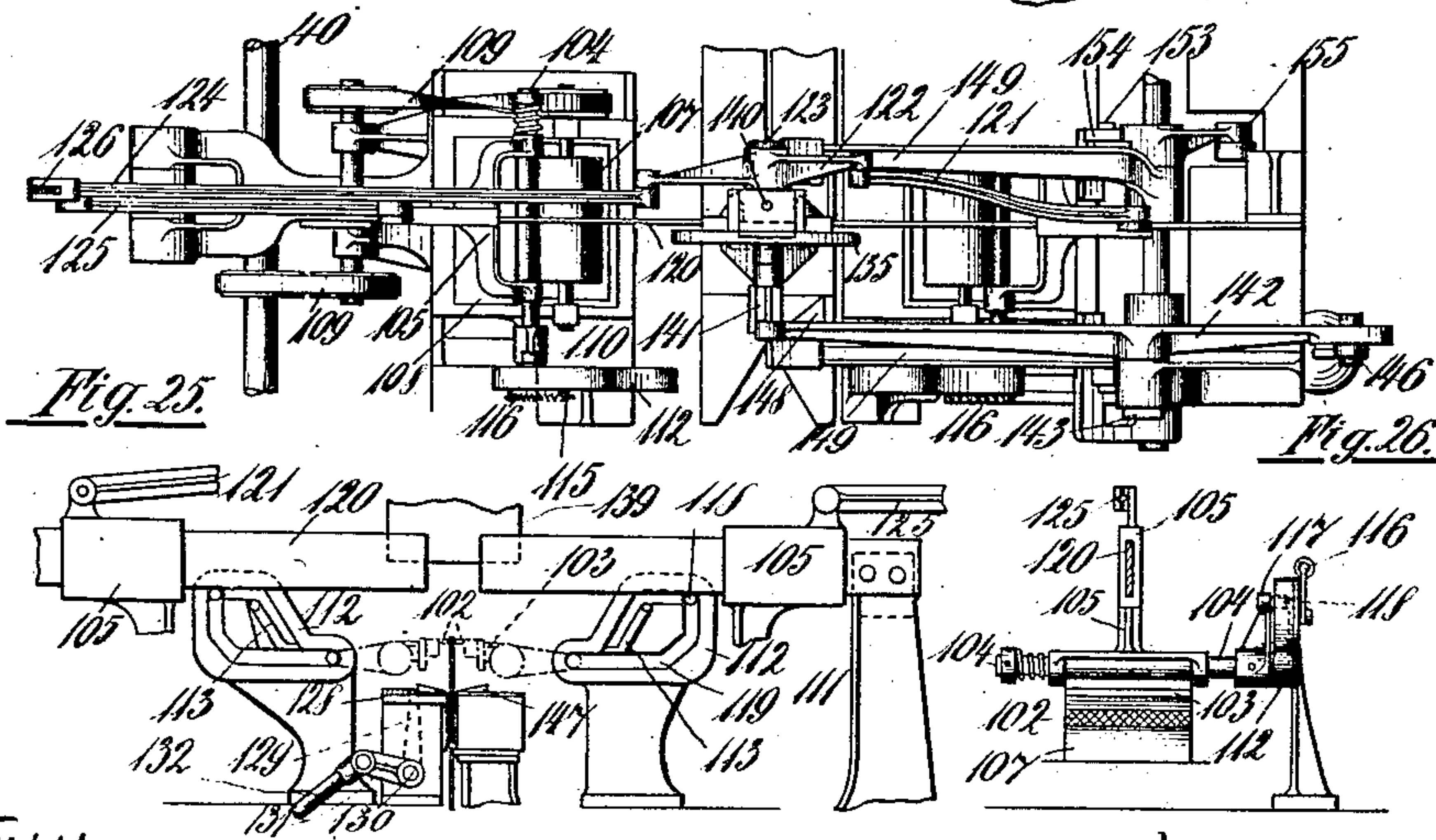
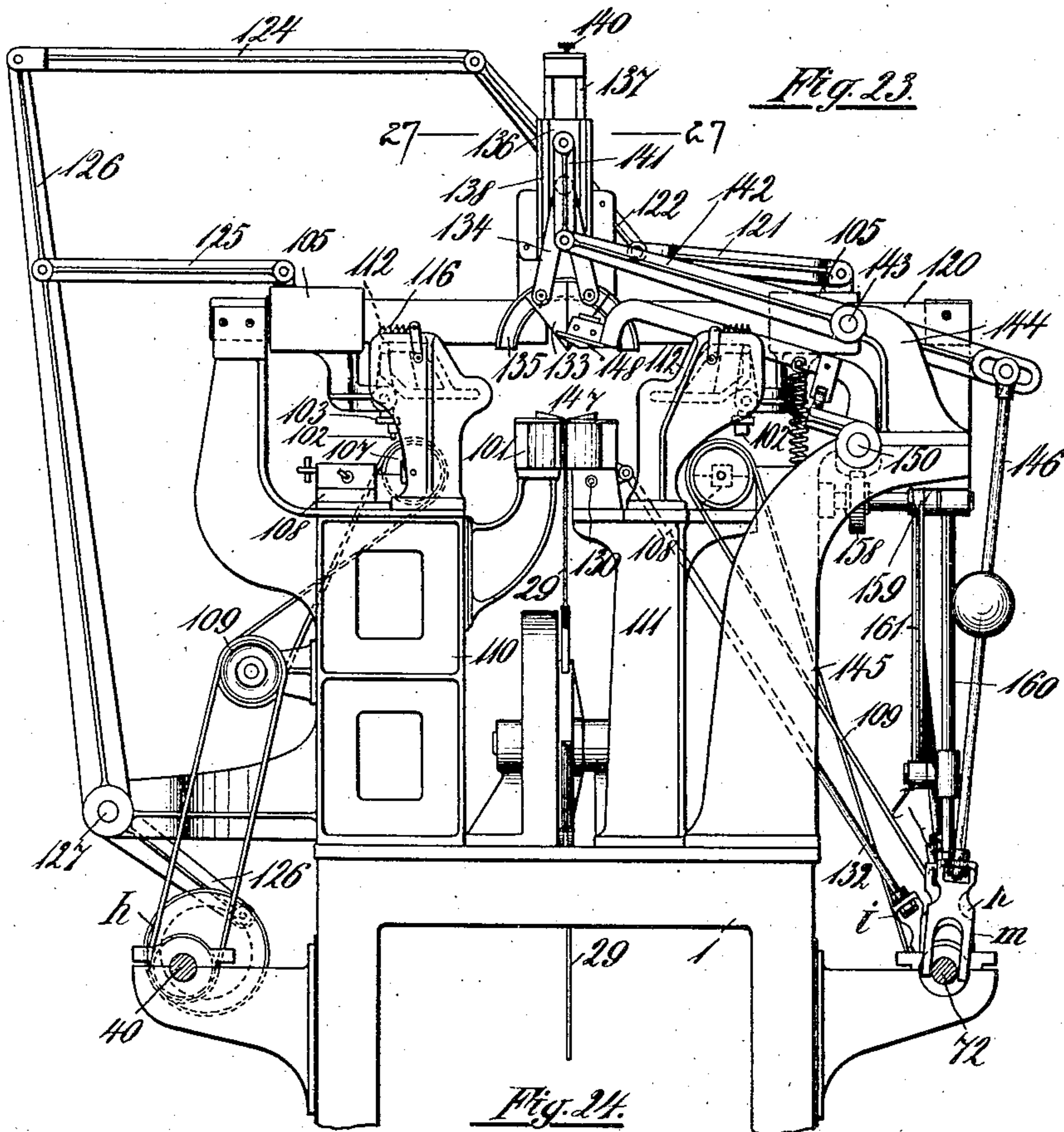
O. HESSER.

PATENTED DEC. 31, 1907.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 5.



Witness
J^m J. Whalley
Albert Topkiss

Inventor
Otto Hesse
by Sturtevant & Greeley
Attorneys

No. 875,526.

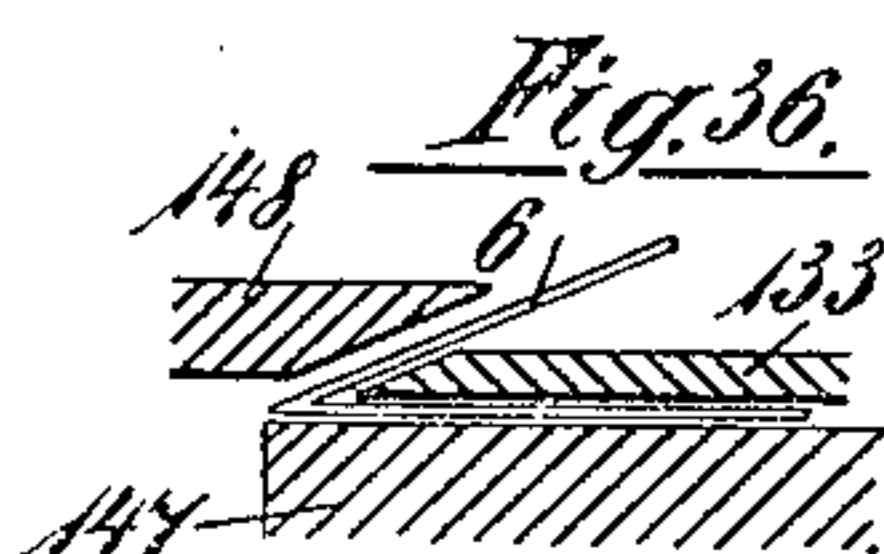
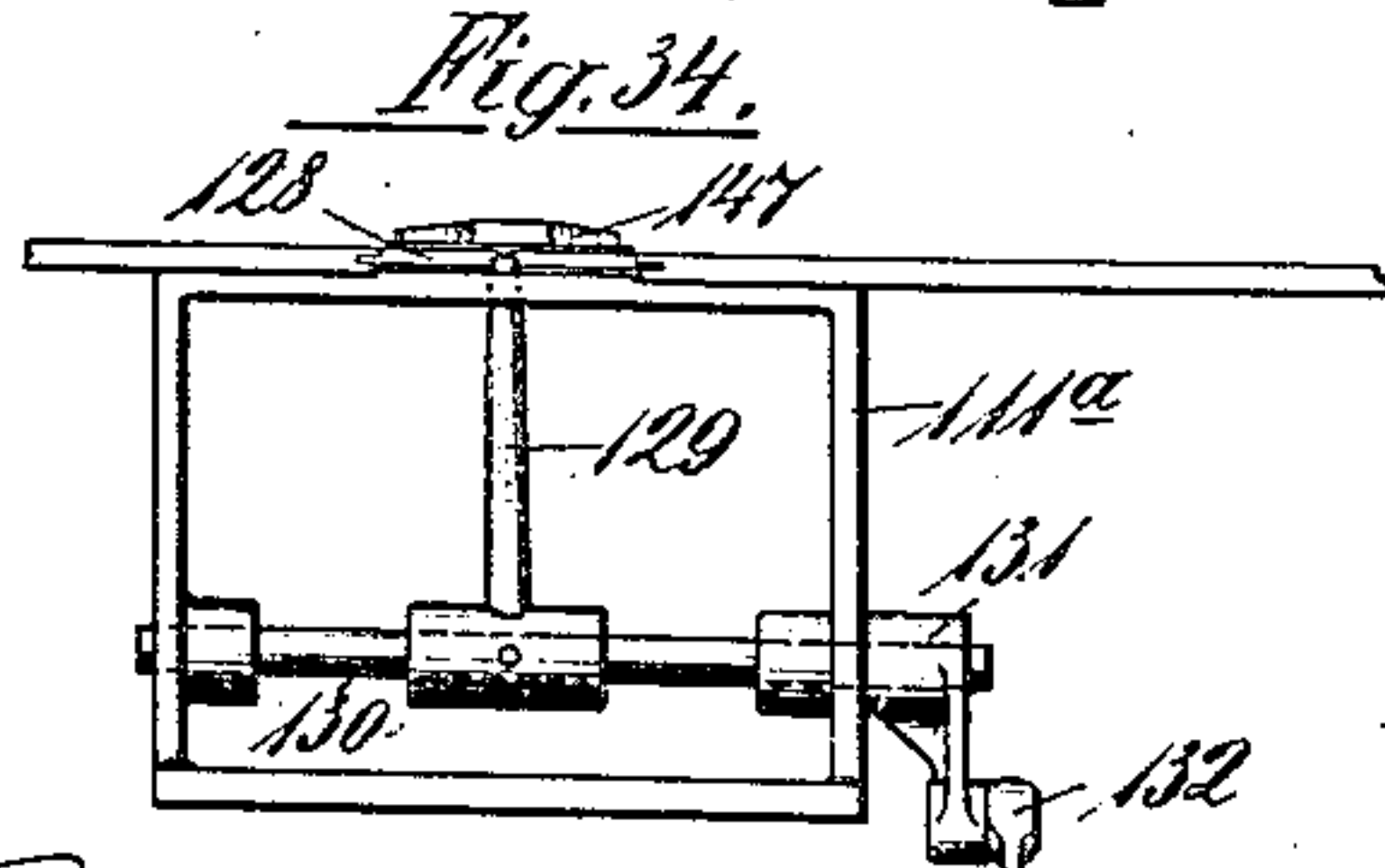
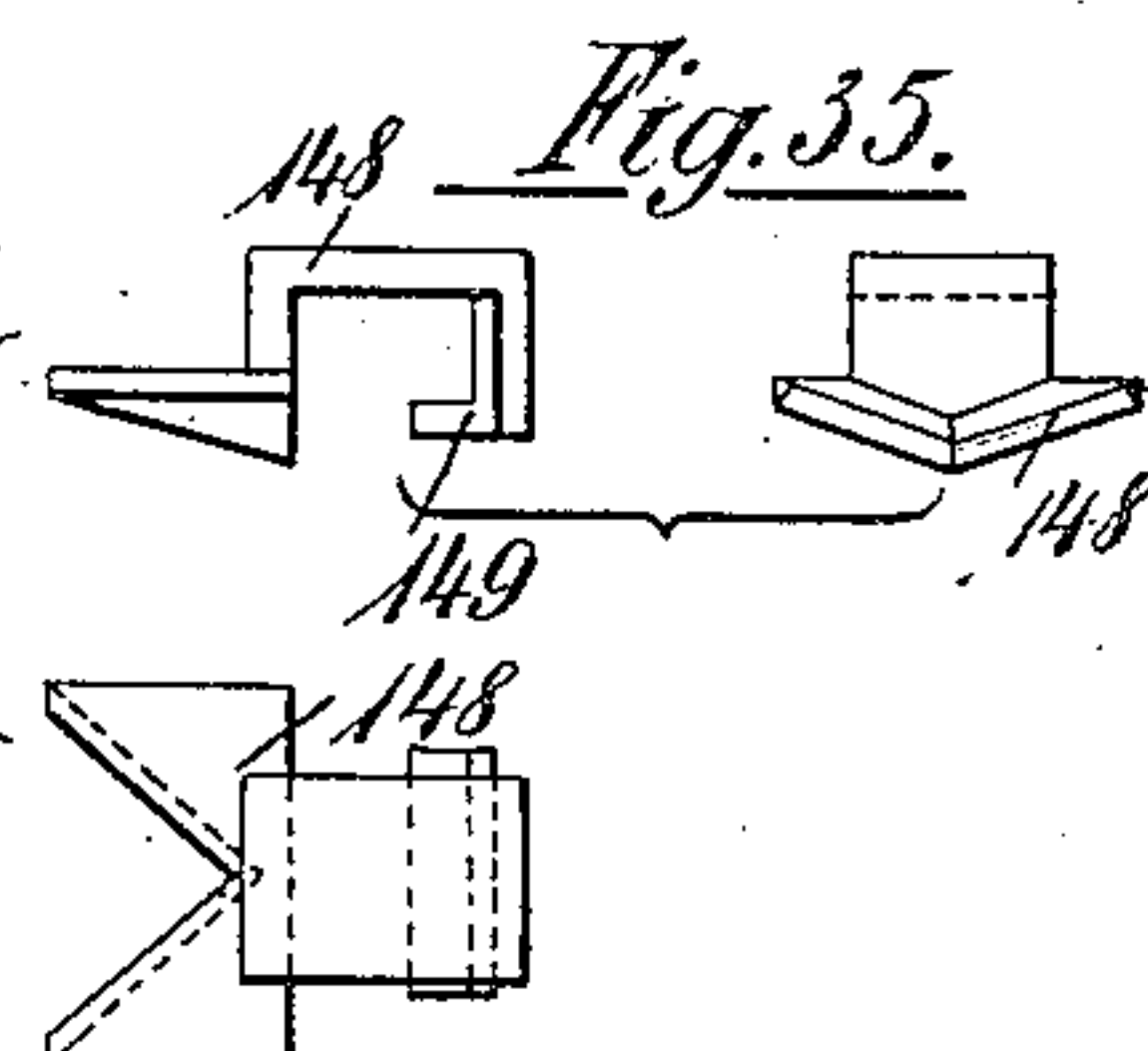
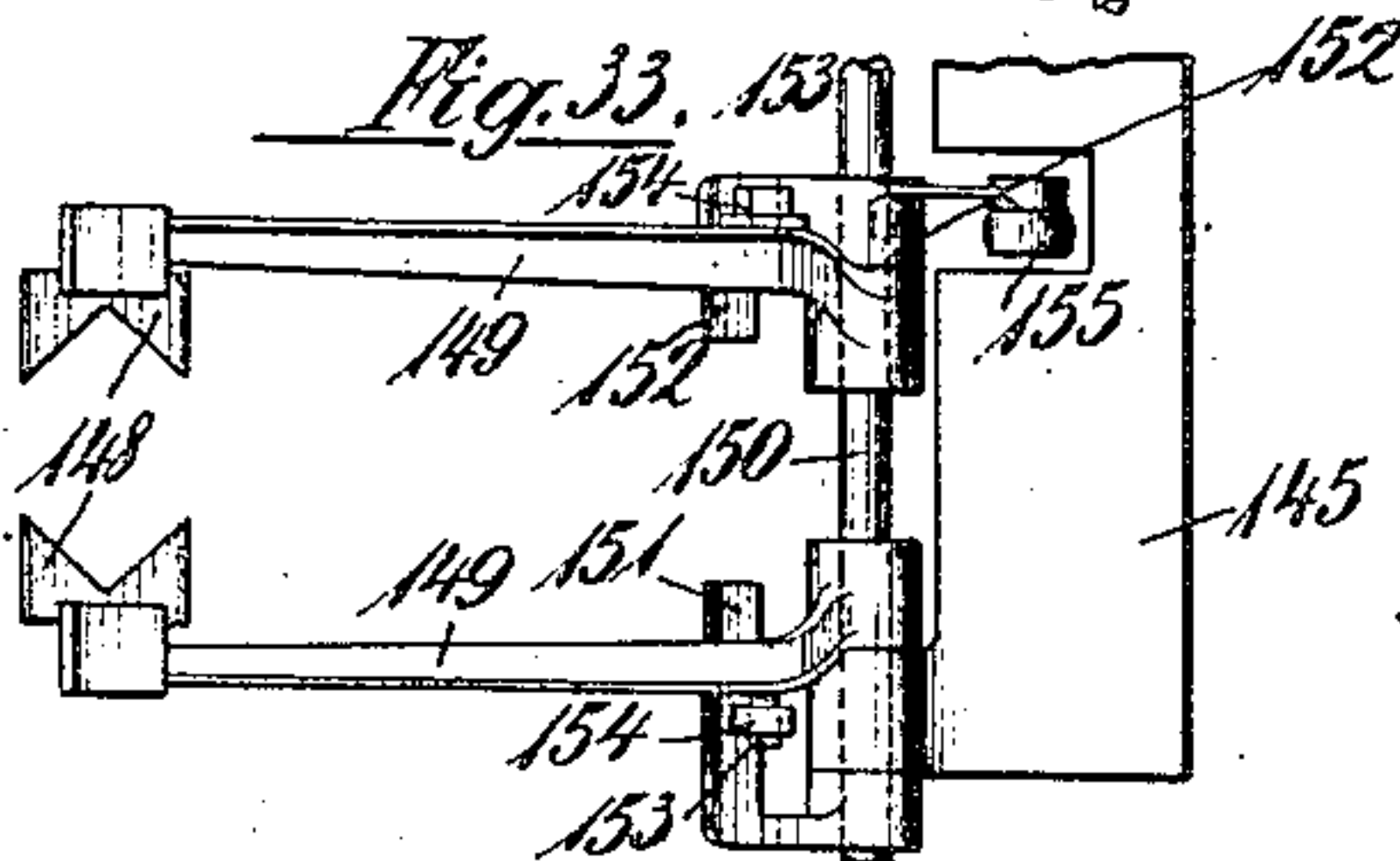
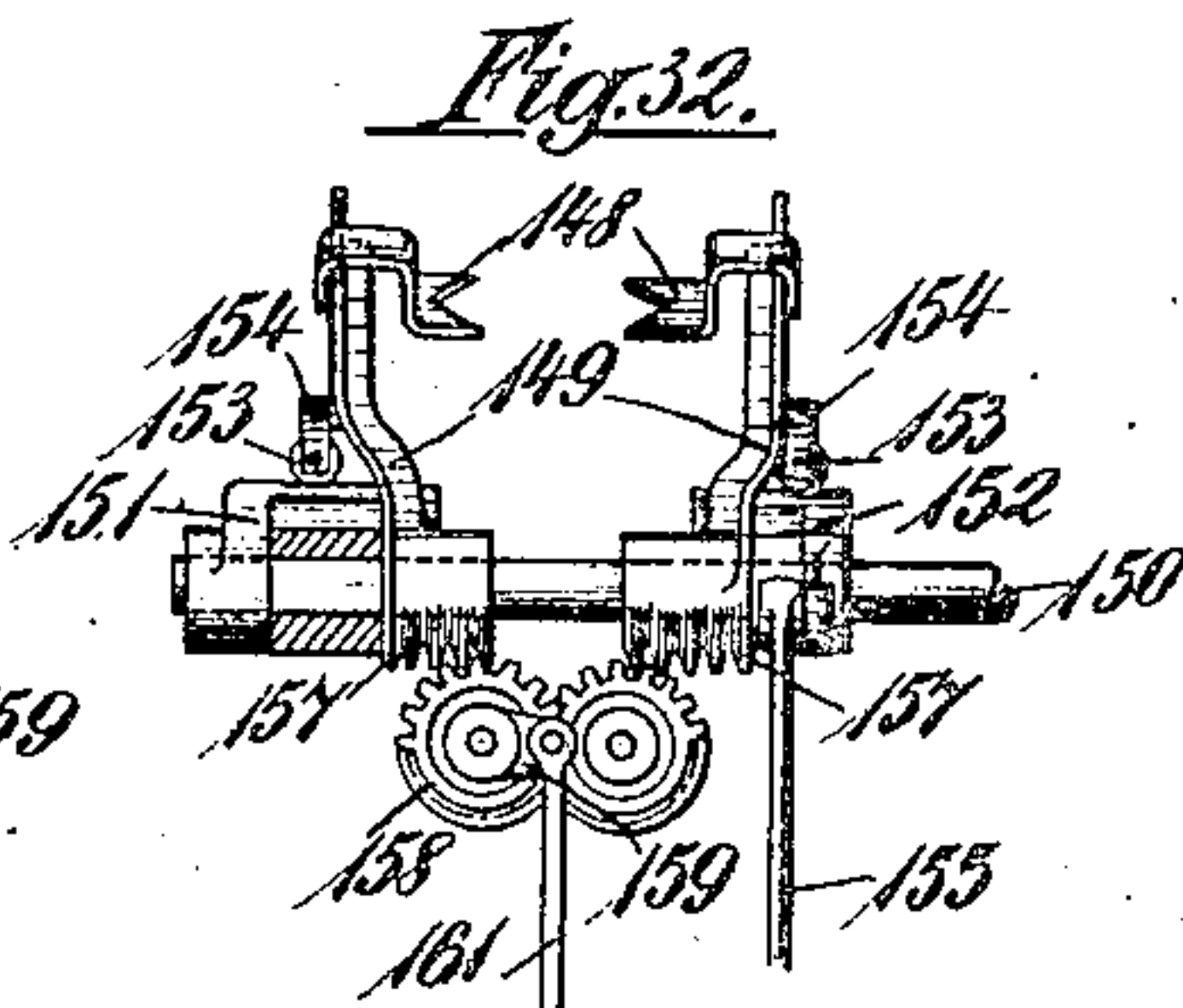
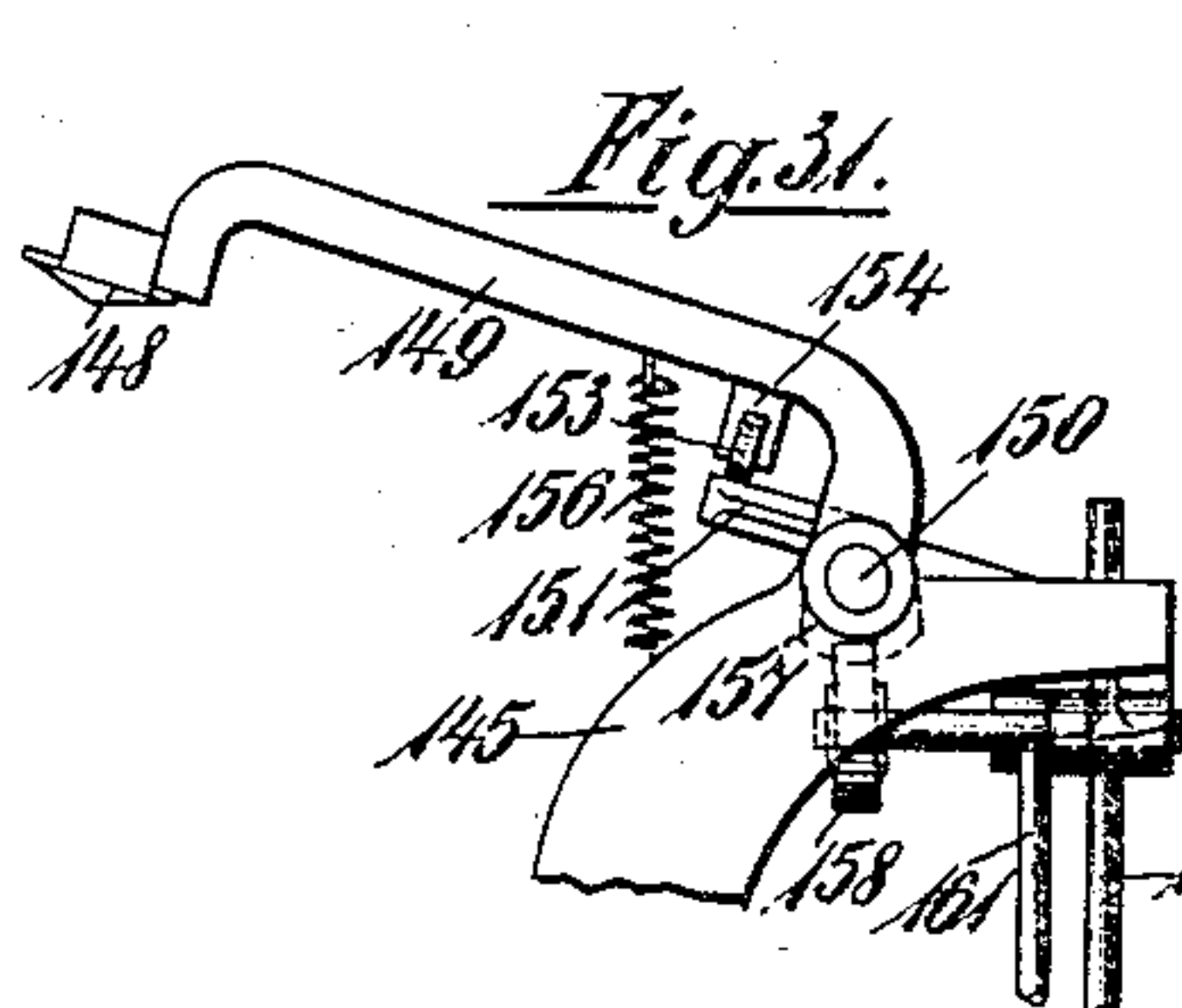
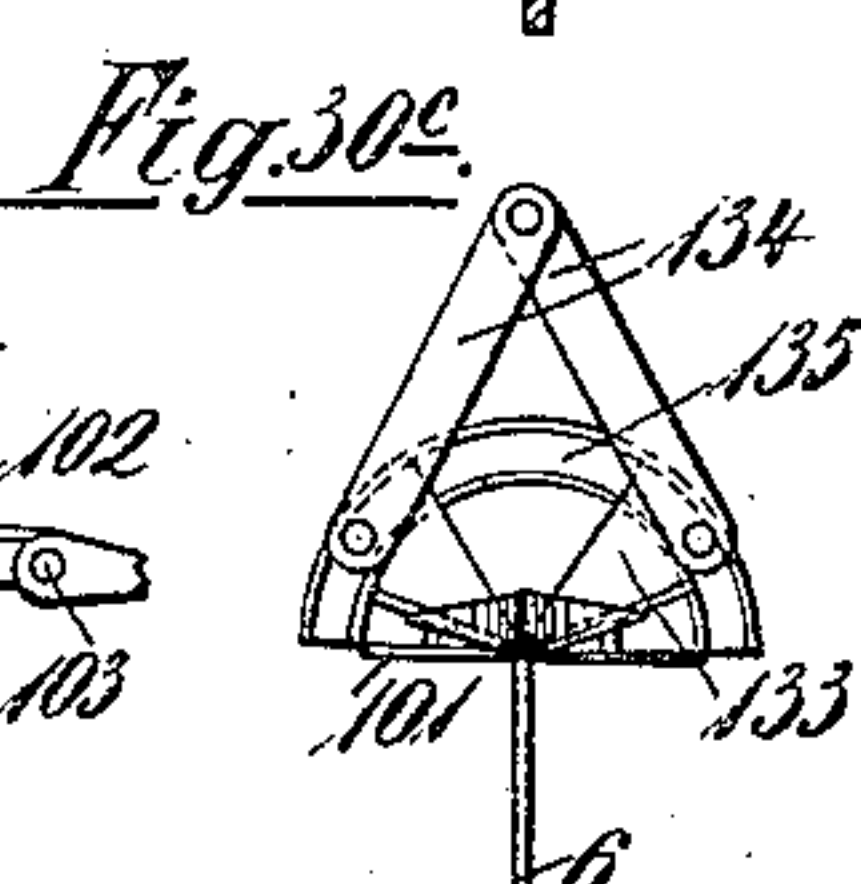
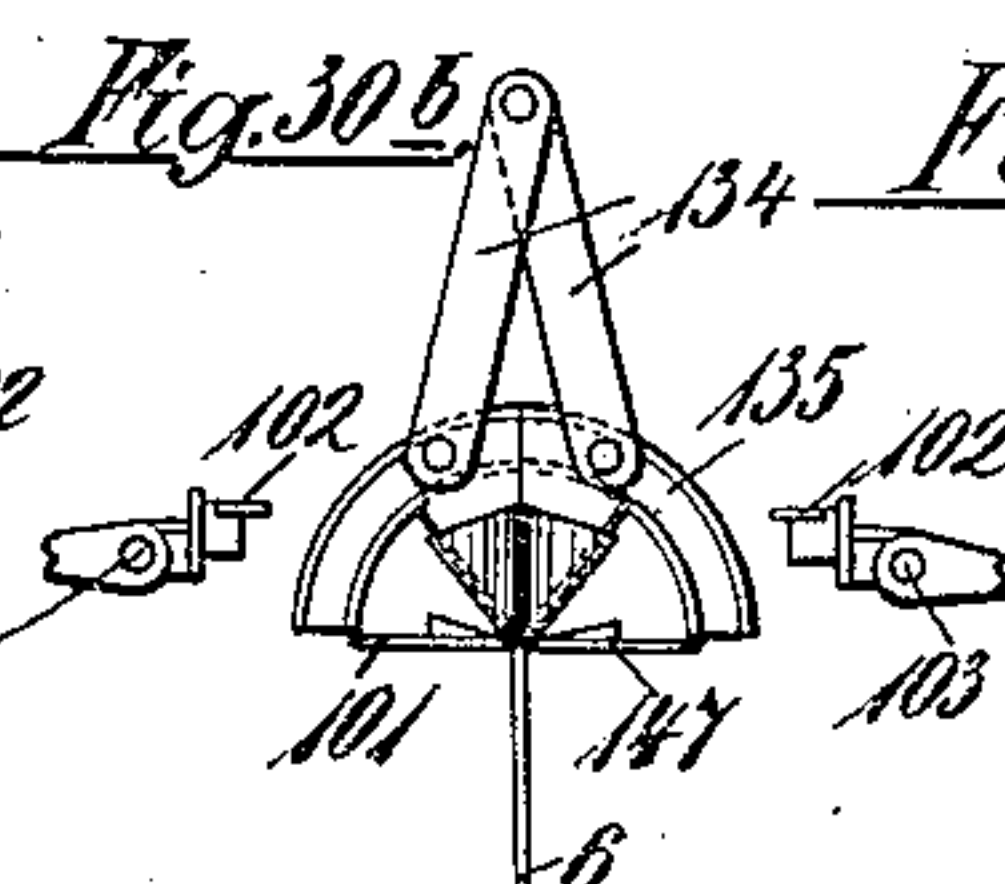
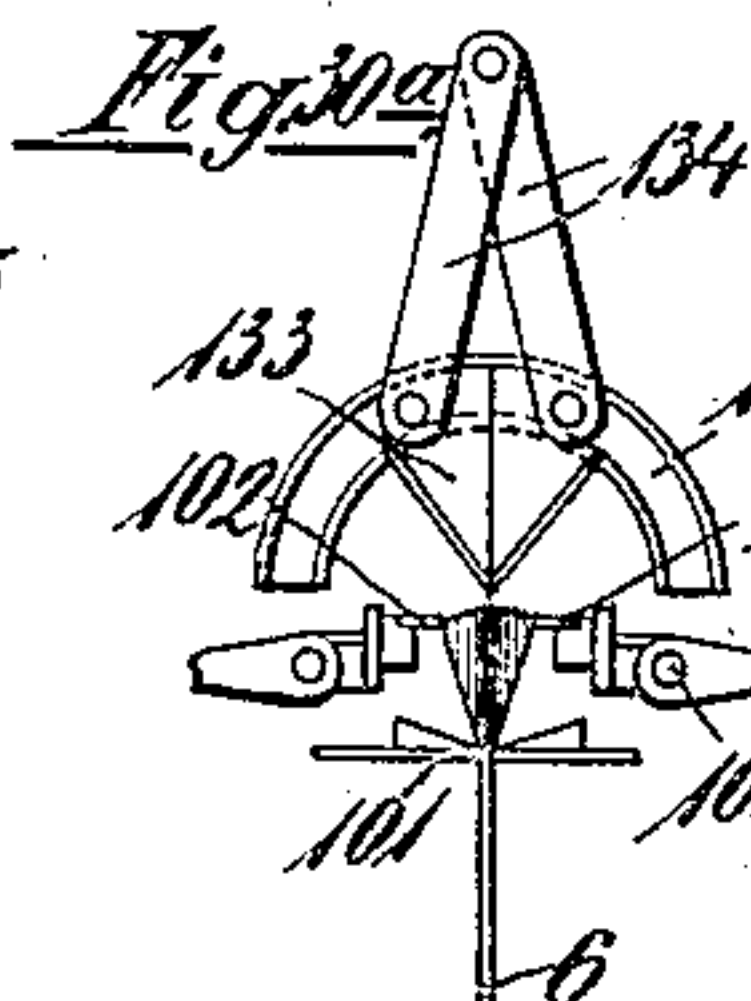
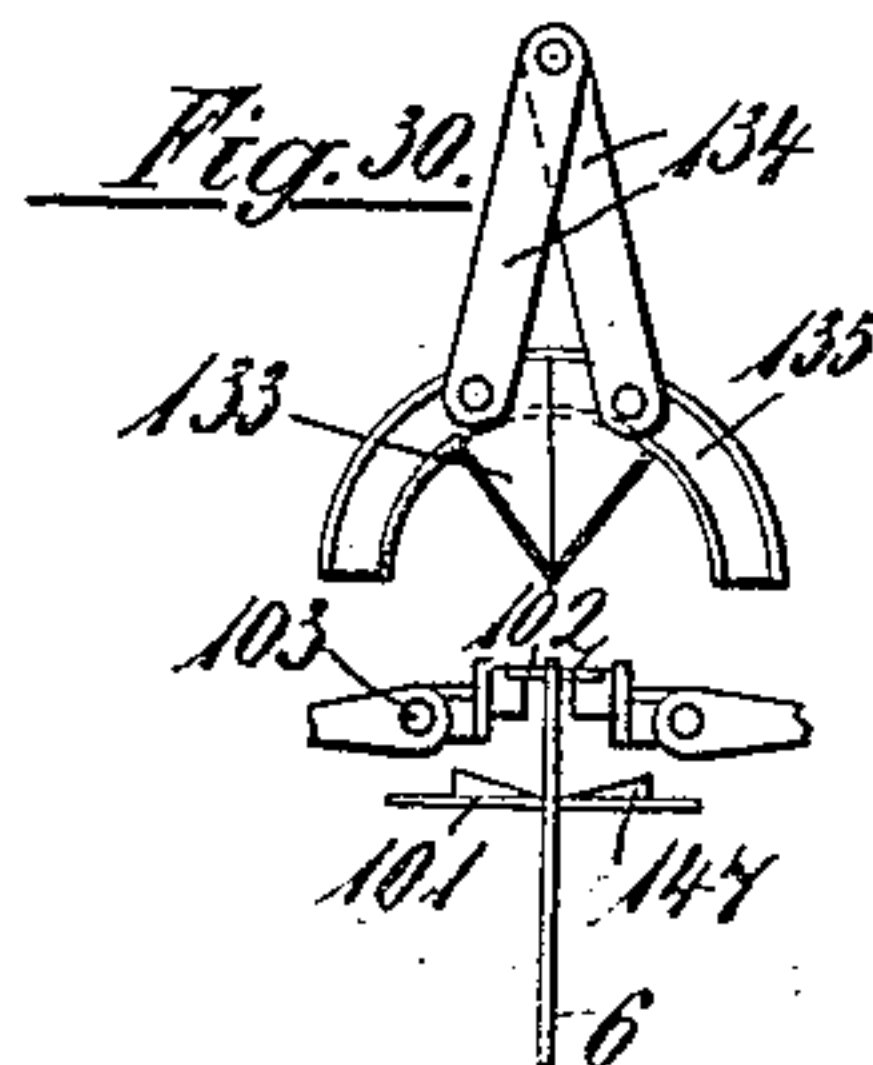
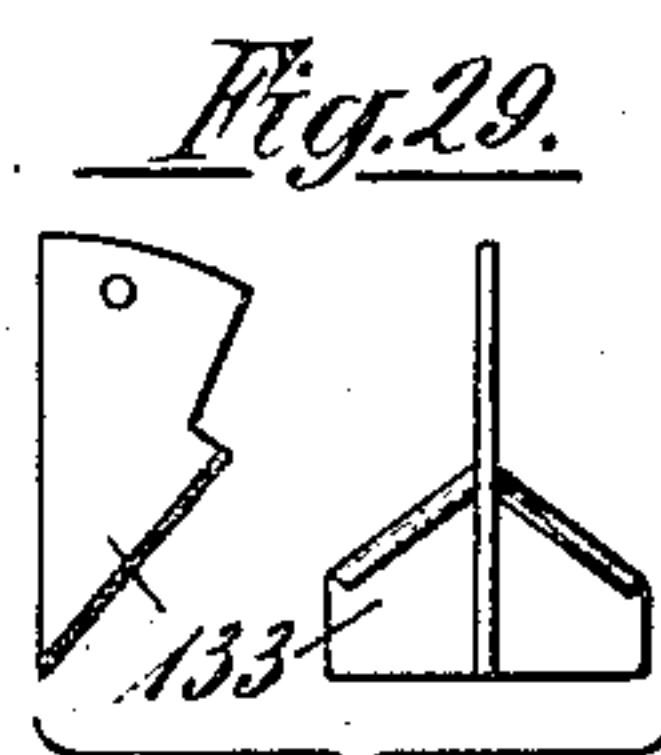
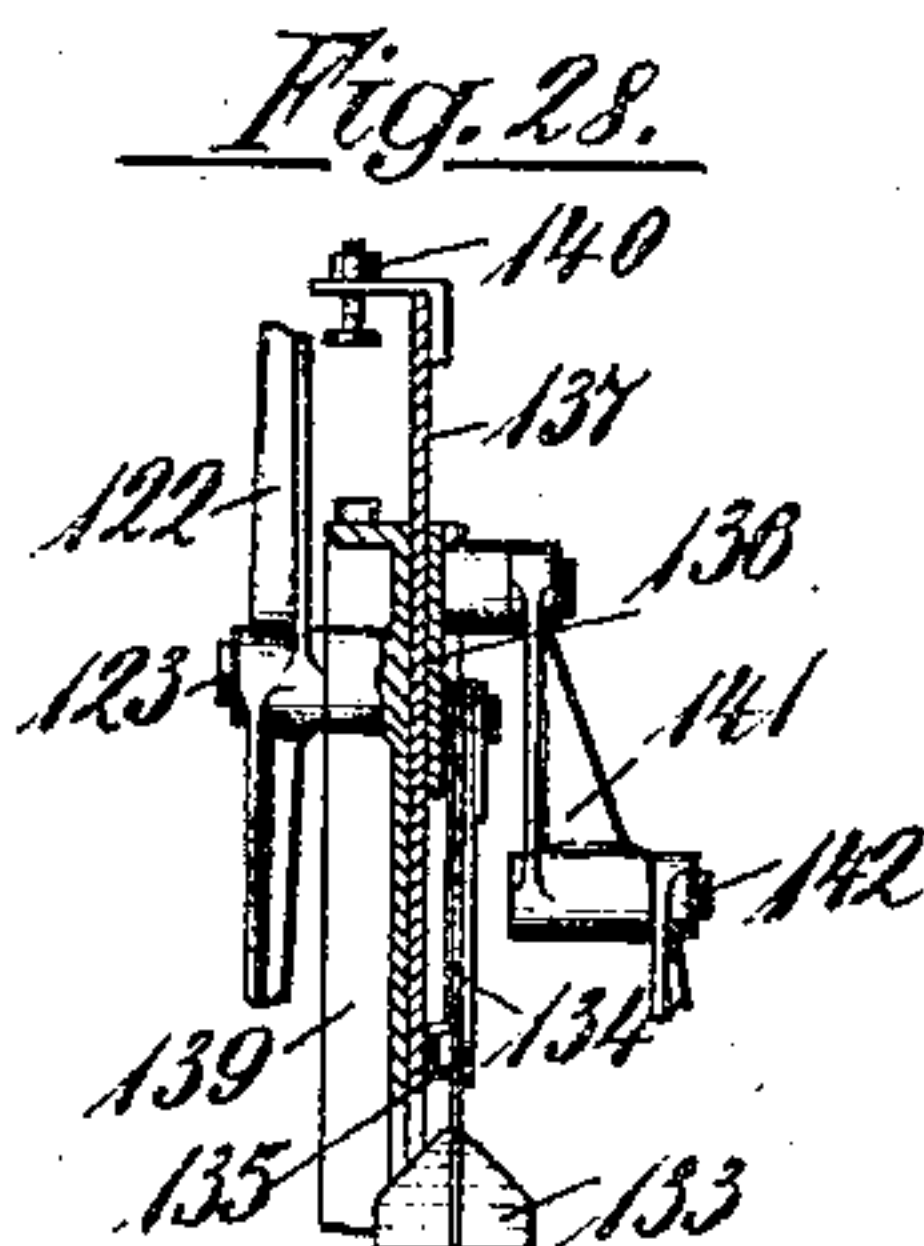
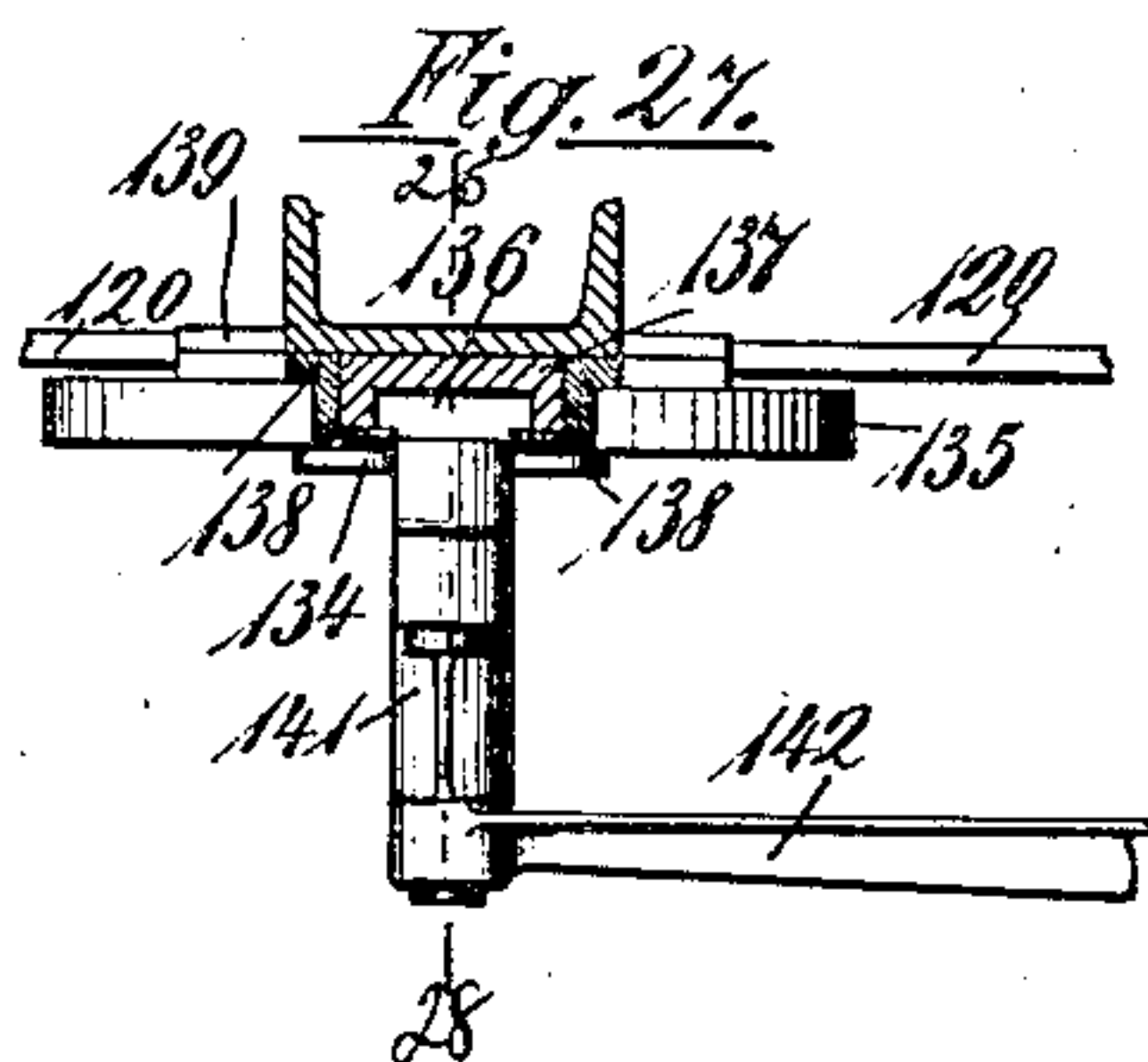
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 6.



Witness
Wm J. Whalley
Albert Hopkins

Inventor
Otto Hesser
by Stuart & Greeley
Attorneys

No. 875,526.

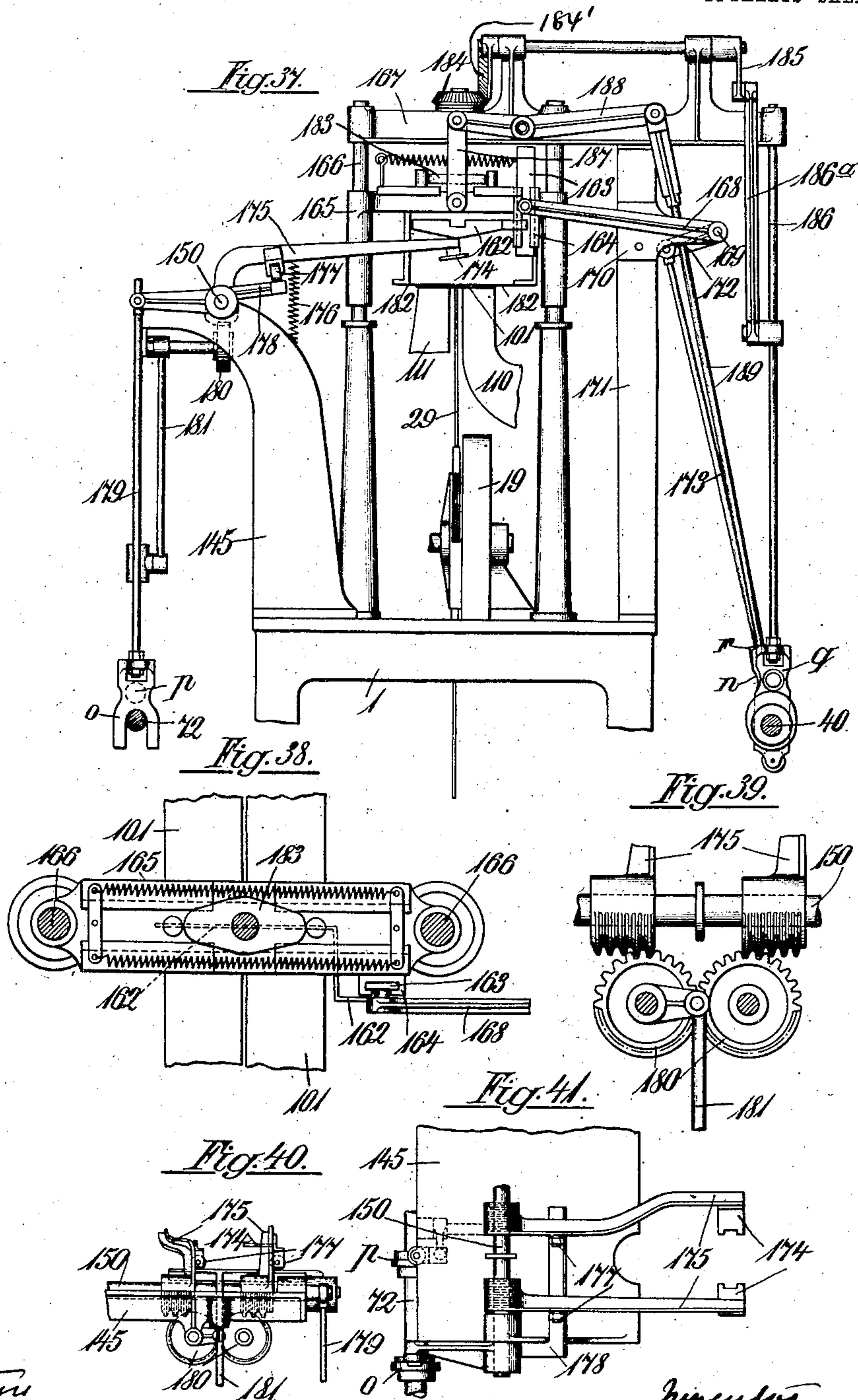
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 7.



Witness
Wm J. Whalley
Albert Perkins

Inventor
Otto Hesser
by Stewart & Bailey
Attorneys

No. 875,526.

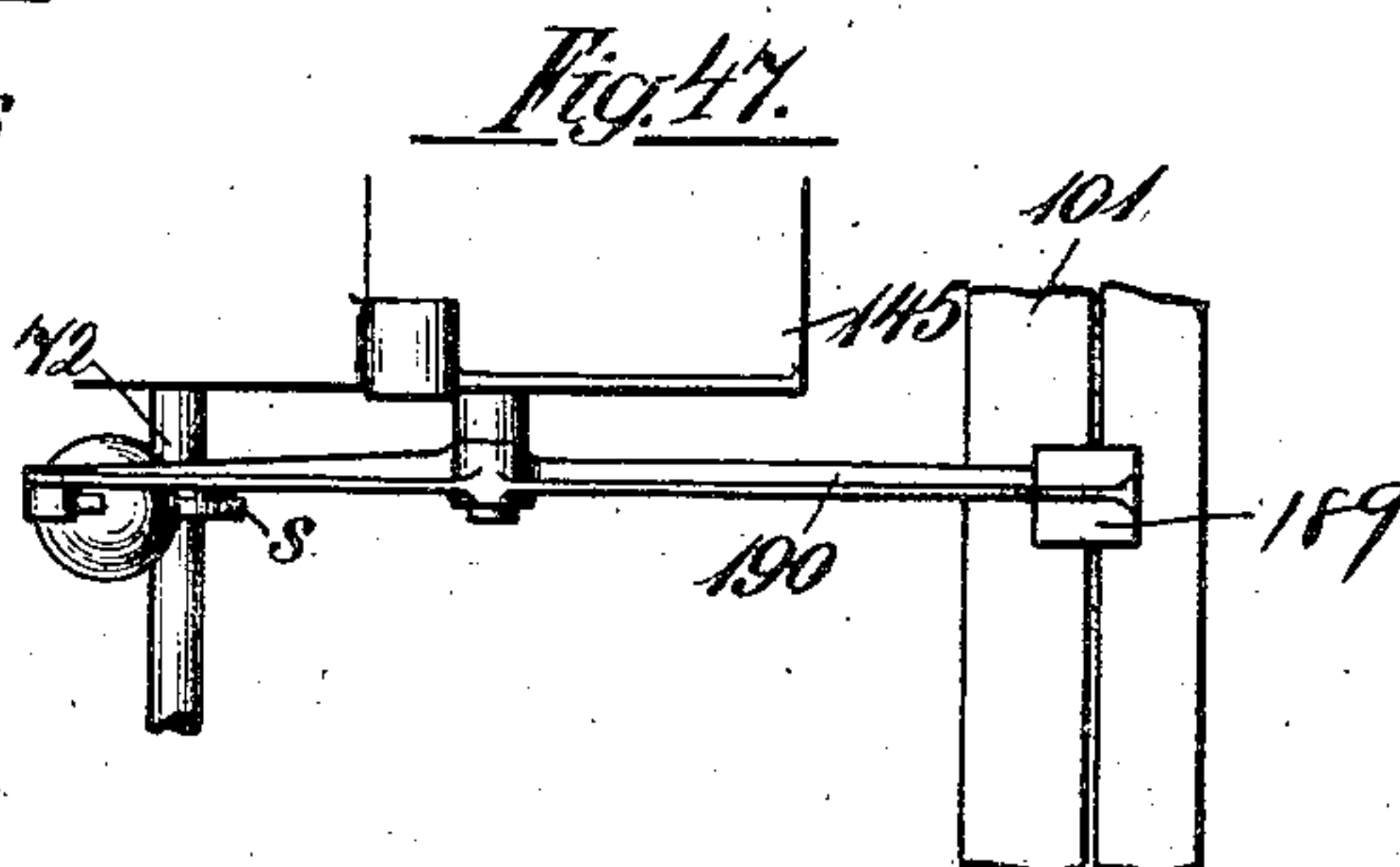
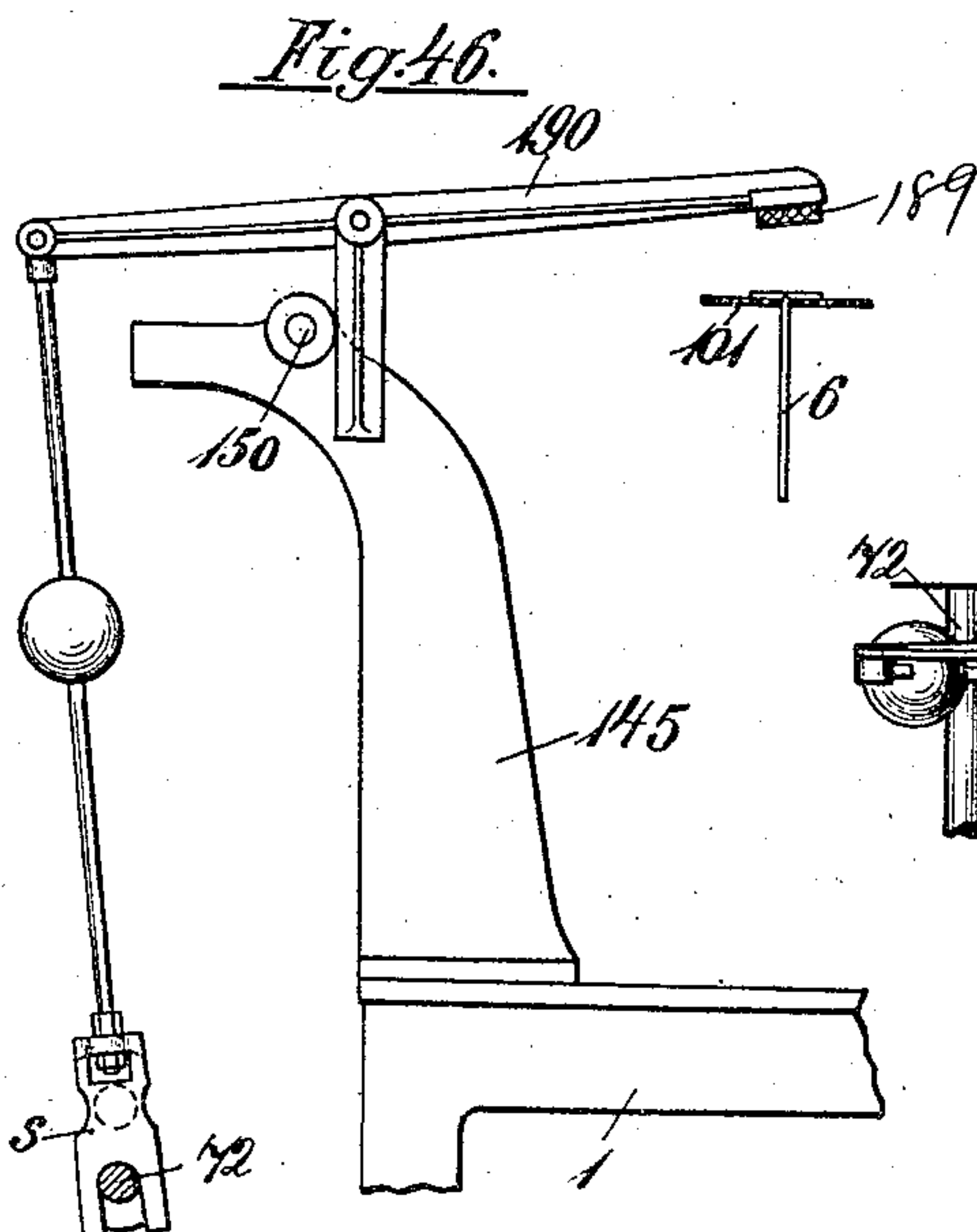
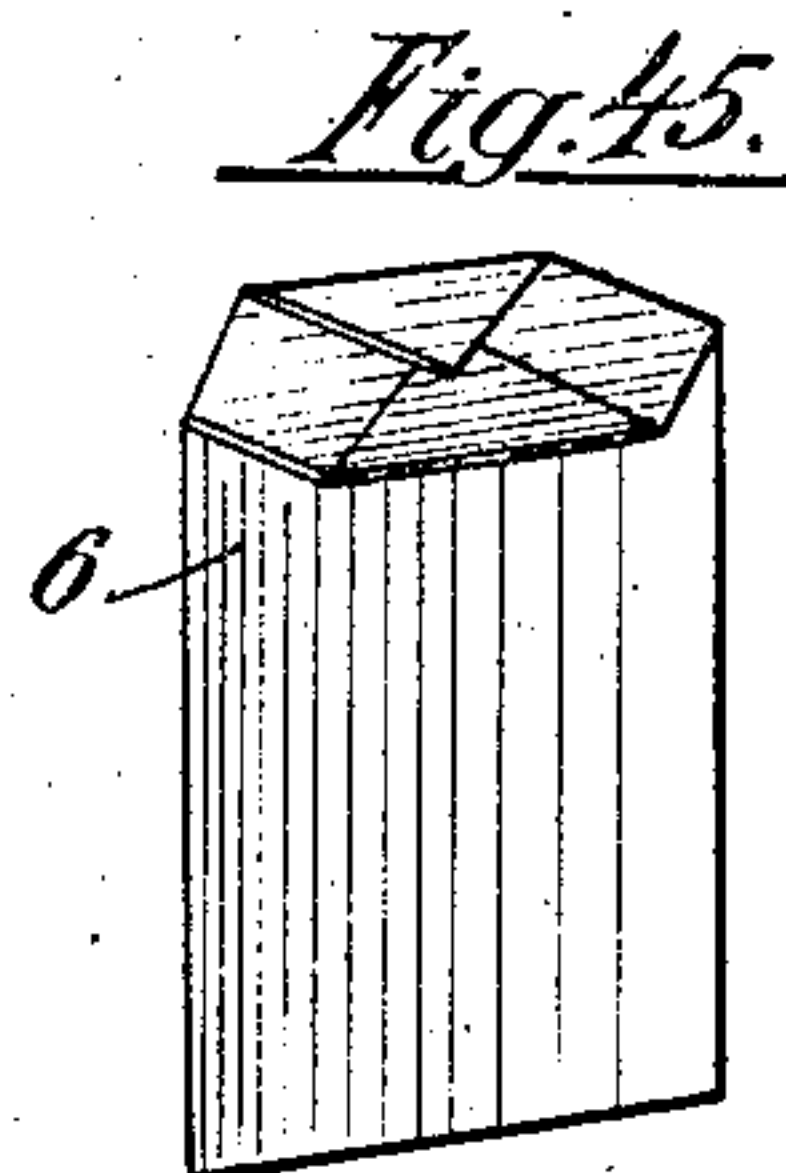
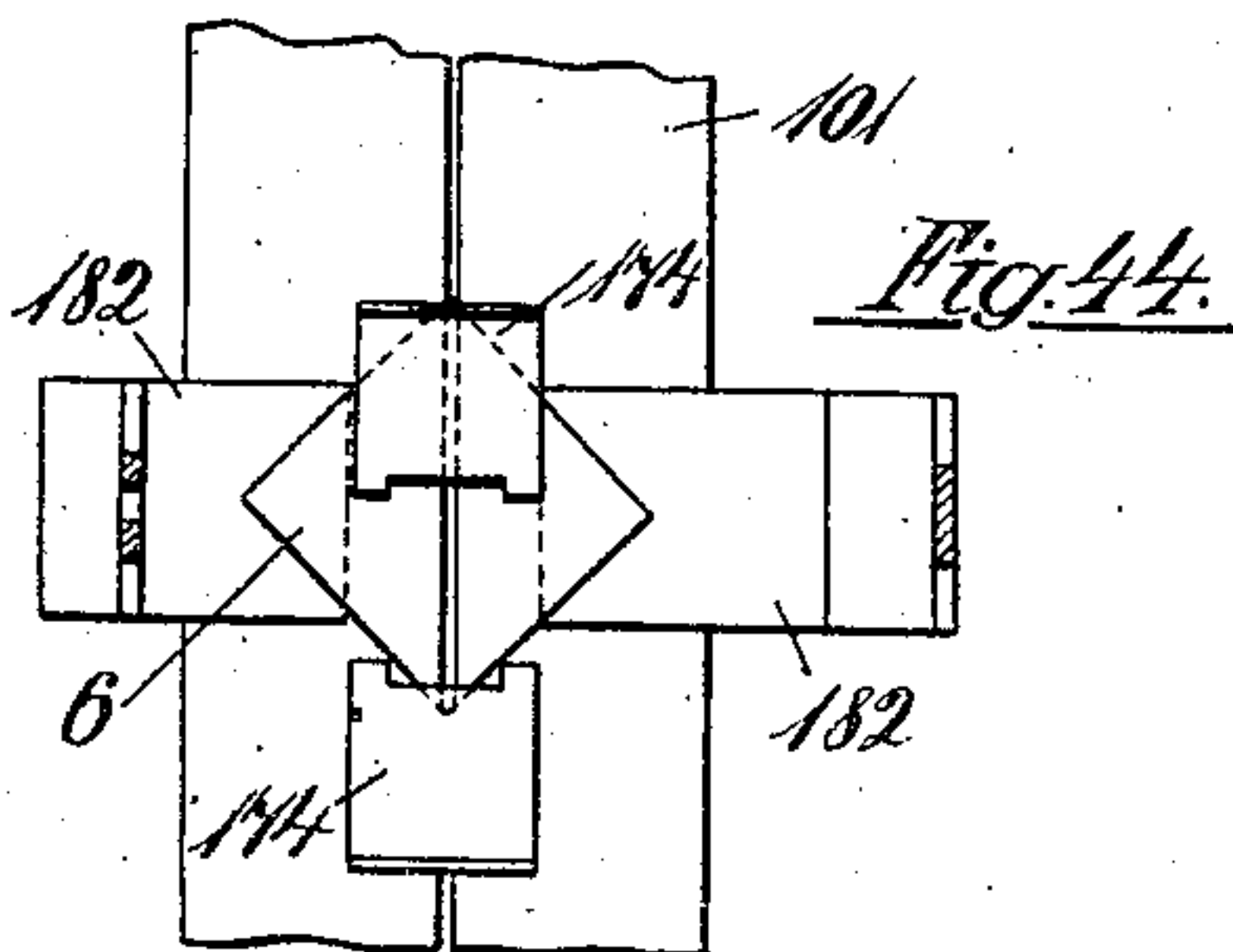
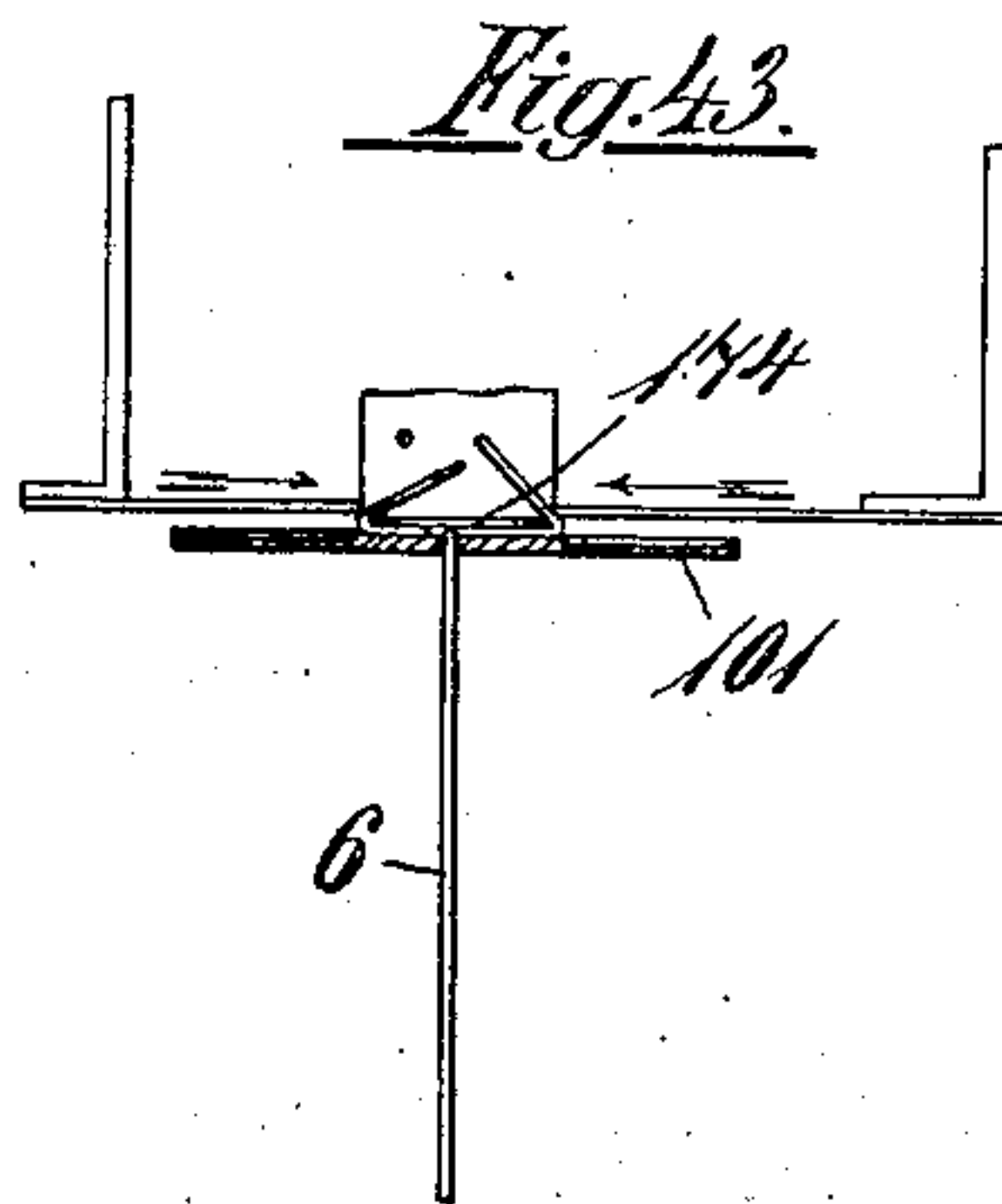
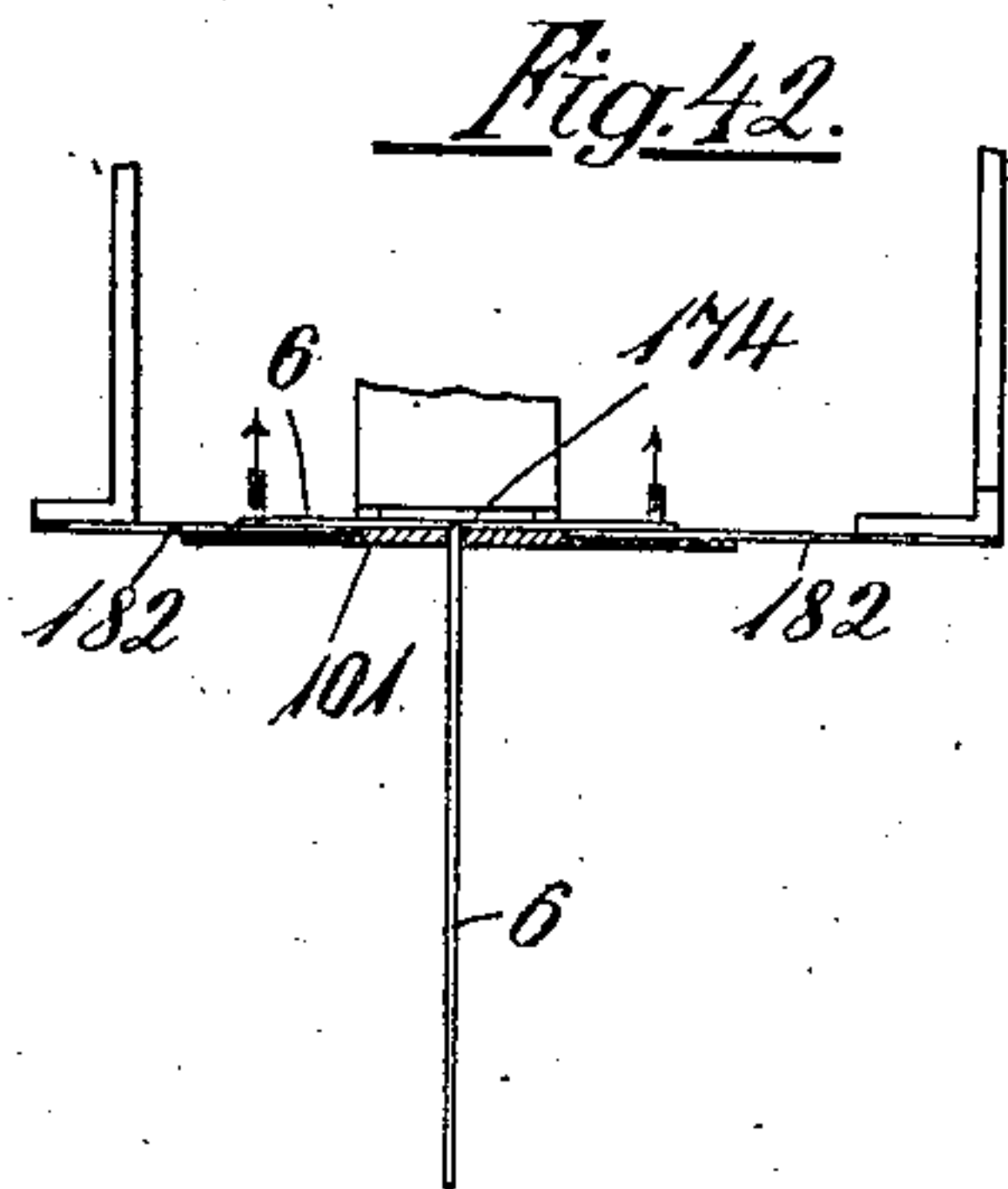
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 8.



Witness
Wm. J. Whalley
Albert Atkins

Inventor
Otto Hesser
by Stuart & Shulby
Attorneys

No. 875,526.

O. HESSER.

PATENTED DEC. 31, 1907.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 9.

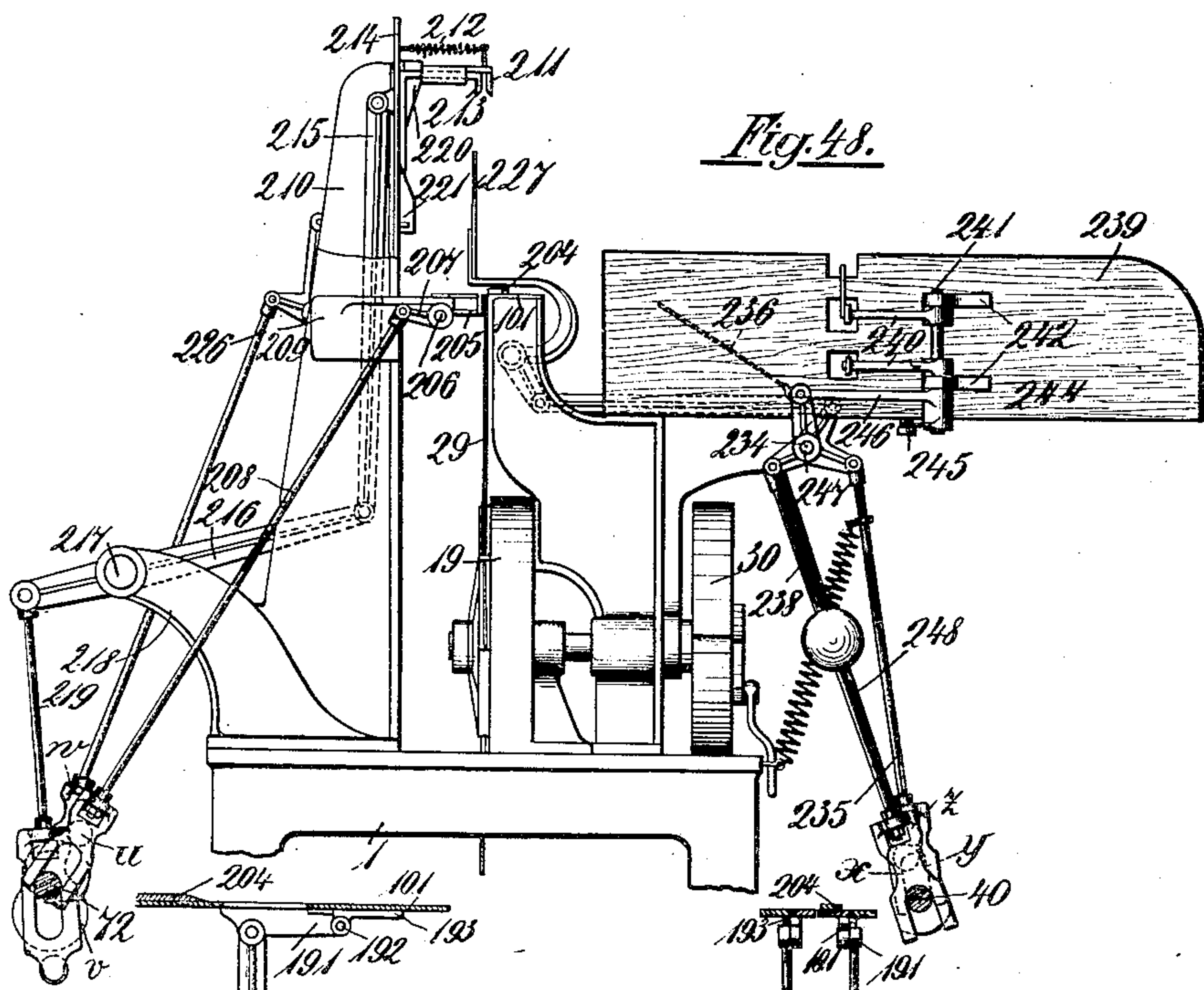


Fig. 48.

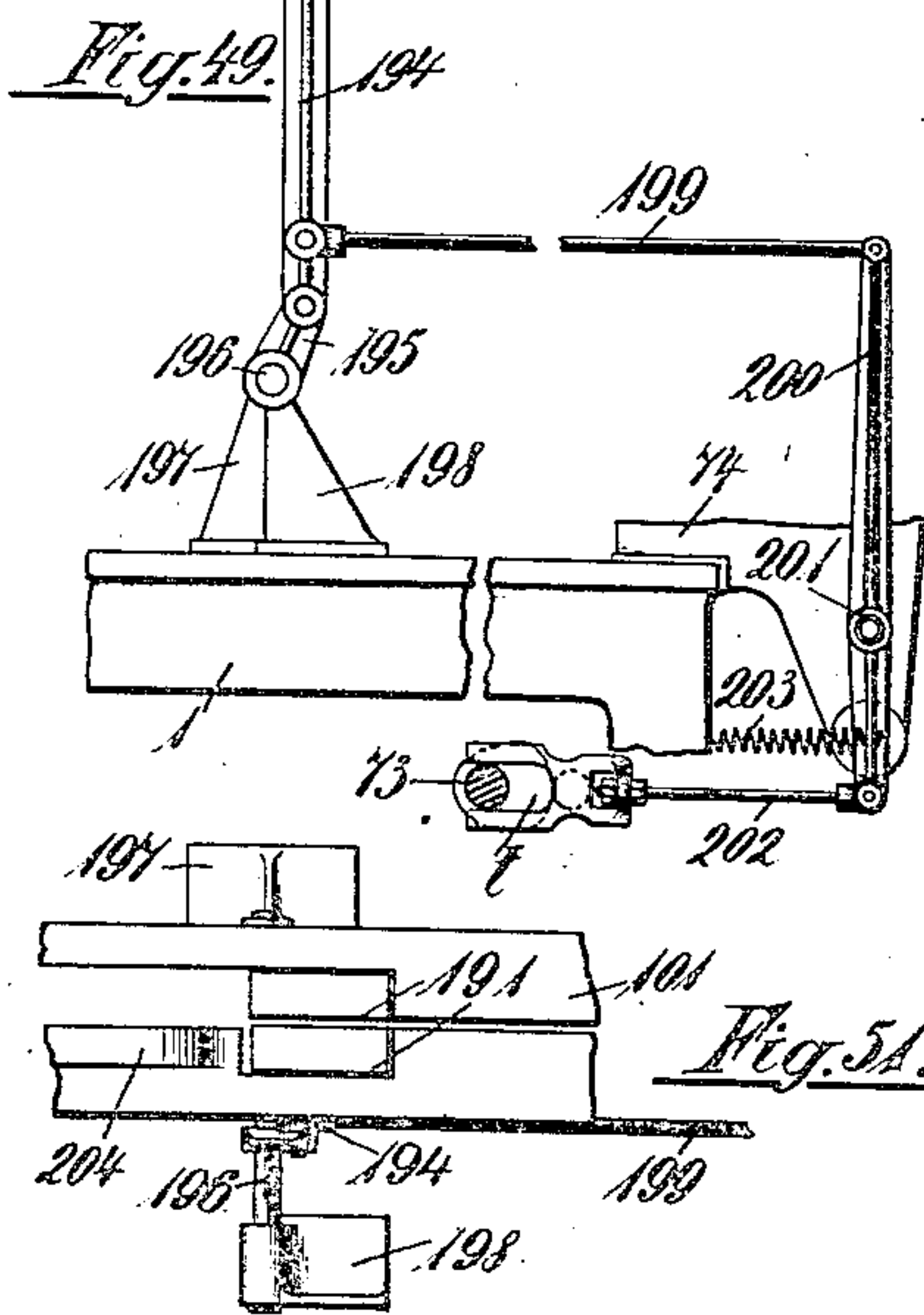


Fig. 49.

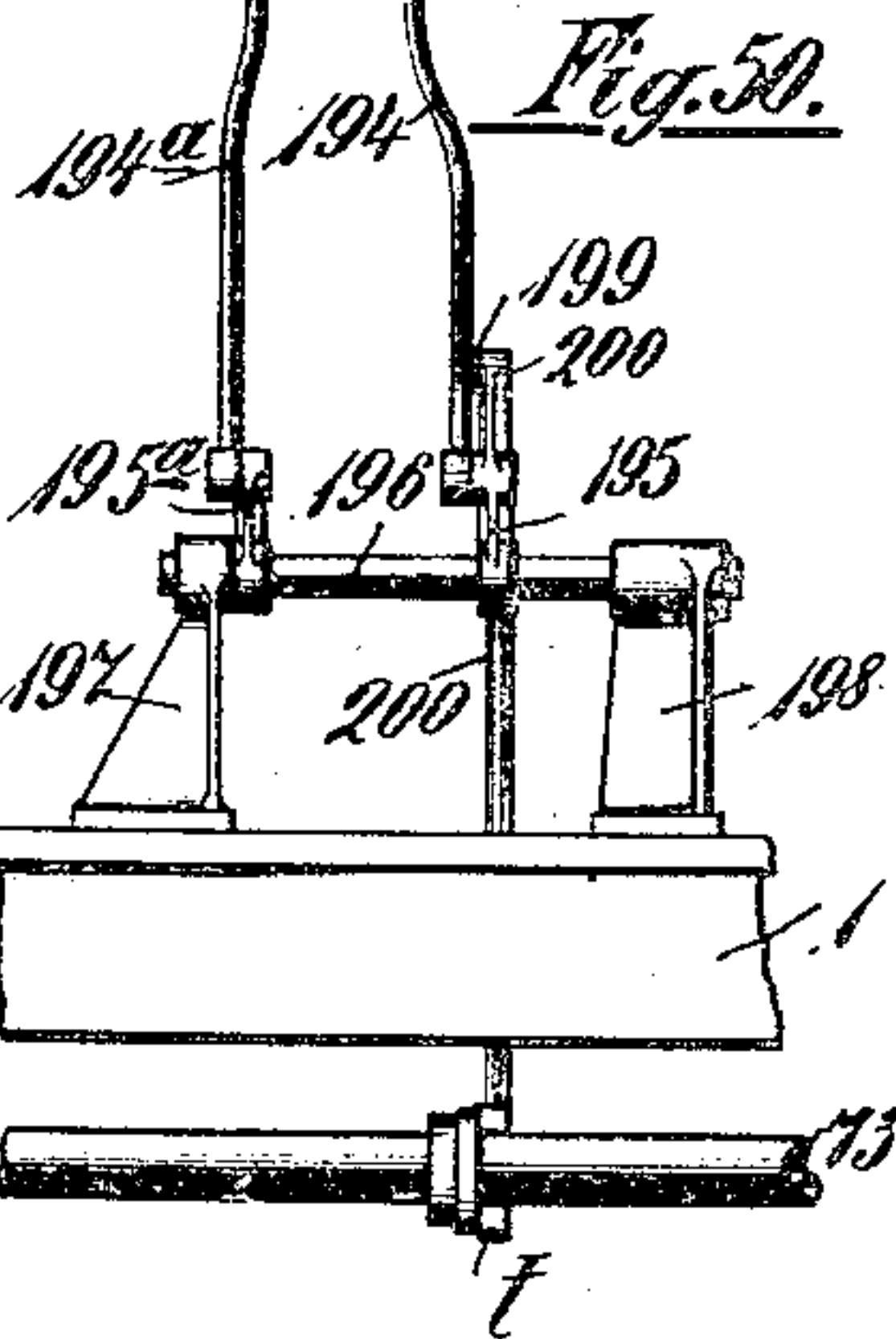


Fig. 50.

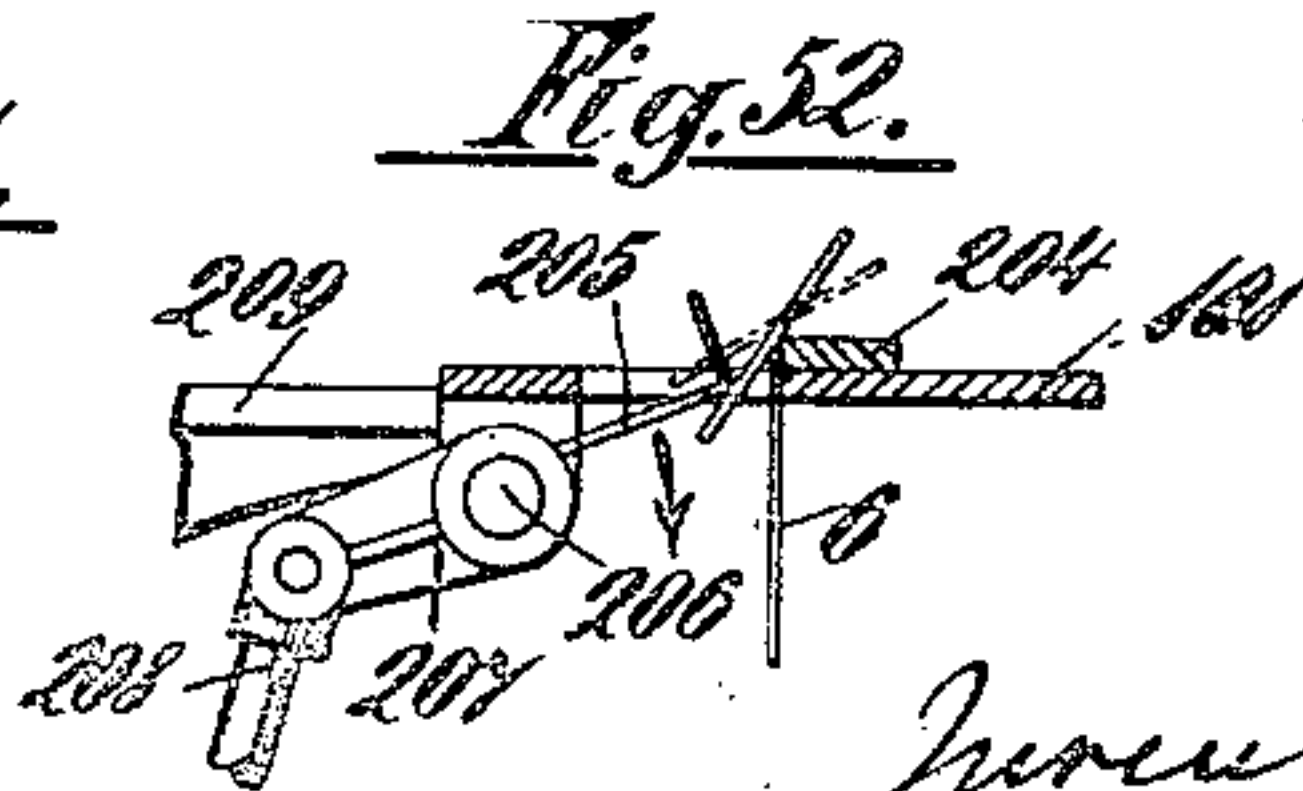


Fig. 52.

Witness
Wm J. Whalley.
Albert Hopkins

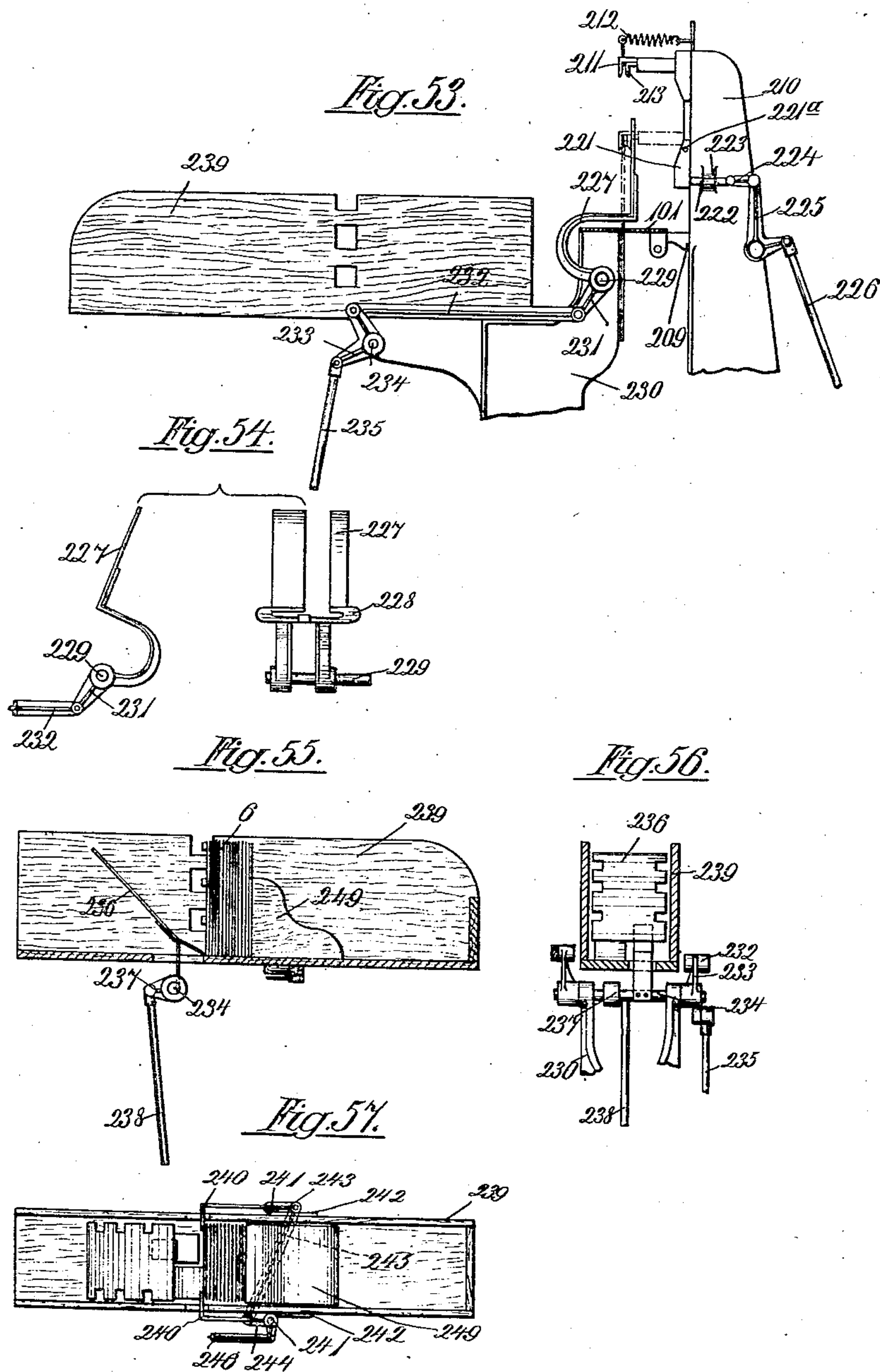
207
Inventor
Otto. Hesse
by Stuart & Hume
Attorneys

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 10.



Witness
 Wm. J. Whalley
 Albert Hopkins

Inventor
 Otto Hesser
 by Stewart & Hensley
 Attorneys

No. 875,526.

O. HESSER.

PATENTED DEC. 31, 1907.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 11.

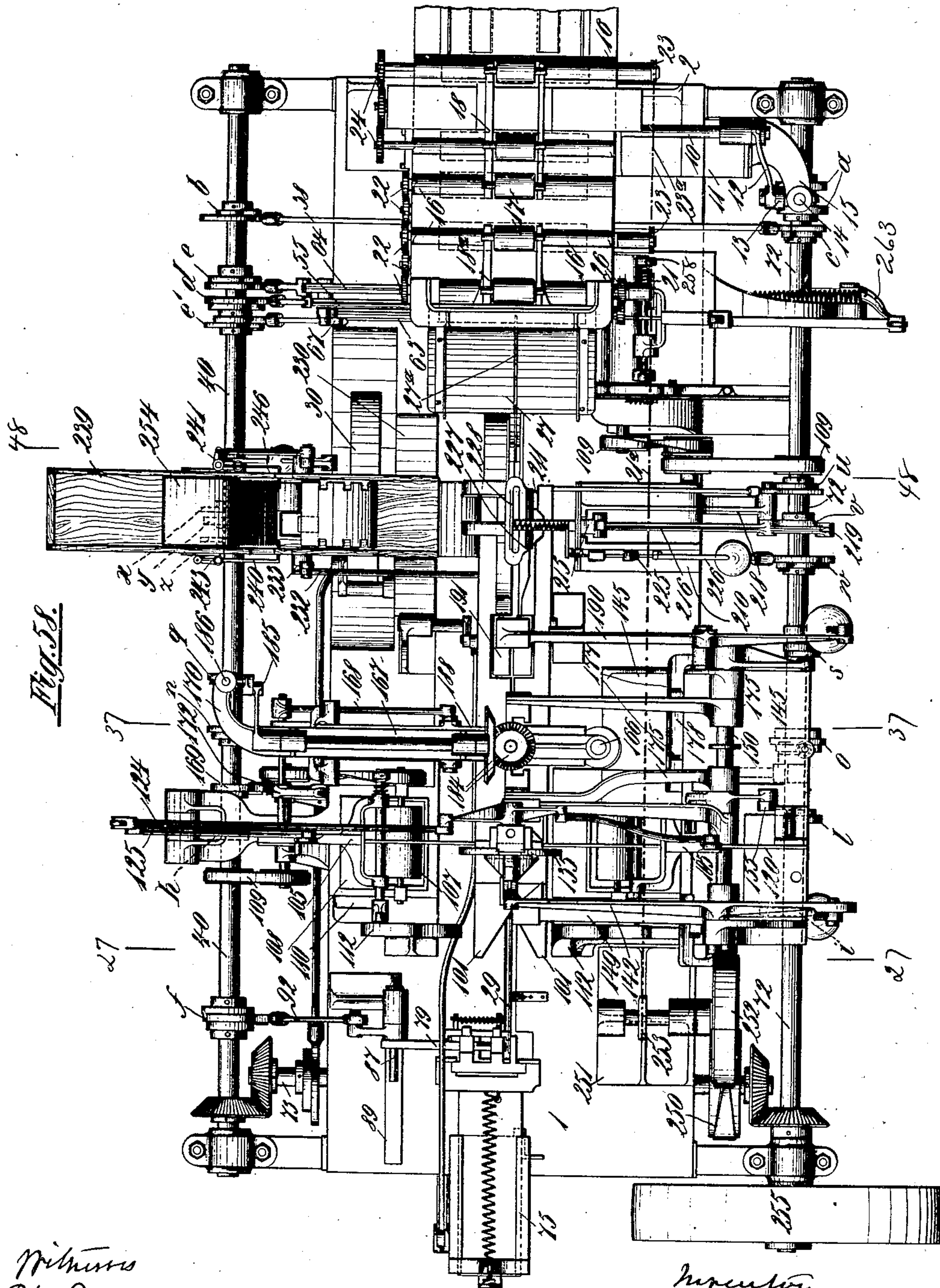


Fig. 58.

Witness
Wm. J. Whalley.
Albert Poplins

Inventor
Otto Hesser
by Sturtevant & Bailey
Attorneys

No. 875,526.

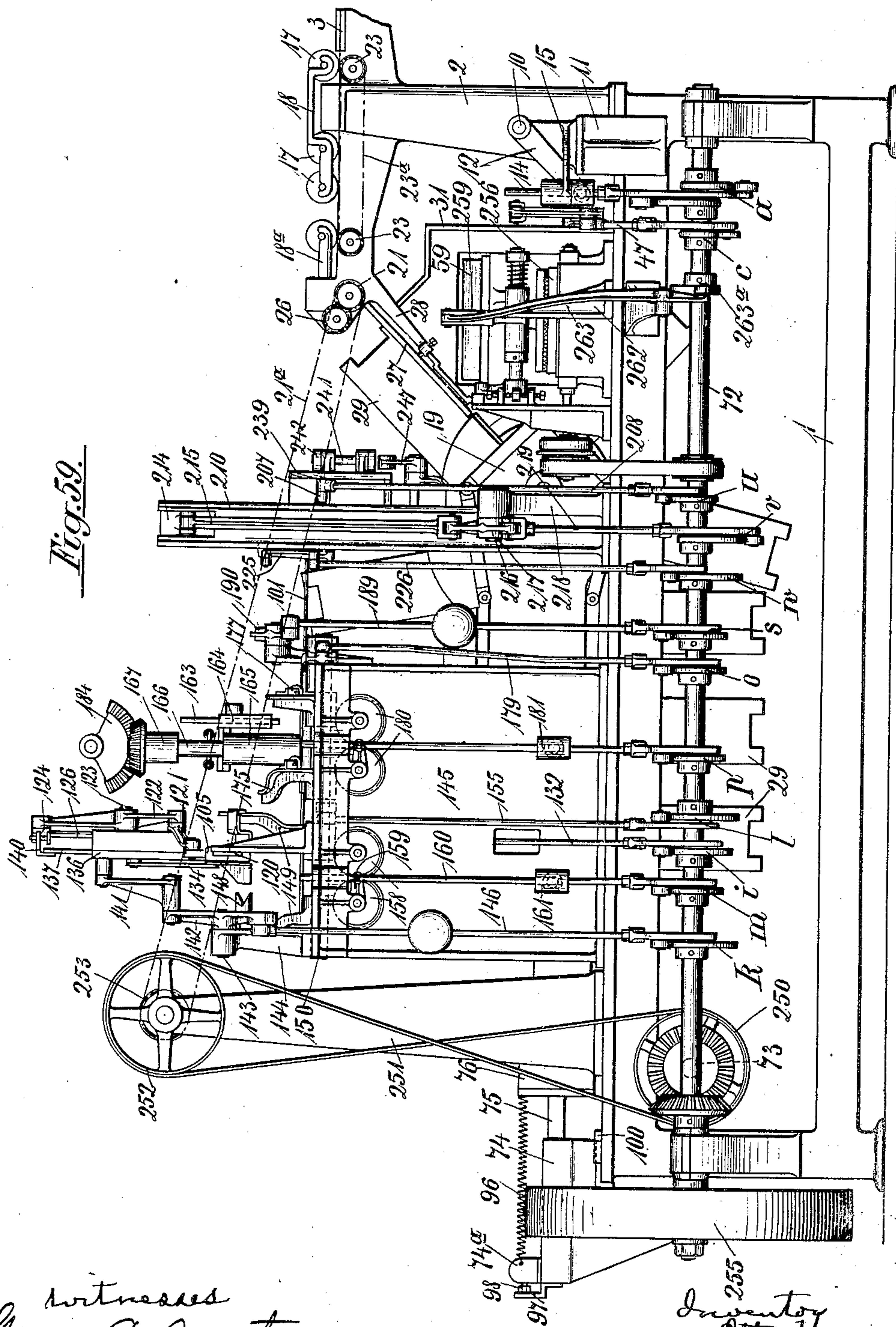
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 12.



witnesses
Grace O. Perretton.
Albert Perkins

Inventor
Otto Hesser
By
Shurtzant & Greeley
Attorneys

No. 875,526.

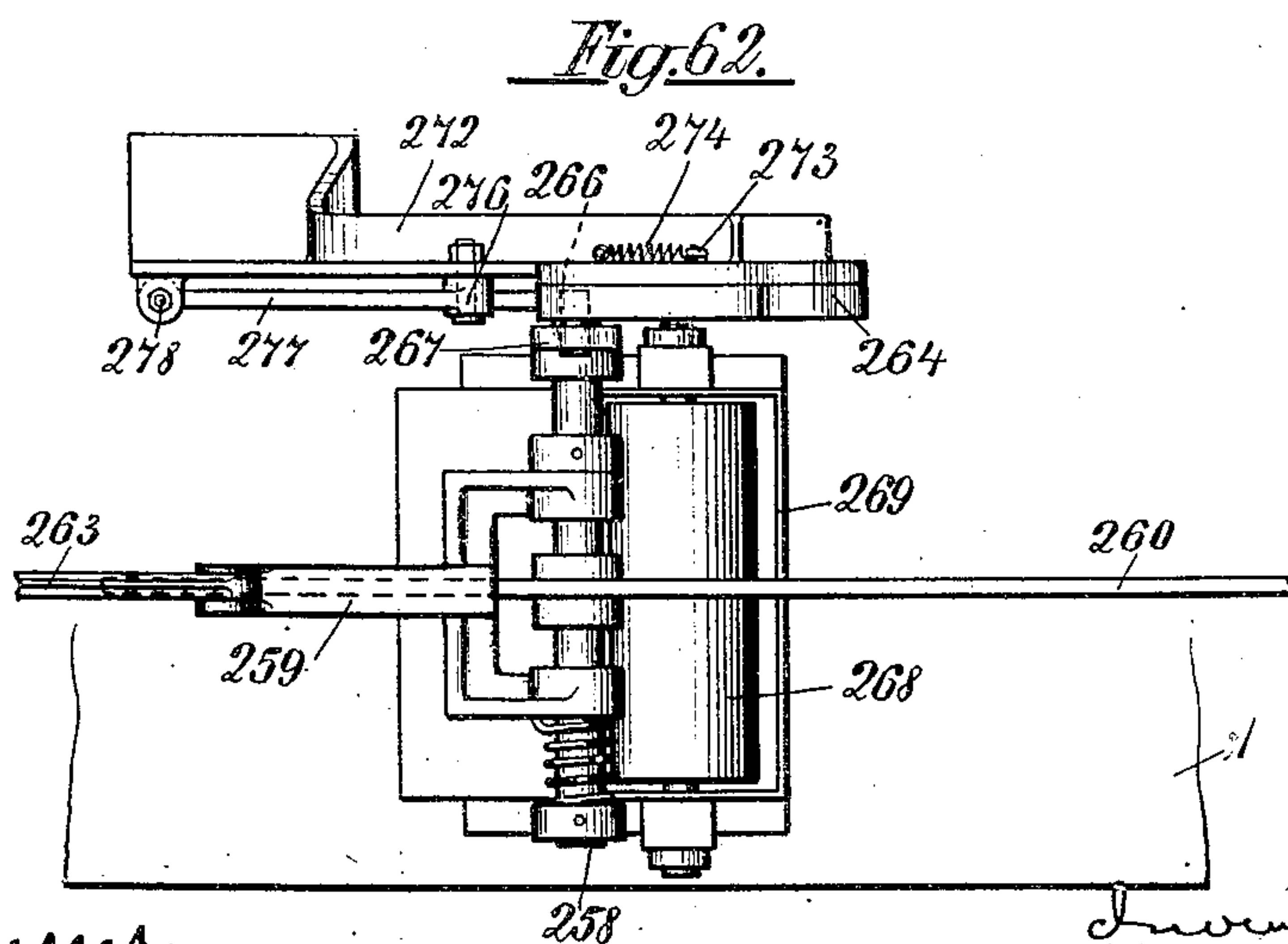
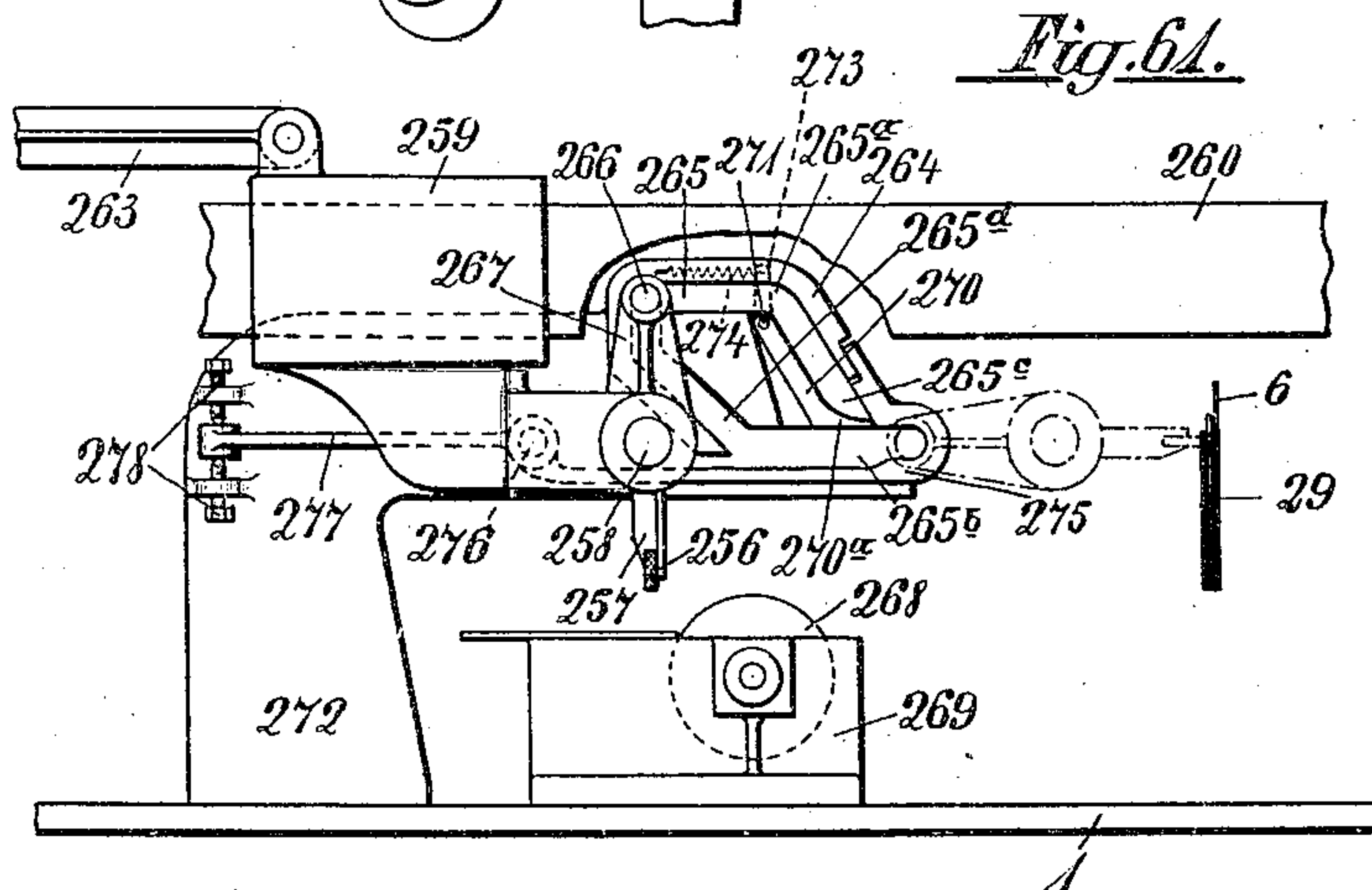
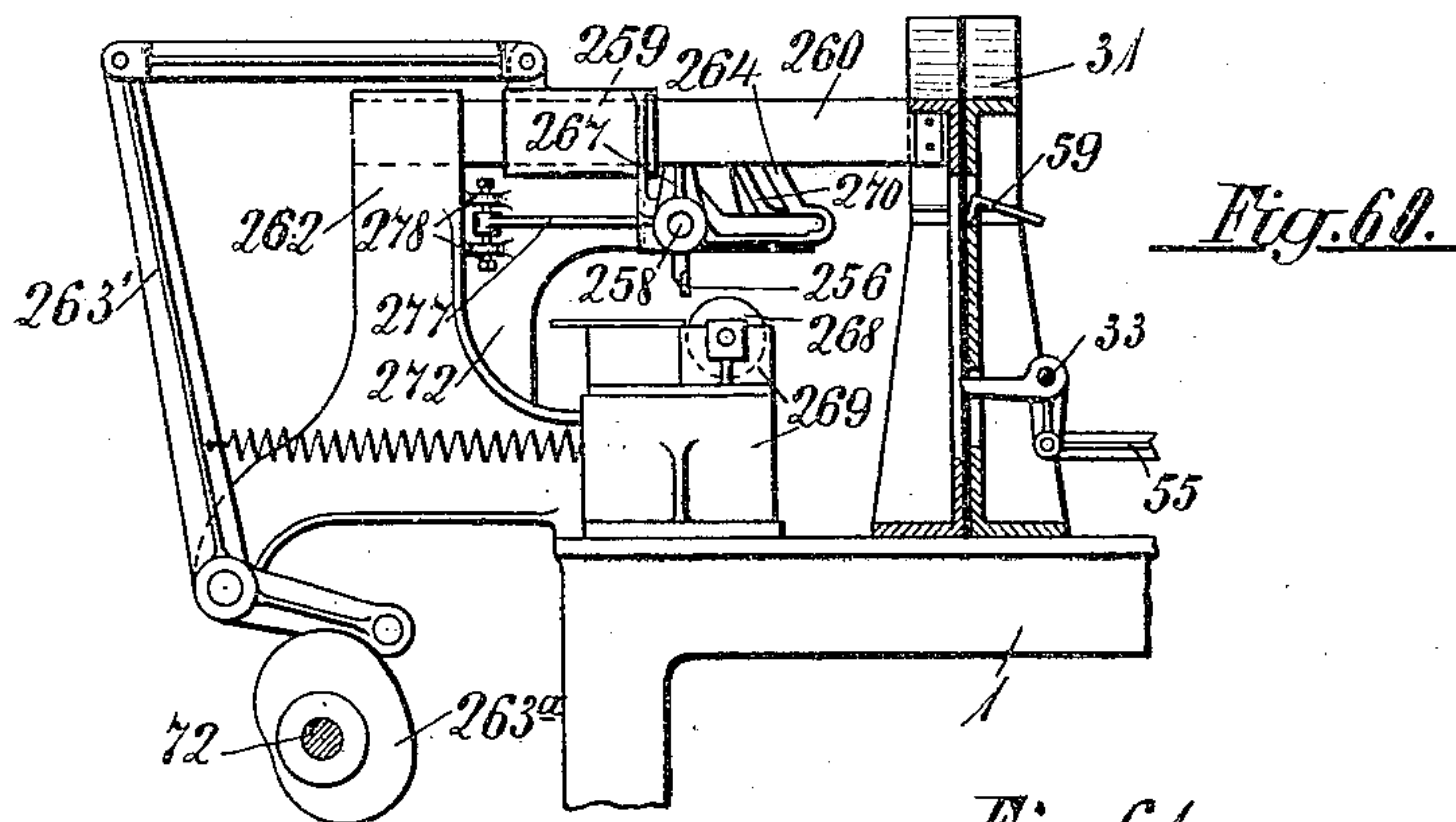
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 13.



Witnesses
Grace P. Brexton
Albert P. Plins

Inventor
Otto Hesser
By
Shurtwant & Greeley
Attorneys

No. 875,526.

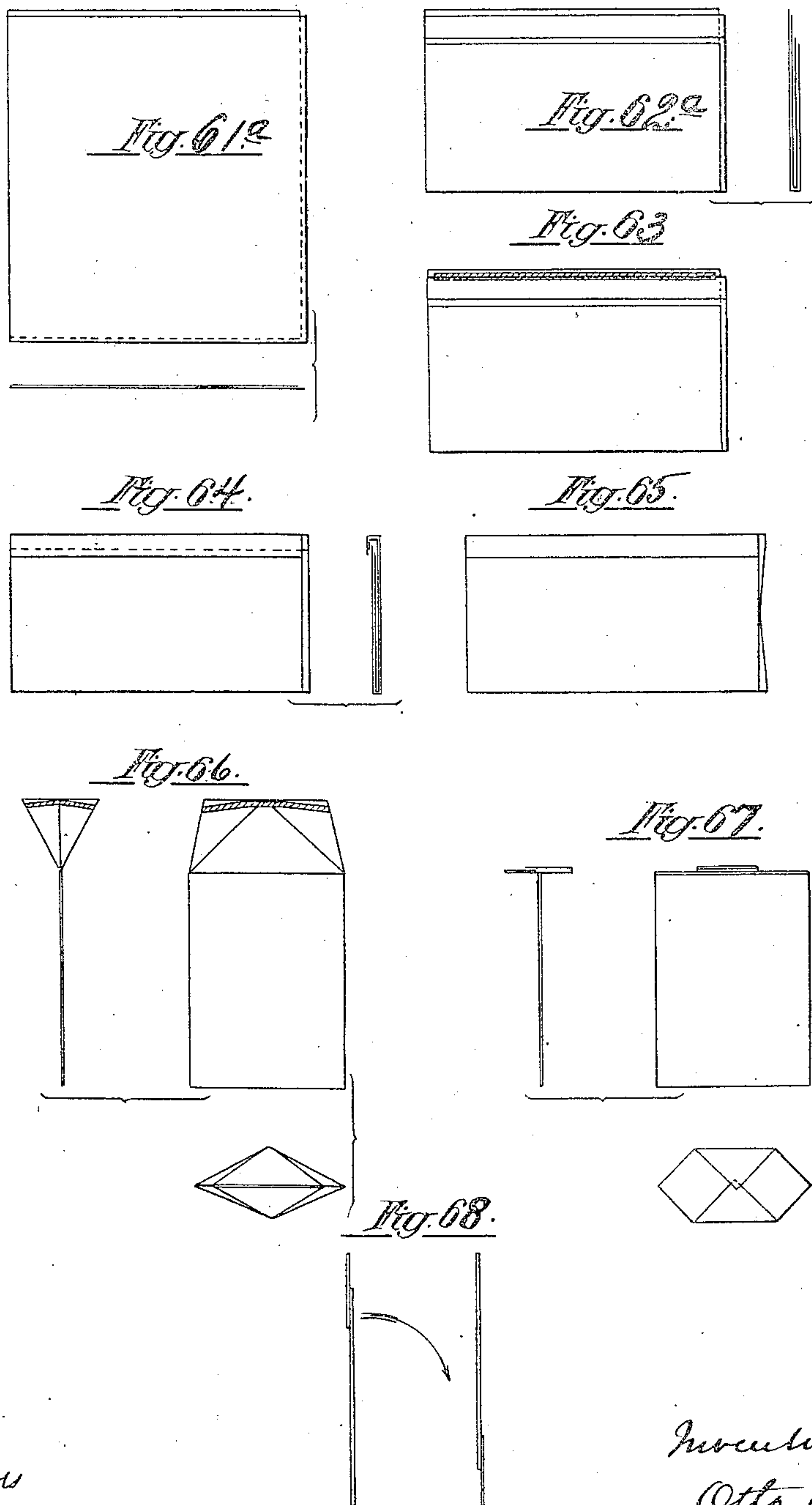
PATENTED DEC. 31, 1907.

O. HESSER.

APPARATUS FOR MAKING PAPER BAGS.

APPLICATION FILED MAY 9, 1905.

14 SHEETS—SHEET 14.



Witness
Wm. J. Whalley.
Albert Hopkins

Inventor
Otto Hesser
by Stuart & Son
Attorneys

UNITED STATES PATENT OFFICE.

OTTO HESSER, OF CANNSTATT, GERMANY.

APPARATUS FOR MAKING PAPER BAGS.

No. 875,526.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed May 9, 1905. Serial No. 259,535.

To all whom it may concern:

Be it known that I, OTTO HESSER, a citizen of the German Empire, residing at Cannstatt, Kingdom of Württemberg, Empire of Germany, have invented certain new and useful Improvements in Apparatus for Making Paper Bags; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine for making lined and single paper bags with crosswise folded hexagon bottom, so-called cross bottom, of square and oblong form. The sheets employed in making lined paper bags are by their treatment on one side caused to adhere one to the other in the ordinary way, and then these two combined sides lie in the finished paper bag at the opening of the same in order that in filling no material can come between the two papers.

Instead of double sheets of course single sheets might equally well be employed, which, however, are preferably not inserted by hand but automatically conveyed to the machine by means of any of the known automatically working devices.

In the accompanying drawings, Figure 1 is a central vertical section of the feeding end of the machine, showing principally the mechanism for feeding the sheets to the slotted folding table; Fig. 2 is a plan view of the same; Fig. 3 is a detail section, on an enlarged scale, of a number of the feeding rolls shown in Fig. 1, and illustrating also the deflecting roller and the folding table; Fig. 4 is a transverse sectional view through the primary table, and the paper-feeding carriage; Fig. 5 is a detail view of the mechanism for operating the carriage; Fig. 6 is a side elevation of the parts shown in Fig. 1; Fig. 7 is a detail sectional view of the same on the line 7—7 of Fig. 6; Fig. 8 is an end view, showing principally the mechanism for operating the folding plate stops, the folders and presser; Fig. 9 is a detail view, on an enlarged scale, of one of the folding plates and the tube indenting finger; Fig. 10 is an end view of the same, showing the finger-carrying shaft in section; Fig. 11 is a detail, on a still larger scale, showing the manner in which the paper tube is interlocked with the folding plate; Fig. 12 is a side elevation of the frame guides between which the suc-

cessive folder plates pass; and showing also the pressing and folding means at this point; Fig. 13 is a transverse sectional view of the same on the line 13—13 of Fig. 12; Fig. 14 is a sectional plan view of the mechanism shown in Fig. 12; Fig. 15 is a detail view of the operating mechanism of the folder plate stops; Figs. 16, 17 and 18 illustrate, in detail, successive stages of the folding of the edge of the paper around a folder plate; Fig. 19 is a central vertical section of that end of the machine opposite the portion shown in Fig. 1; Fig. 20 is a plan view of the same; Fig. 21 is an end elevation of the same; Fig. 22 is a detail plan view of the tube-notching or cutting mechanism; Fig. 23 is a transverse section of the machine, principally on the plane indicated by the line 23—23 of Fig. 58; Fig. 24 is a plan view of the mechanism shown in Fig. 23; Fig. 25 is an enlarged detail view of portions of the folding mechanism shown in Fig. 23; Fig. 26 is a vertical sectional view of the same; Fig. 27 is a detail sectional plan view on the line 27—27, of Fig. 23; Fig. 28 is a vertical section of the same on the line 28—28, of Fig. 27; Fig. 29 shows one of the folding members in side and front elevation; Fig. 29^a is a sectional view of the folding member shown in Figs. 28 and 29. Figs. 30 to 30^c illustrate in detail, successive stages of the opening of the end of the tube; Fig. 31 is an elevation of the bottom folder; Fig. 32 is a side view of the same, partly in section; Fig. 33 is a plan view of the bottom folder; Fig. 34 is a front view of the tube holder; Fig. 35 shows one of the folders in detail; Fig. 36 is a detail sectional view, on an enlarged scale, showing the formation of the sharp edge in the bottom fold; Fig. 37 is a transverse sectional view of the machine approximately on the line 37—37 of Fig. 58; Fig. 38 is a plan view, partly in section, showing the folder-actuating eccentric or cam; Fig. 39 is a detail view of the driving connections of the levers 175; Fig. 40 is a detail elevation, looking from the left of Fig. 37; Fig. 41 is a detail plan view of the folders and their carrying levers; Figs. 42 and 43 illustrate the operation of the bottom folders; Fig. 44 is a plan view, showing the operation of these folders; Fig. 45 is a detail perspective view of the bag after the bottom has been folded; Fig. 46 shows the bottom pressing stamp, and its actuating means; Fig. 47 is a plan view of the same; Fig. 48 is a

transverse section of the machine approximately on the line 48—48 of Fig. 58; Fig. 49 is a sectional elevation, showing the sinking plates and their actuating means; Fig. 50 is a side view of the same, partly in section; Fig. 51 is a plan view of the plates, showing their relation to the guides; Fig. 52 is a detail sectional view of the mechanism for turning the bottom of the finished bag; Fig. 53 shows the mechanism for removing the bags from the folder plate and conveying the same to the trough; Fig. 54 shows, in elevation and side view, the bag turning or folding member at the entrance of the trough; Fig. 55 is a sectional elevation of the trough; Fig. 56 is a transverse sectional view of the same; Fig. 57 is a plan view of the same; Fig. 58 is a plan view of the entire machine; Fig. 59 is a side elevation of the machine. Fig. 60 is an end view of the apparatus for applying the paste in making a tube, parts being shown in section. Fig. 61 is an end view of a portion of the mechanism on an enlarged scale. Figs. 61^a, 62^a and 63 to 68, are diagrams illustrating the different steps of manufacture.

The frame 2 of a device which feeds a sheet of paper 6 to the conveyer mechanism 19, is arranged on the machine frame 1. It carries a table 3 in which a paper carriage 4 travels (Figs. 1, 2 and 4), which is moved by a double cam *a* mounted on the front driving shaft 72. For this object projections 7 are provided on the under side of the carriage 4 and to these projections a link 8 attached, which is moved by a lever 9 (Fig. 1). This lever is mounted on a rock shaft 10 having bearings 11 in the frame 2.

The transmission of the movement of the cam or eccentric *a* to the shaft 10 is effected by means of rod 14 mounted in the guide 15 of the bearing 11, which rod is connected by a link 13 with a lever 12 mounted on the shaft 10. On the movement of the shaft, the paper carriage 4 is reciprocated and catches 5 provided thereon convey, in the forward movement, the double sheet 6 of paper laid by hand from the starting point on the table 3.

The forward movement of the paper carriage 4 is calculated in such a way that after its completion, the sheet 6 comes with its front end, that is to say with the two edges which are stuck together, between two superimposed conveying rollers 16 and 17 which serve for moving it forward. For this object a number of similar pairs of rollers 16 and 17 are arranged, the under ones 16 of which are revolvably mounted in the frame 2 and constantly rotate, while the upper ones 17 are elastically mounted in the bearings 18 and 18^a, and lift on the passage of the sheet of paper 6. The conveying rollers 16 are operated from the driving gear of the machine by a belt pulley 250 mounted on a transverse

shaft 73, by means of a belt pulley 252 mounted in a frame 251, on the shaft of which latter belt pulley, a chain wheel 253 is arranged, which in turn operates by means of a chain 21^a a chain wheel 21 mounted on the shaft of the final conveying roller 16^a.

By means of the intermeshing toothed wheels 22, chain wheels 23, and their chain 23^a and also the toothed wheels 24, the various conveyer rollers 16 are operated so that the sheet 6 passes from one pair of rollers 16, 17 to the other, intermediate plates 20 being provided which conduct the sheet 6 from one roller to another. In order to guide the sheet 6 on the inclined folding plate 27, a roller 25 (Fig. 3) is provided which is driven from the conveying roller 16^a by means of the toothed wheel 26. The roller 25 is provided with a rough surface, for instance emery paper, and so arranged that the front end of the arriving sheet 6 is deflected downwards and thus reaches the inclined folding plate 27, that is to say comes to a third stage of treatment. The plate 27 hangs loosely on the shaft of the conveying roller 16^a, and rests on a set screw 28^a arranged in the arms 28 of the frame 2, the screw serving also as a means for adjusting the angular position of the plate.

In order to form the sheet which has reached the folding table 27, it is conveyed further by a conveyer mechanism 19 from stage to stage. The conveying mechanism in the present machine consists of an endless chain on the links of which folding plates or folders 29 are arranged and which is moved forward periodically by means of a ratchet mechanism, the paper sheet 6 being carried along by these folders 29 and remaining thereon until completely converted into a finished paper bag. The conveying mechanism 19 and also its ratchet mechanism are both well-known and therefore need not be further explained. A slot 27^a is provided in the folding table 27 for the passage of the folder plate 29 (Fig. 2). The sheet 6 lying on the folding table 27, on the folder passing the slot, is drawn through this slot 27^a and thereby folded longitudinally (Fig. 63). The folder plate 29 in question then passes between two guide frames 31 which are provided with suitable recesses for the parts here working (Figs. 12 to 15) and its sheet 6 lies on two stops 32, so that the position of all the folder plates 29 at this station is exactly the same and the gum is always applied on the correct spot. These two stops 32 are carried on a rock shaft 33 mounted in the rear guide frame 31, which shaft by means of a toothed wheel 34 and a sector 35 revolvable on the pin 36 with an arm 37, and also an eccentric rod 38, is so turned by the cam *b* (Fig. 58) that the stops 32 assume their stopping position shortly before the movement is ended, a spring 39 drawing them out of the way of the folder plate 29 im-

mediately before the latter is moved forward (Figs. 8 and 18). Simultaneously with the stops 32, a pin 71, mounted on the same shaft 33, is turned against the approaching folder plate 29 and now impresses a dent in the paper 6, the paper being pressed into a recess 70, provided in the plate, which thus prevents the paper tube slipping off the folder plate 29 when the latter is directed downwards.

As soon as the folder plate 29 rests with its longitudinally folded sheet 6 on the stops 32, they are both pressed by a plate 41, mounted on the revoluble shaft 42, against the wall of the rear guide frame 31, the turning of the shaft 42 being accomplished by means of a lever 43 mounted thereon, which is connected by a link 44 with an elbow lever 45 mounted on the bolt 46, which lever is operated by means of a cam rod 47 from a cam *c* and stands under the action of a spring 48 (Fig. 8). Before the folder plate is again moved forward, the plate 41 is turned somewhat back and the tube 6 released.

The folding over (Fig. 65) of the part of the sheet 6 which stands up above the folder plate 29 is effected by a folder 59, which is mounted on an arm 60 mounted on the shaft 61. The folder 59 executes a double movement in order to fold over the sheet 6, first a turning on the shaft 61 and then a horizontal movement. The turning is effected by means of a lever 67 acted on by a spring 69, which lever is mounted on a shaft 61 and moved by means of an eccentric rod 68 from an eccentric or cam *e'*. In the horizontal movement of the folder 59 a carriage 62 carrying the shaft 61 travels on a fixed guide bar 63 mounted on the rear guide frame 31 and the bearing 63^a, and is moved by a link 64 and elbow lever 65 pivoting on the shaft 57 by means of an eccentric rod 66 from an eccentric *e*. All these devices are well known in themselves, but an improvement is the arrangement of a slide 49 (Figs. 12-14) which prevents the bending up of the upper edge of the part, which is to be overlapped, of the sheet 6. The slide 49 lies in the plane of the pressing on plate 41 and is fastened with a projection 49^a to a vertical carriage 50 which travels in guides 53 on the plate 41 and is pushed upwards by a lever 54 loosely mounted on the shaft 33 (Figs. 12 to 14). This lever is an elbow lever and is moved by a link 55, and also an elbow lever 56 pivotally mounted on the shaft 57 by means of an eccentric rod 58 from an eccentric or cam *d*. The slide 49, shortly before the commencement of the movement of the folder 59, is pushed up to the level of the folder plate 29 and thereby covers the upper edge of the tube 6, so that it cannot be bent back when being overlapped. Shortly before the completion of the folding, the slide 49 is drawn back again by means of a spring 51, so that the

folding down may take place unimpededly and correctly, whereby the paper tube is finished.

Before the folding down, gum is applied to the uppermost edge of the sheet 6 (Fig. 64). This may be done in any suitable way, for instance, in a similar manner to that hereinafter explained at station VI, and the mechanism employed is preferably of the character shown in Figs. 60, 61 and 62, in which the pasting stamp 256 is carried by an arm 257 which is mounted on the shaft 258, which is pivotally mounted in the carriage 259. The carriage travels on a guide bar 260 which is fixed on the standards 31 mounted on the machine table 1. The carriage is moved to and fro by means of a link 263 and lever 263' which receives its motion from an eccentric 263^a on the driving shaft 72.

The turning of the shaft 258 when the pasting stamp moves forward and backward is accomplished by means of a grooved plate 264, in which a groove 265 of approximately parallelogrammatic form is cut. In this groove 265 fits a pin 266 which is carried by a crank 267 mounted on the shaft 258, so that the stamp 256 and stamp carrying arm 257 and crank 267 form to a certain extent a two-armed lever the axis of rotation 258 of which is moved horizontally, and which itself is caused to turn by means of the pin 266 traveling in the groove 265. The groove 265 consists of horizontal parts 265^a and 265^b and also of inclined parts 265^c and 265^d, of which the latter operate to rock the stamp 256.

So long as the pin 266 travels in the upper horizontal part 265^a of the groove, the stamp 256 moves forwards uniformly with the carriage 259 without altering its horizontal position. During this movement the elastic stamp 256 takes up paste, preferably from a paste roller 268 revolving in the paste containing vessel 269, over which roller the stamp 256 rubs. The pin 266, on the further movement of the carriage 256, comes into the inclined part 265^c of the groove 265 and enters on a downward movement, during which the axis of rotation 258 of the stamp always moves forward uniformly and horizontally.

By the time the pin 266 has reached the lower horizontal part 265^b of the groove 265, the stamp 256 has rotated through 90°, so that it stands horizontally. In this position the paste is applied to the sheet of paper 6 standing on the folding plate 29.

Preferably when the stamp 256 is pressed on the sheet of paper the shaft 258, which serves as a support or counter holder for the stamp, is at the same height as the stamp 256.

Now in order to prevent the pin 266, in its then succeeding return movement, from

reëntering the portion 265^c of the groove, a tongue 270 is provided in the part 265^c of the groove, which tongue forms the inner wall of the part 256^c of the groove, and which tongue is mounted on a pin 271 which is pivotally mounted in the guide bearing 264. A lever 273 which is under the action of a spring 274 is mounted on the pin 271 and presses the bent tongue 270 against the opposite cheek of the part 265^c of the groove. The flap 273^a of the tongue 270 is pressed aside on the passage of the pin 266 through the part 265^c of the groove. The tongue 270 returns however immediately afterwards into its former position in which it closes the branch 265^c of the groove, so that on the return of the stamp the pin 266 is forced to return to the horizontal part 265^b of the groove. The stamp 256 thus remains in a horizontal position until it has passed the paste roller 268, after which the pin 266 enters a groove 265^d which is first oblique and then runs vertically, by means of which groove the stamp 256 again reaches its initial vertical position.

For various sizes of bags the place at which the paste is applied to the sheet varies, although only slightly, and the pasting stamp 256 must accordingly be adjustable in its height when applying the paste. For this purpose the lower wall 275 of the part 265^b of the groove, together with the point of the groove at which the pin 266 is located when the paste is applied, is displaceable. This is attained by the wall 275 being formed as a double armed lever. It is pivotal on a bolt 276, while its free end 277 lies between set screws 278 which are arranged in eyelets of the frame 272. The front end of the grooved plate 264 may thus be further moved upwards or downwards by adjusting the screws 278.

On the next forward movement of the conveyor chain 19, the tube 6 comes to next station (Figs. 19 to 22). Here a narrow piece is punched out (Fig. 63) of the outer end of the paper tube 6, as it is well-known is necessary in making paper bags with square bottoms. For this object, the tube 6 passes between a knife or punch 79 and its die 79^a (Fig. 22), so that when the punch 79 is projected, a suitable piece is punched out of the tube 6. The punch 79 is carried in projection 78 of a vertically movable carriage 76 and its projecting end slides on a bar 89. In order to move the punch 79, a vertical slot is provided in this end, in which slot a pin 87 engages, by the help of which the movement takes place. The pin 87 is mounted on one arm of an elbow lever 88 which turns on the pivot 90 of a bearing 91. The other arm of the lever is connected with an eccentric rod 92 which is operated from a double cam *f* mounted on the rear driving shaft 40.

As in a machine according to the present invention, paper bags of various widths may be made, for which of course folder plates 29 of varying width are necessary, the carriage 76 carrying the punch 79 is vertically adjustable so that the cutting operation may always be at the middle of the width of the paper tube. For this object the vertical carriage 76 movable in the guides 77 of a horizontal carriage 75 has at various heights a number of perforations 98' (Fig. 19), in which, according to requirements, an adjusting pin 99 is inserted which holds the carriage at the desired height (Fig. 19). The entire punching apparatus may also be easily changed, in the case of extra large sized paper bags, by drawing out the carriage 76. At this station the tube 6 is also drawn out to the extent necessary for forming the bottom. This is done by its being clamped on the die 79^a, and the latter then drawn back with the horizontal carriage 75. This retention of the tube is accomplished by means of a slide 81, which also sliding in the projections 78, effects the retention by a foot 85, which is pressed by a spring 83 against the die 79^a, on the punch 79 being sufficiently moved forward. On the return of the punch 79, a projection 80 thereon engages behind a projection 84 of the carriage 81 and draws this latter back (Fig. 22), so that the paper tube 6 is released, whereby it may be further conveyed to the next station. The drawing back of the horizontal carriage 75, together with the depending vertical carriage 76, punch 79 and tube 6, which horizontal carriage slides in the bearings 74, is effected by means of a spring 96 one end of which is attached to the carriage 75 and the other to the fixed yoke 74^a of the bearing 74. This spring is stretched when the carriage 75 is pushed in, which is done by means of an elbow lever 93 pivotally mounted on the pin 94 of the carriage bearing 74, and a rod 95 operated by a cam *g*. This movement may be regulated by a stop 97 fixed on the carriage 75, which stop a set screw 98 on the bearing 74 encounters, while the drawing back of the carriage 75, that is to say the extent to which the tube is withdrawn from the folding blade may be suitably adjusted by means of removable stops 100 which the carriage 75 in its return movement encounters, in other words the actual bottom of the paper bag 6, may be suitably restricted. On being moved forward, the paper tube 6 now passes upwards in a vertical position and at the next station it passes into a folder plate guide 101 (Figs. 23 and 24). Immediately after reaching this station, it is pressed by a slide 128 against a fixed part of the guide 101 and thereby retained during the movement, until it is conveyed further (Figs. 25 and 34). This movement is obtained by means of a lever 129, the head of which lies in a suitable

slot of the slide 128 and mounted on a shaft 130 which is revoluble in a bearing arranged on the frame 111. The shaft 130 itself is operated, from an eccentric *i* mounted on the shaft 72, by means of an eccentric rod 132 and a lever 131 mounted on the shaft 130 (Figs. 33 and 34). Inclined projections 147, suitably shaped to correspond with the square form of the bottom of the bag, are provided on the movable part 128, and also facing them on the fixed guide 101, on which projections 147 the preliminary folding of the bottom takes place by means of a sharp fold. For this object the tube 6 is first opened, which is done by the gumming stamps 102 which, in order to apply the gum encounter the tube 6 from both sides simultaneously, and in returning, draw the same apart. The gumming stamps 102 stand initially in a vertical position and must therefore be turned through 90°, that is to say into a horizontal position, in order to apply the gum (Figs. 23 and 25). This turning of the two gumming stamps 102 and also their pushing forward takes place simultaneously, so that they reach the tube 6 from both sides exactly at the same time and therefore form a mutual support in applying the gum.

The turning of both the gumming stamps 102 and their projection is attained by similar devices which are in themselves known and therefore only the former of them will be briefly hereinafter described (Figs. 23-26).

The front gumming stamp 102 is mounted on a holder 103 which is in turn firmly connected with a shaft 104 revolubly mounted in the carriage 105. In order to turn the stamp 102 out of the vertical position into a horizontal one, after it has been provided with gum by means of a gumming roller 107 of a gumming apparatus 108 mounted on the frame 111, a lever 117 is mounted on the shaft 104, which lever has a pin 118 which travels in a groove 119 of a switch 112 also arranged on the frame 111. In order to allow this pin 118 a movement in one direction only, a revoluble tongue 113 is provided which is pushed aside by the pin 118 on the movement forward of the stamp 102, and after passing the same is again returned to its normal position by a spring 116, so that the return way in this branch groove 119 is immediately closed again, and the pin 118 is forced to slide into the horizontal branch of the groove 119.

Links 121 and 125 push forward or project the carriages 105 of the two stamps 102, the carriage 105 sliding on the fixed guide rails 120. The link 125 is directly mounted on an elbow lever 126, while the link 121 is first connected with a two-armed lever 122 pivotally mounted on a fixed pin 123 (Figs. 23 and 28), said lever 122 being in turn again connected by the link 124 with the elbow lever 126. This is pivoted on the pin 127

on a frame 110, which carries the rear gumming apparatus 108, and is moved by a cam disk *h* which is mounted on the rear driving shaft 40. The transmission is so selected that both stamps 102 are uniformly pushed forward and uniformly encounter the paper tube 6 on both sides. These gumming stamps 102 have a double function; first they serve for applying the gum, and then to open the paper tube 6. The first operation is effected by the device hereinbefore explained, while the latter is automatically effected on the return of the stamp 102, the tube walls remaining adherent thereon by reason of the gum (Figs. 30 to 30^c), so that now the preliminary folders 133 can enter the tube 6. They serve for separating the bottom part of the tube 6 according to the contour of the bottom, so that the edges in this position may be sharply folded.

In order to insert the preliminary folders 133 in the paper tube 6, they are suspended by means of levers 134 on a vertical carriage 136 which travels in a second vertical carriage 137, which is removable to allow of paper bags of various sizes being made, this second vertical carriage is arranged in guides 138 of the frame 139 firmly connected with the slide bars 120. The carriage 137 has, beneath, a semicircular guide 135 for the preliminary folders 133, so that, by the carriage 136, the carriage 137 is also held in a raised position. The up and down movement of the former, and therefore also of the latter, is effected by means of the lever 141 which is connected with a double armed lever 142 pivotally mounted on the pin 143 of a bearing 144 arranged on a frame 145 and operated by means of an eccentric rod 146 from an eccentric *k*. Now if the carriage 136 be lowered, the preliminary folders 133 enter the paper tube 6 previously opened by the retreating gumming stamps 102 (Fig. 30^a). The two carriages 136 and 137 sink together until the contact screw 140 mounted on the latter carriage, rests on the frame 139, so that also the semicircular guide 135 is stopped. The carriage 136, however, descends still further and accordingly the preliminary folders 133, following the same, must separate in consequence of the stoppage of the guide 135, and this takes place at the moment at which the preliminary folders 133 have penetrated into the paper tube 6 to the projections 147 (Fig. 30^b). The bottom part of the tube 6 is thereby stretched so far apart that together with the folders 133 it rests on the projections 147.

The folding of the edges is now effected by means of two edge folders 148 (Figs. 31-33) which are cut out to suit the form of the bottom and the working edges of which are beveled (Fig. 35). These folders 148 make a double movement, first they descend and then they move laterally toward each other.

In order to allow of the sinking of the folders 148, they are mounted on levers 149 which are revolubly mounted on a shaft 150 revoluble in the frame 145 and the bosses of which levers have teeth 157 beneath, with which two mutually engaging toothed wheels 158 gear. One of these is turned by means of a lever 159 mounted on its shaft, which lever is moved by means of an eccentric *m*, mounted on the shaft 72, by the intermediary of an eccentric rod 160 guided in the frame 145. In this lateral movement, a revoluble roller 153 mounted on each lever 149, by means of its bearings 154, slides on their tracks 151 and 152 which are mounted on the shaft 150. By means of these tracks 151 and 152, the sinking and rising of the edge folders is effected, as the shaft 150 is moved from the eccentric *l*, by means of the track 152 shaped as a double lever and an eccentric rod 155, whereby the tracks 151, and 152, sink and rise, the edge folders 148 in the first case being drawn down by springs 156.

The sharply folded edges (Fig. 64) are formed by the edge folder 148 pushing its beveled edge over the bottom part of the paper bag 6 (Fig. 36) which has been opened and rests on the projections 147, within which part of the paper tube the preliminary folders 133 are located which are also beveled in order to produce a sharp edge at the folding place (Fig. 29^a). The paper tube 6 now passes to the next station where the bottom (Figs. 45 and 65) is formed. For this object a wedge shaped plate 162 (Figs. 37 and 38) enters the opened bottom part transversely to the plane of the tube 6, in order to prevent any movement of the bottom during the work of the bottom folders, and completely opens the same.

The wedge 162 is mounted on a carriage 163 which travels in guides 164 of a vertical carriage 165 and is moved up and down by means of an eccentric *n*, mounted on the rear driving shaft 40, through the intermediary of an eccentric rod 173 and two levers 172 and 168 mounted on the shaft 169, the shaft being revolubly mounted in bearings mounted on the cross supports 171. The further formation of the bottom is accomplished by two pairs of flat folders 174 and 182 (Figs. 42 to 44) working against one another. The two folders 174 move in similar manner to the two edge folders 148. They are mounted on levers 175 and their rollers 177 rest on a track 178 revoluble on an axis 150 and common to both (Figs. 37, 39, 40 and 41), which track is moved by means of an eccentric rod 179 by an eccentric *o* mounted on the shaft 72, so that the folders 174 descend by the aid of the springs. The lateral movement is effected by means of toothed wheels 180, gearing with one another, and revoluble from the eccentric *p* of the shaft 72 by means of an eccentric rod 181, which toothed wheels gear

with the toothed bosses of the levers 175. The lapping over of the middle part of the bottom is effected by means of the folders 182 which first lie in recesses beneath the bottom in the guides 101, and then are elevated by the rise of the vertical carriage 165 sliding on guide bars 166 and successively lap over the middle part of the bottom. The lifting of the carriage 165 is effected by means of links 187 which are connected with double armed levers 188 pivoted on the cross bar 167, which levers in turn are moved by means of the eccentric rod 189, which is forked above, from an eccentric *r* mounted on the shaft 40. The lapping over of the middle part of the bottom is effected by the folders 182 approaching one another in consequence of the turning of the eccentric 183, this turning being produced by means of a bevel wheel 184 and segment or sector 184', the shaft of which is mounted in the cross bar 167, a lever 185 which is moved by an eccentric *q*, mounted on the shaft 40, by the intermediary on an eccentric rod 186 guided in the cross bar 167 and a lever 186^a.

At the next station, the bottom is pressed down by the pressing stamp 189 (Figs. 46 and 47), which is mounted on a lever 190 moved by means of an eccentric *s* mounted on shaft 72. In consequence of the further movement of the conveyer chain 19, the folder plate 29 located on this spot inclines towards the side and thereby the end of the bottom sinks beneath the guide bars 101. Now in order to avoid damage to the bottom, the respective part of the guide bars 101 is made capable of being lowered (Figs. 49 and 51). For this purpose two plates 191 are inserted there, said plates being pivoted on pins 192 held in bearings 193. The sinking of the plates 191 is effected by an eccentric *t* mounted on the cross shaft 73, which eccentric moves by means of an eccentric rod 202 a double armed lever 200 acted on by a spring 303. This lever is pivotally mounted on the pin 201 of the bearing 74 and connected by a rod 199 with a link 194, which is connected with a lever 195 mounted on the shaft 196. The shaft 196 is revolubly mounted on the bearings 197 and 198 and carries on its front end a second lever 195^a corresponding with the lever 195, which lever 195^a is connected with a link 194^a whereby both plates 191 are uniformly lowered.

On its way to the next station, the bottom of the finished paper bag 6 is turned through 90°, that is to say folded over in the plane of the tube (Fig. 66). This is accomplished by a stationary cam 204 provided on one part of the guide bar 101, on to which cam one side of the bottom runs (Fig. 52) and is thereby folded over. The complete folding over and flat pressing of the same is completed by an elbow piece 205 which is mounted on the shaft 206. This is mounted in a bearing 209 which

is carried by a frame 210. The turning of the elbow piece 206 is operated by an eccentric *u* by means of an eccentric rod 208 which is connected with an elbow lever 207 mounted on the shaft 206. After the bottom has been firmly pressed on the paper tube 6, it is drawn off the folder plate 29. For this purpose a pincer or gripper device in two parts is provided, the fixed arm 213 of which is mounted on a vertical carriage 214 which slides in the frame 210. The movement of this carriage 214 is effected by means of an eccentric *v* mounted on the shaft 72, which eccentric by means of its eccentric rod 219 moves a double armed lever 216 revolvably mounted on the pin 217 of the bearing arm 218, which lever is connected with the carriage 214 by a link 215. The other arm 211 is slidably mounted on the fixed arm 213 of the pincers or grippers, said other arm 211 being acted on by a spring 212. The opening and closing of the pincers or grippers, or rather the movement of the arm 211, is effected by cams 220 and 221, the upper one of which is firmly mounted on the frame 210, while the lower one 221 is revolvably suspended on the pin 221^a (Fig. 53). This bears against the pin 222 carried in a socket 223 of the frame 210, which pin 222 by means of a link 224, elbow lever 225 and eccentric rod 226 is pushed forward and backward by means of an eccentric *w*, so that the cams 221 alternately find a support against the bolt 228.

When the pincers or grippers descend they open by the arm 211 encountering the cam 221. The bolt 222 yields and the cam 221 is pressed back by the spring 212. The pincers or grippers are thus closed, that is to say the bottom of the paper bag is gripped. On the upward movement of the pincers or grippers they remain closed until the bag 6 has been entirely drawn off the folder plate 29. At this moment the arm 211 encounters the fixed cam 220, that is to say, the pincers or grippers are opened, and the released paper bag 6 comes to rest on the folder 227 through the slot 228 (Fig. 54) of which it is drawn when pulled off the folder plate 29, and which folder at this moment commences its movement. The turning over device or folder 227 is mounted on a shaft 229 which is revolvably mounted in a frame 230. For operating the turning over device 227, a lever 231 is mounted on the shaft 229, which lever is connected with an elbow lever 233 by means of a link 232, said elbow lever being revolvable or pivoted on an axis 234 revolvable in the frame 230 and moved by means of an eccentric rod 235 from an eccentric *x*. In this rotation the turning device 227 carries the paper bag, which has been drawn off the folder, with it, and conducts it into the distributing trough 239. Here it first comes on to an erecting plate 236 which at this moment is turned

over and which is bent downwards, and mounted on the shaft 234. In order to erect the paper bag 6 on the plate 236 a lever 237 is mounted on the shaft 234, which lever is moved by means of an eccentric rod 238 from an eccentric *y* mounted on the shaft 40.

In order when turning over the plate 236 to maintain the accumulated paper bags 6 in a vertical position, elbowed arms 240 are provided which engage behind the paper bags 6. In order always to pass behind the last erected paper bag 6, the arms 240 are mounted on spindles 241 which are revolvable or pivotal in bearings 242. These bearings 242 are arranged on both sides of the trough 239 which is carried by the frame 230. The turning of the spindles 241 is effected by means of an eccentric *z* mounted on the shaft 40, which eccentric by the intermediary of an eccentric rod 248, an elbow lever 247 revolvably mounted on the shaft 234, and a link 246, operates an elbow lever 244 mounted on the shaft 241, which lever in turn, by means of a link 245 and an elbow lever 243 mounted on the other vertical axis 241, causes the latter to turn in the opposite direction (Fig. 57). In order to maintain the paper bags 6 accumulated in the trough 239 in an upright position a movable support 249 is located before them.

The machine is driven by means of driving shafts 72, 73 and 40, of which, for instance, the front shaft 72 is driven by means of a belt pulley 255 (Fig. 11).

The movements are of course regulated in such a way that the devices operated by the various eccentrics or cams at each revolution of the driving shaft turn out a finished paper bag 6.

I claim:

1. In a paper bag machine, an endless conveyer, a series of equidistantly spaced folder plates carried by said conveyer, means for operating the conveyer, means for placing sheets of paper in the path of movement of the successive plates, means for acting on the paper at successive stages of movement of the plates to paste and fold the same into the form of a tube, to notch or cut the end of the tube, to withdraw the tube partly from the plate, to fold the part so withdrawn, and form the bottom of the bag and to finally remove the finished bag.

2. In a paper bag machine, a folding plate, a pressing plate for engaging and forcing one side of a partly folded sheet against the folding plate, a slidably mounted strip carried by the pressing plate, and arranged to engage and hold the edge of the sheet, and means for turning the opposite edge of the sheet over the folding plate and against the confined edge to form a tube.

3. In a paper bag machine, an endless conveyer, a series of folding plates carried

thereby, and movable stops for engaging and holding the successive plates in proper position after each movement of the conveyer.

4. In a paper bag machine, a folding blade having a notch, and means for pressing a portion of the sheet to be folded into said notch, and thereby locking the sheet in position.

5. In a paper bag machine, a folding plate, cutting members for recessing the paper carried by the plate, and means operating simultaneously with the cutting members for engaging and partly withdrawing the paper from the plate.

6. In a paper bag machine, a folding plate, and means for engaging and partly withdrawing a previously formed paper tube from said plate.

7. In a paper bag machine, a folding plate, a movable carrier, a cutting means on said carrier, a tube clamp carried by and co-acting with the carrier, and means on one of the cutting members for operating said tube clamp.

8. In a paper bag machine, a tube-forming means, gum-applying members arranged to engage the opposite sides of the tube, means for separating said members, and thus opening the bag, and folders adapted to enter the partly opened tube and fold the same outward.

9. In a paper bag machine, means for forming a flat tube, gum-applying members arranged to simultaneously engage the opposite sides of the tube, and means for simultaneously moving said members away from each other in order to open the tube.

10. In a paper bag machine, gum-applying tube-opening members, and folders arranged to enter the partly opened tube and fold the same outward.

11. In a paper bag machine, a pair of folders having tapered edges, means for operating them to make an initial fold, and a second pair of folders acting subsequent to

the first and having tapered edges interfitting with those of the first folders to form a sharp fold in the paper.

12. In a paper bag machine, means for forming a tube, means for folding the end of the tube to form the bottom of the bag, and a wedge plate for entering and spacing side portions of said bottom during the folding operation.

13. In a paper bag machine, means for forming a bottom at one end of a paper tube, with the bottom approximately at a right angle to the body of the tube, a conveying means for the bag, and a stationary cam for engaging one side of the bottom and turning the same into parallel relation with the tube.

14. In a paper bag machine, means for forming a bottom at one end of a paper tube, with the bottom approximately at a right angle to the bottom of the tube, a conveying means for the bag, a stationary cam with which one side of the bottom engages, and means for engaging the opposite side of such bottom, and folding the same against the body of the tube.

15. In a paper bag machine, a rocking delivery plate, a carrier therefor, the plate and carrier being slotted for the passage of the bag, and means for drawing a bag through the slot into position to be engaged by the plate.

16. In a paper bag machine, a rocking delivery plate, a trough, an erecting plate a carrier therefor, the plate and carrier being slotted for the passage of the bag arranged within the trough to receive the bags from the delivery plate, and means for operating the plates.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

OTTO HESSER.

Witnesses:

AUGUST B. DRAUTZ,
RUDOLF BRECHT.