

A. DAY.

MACHINE FOR FORMING AND MAKING PAPER BAGS.

APPLICATION FILED OCT. 26, 1905.

7 SHEETS—SHEET 1.

Fig. 1.

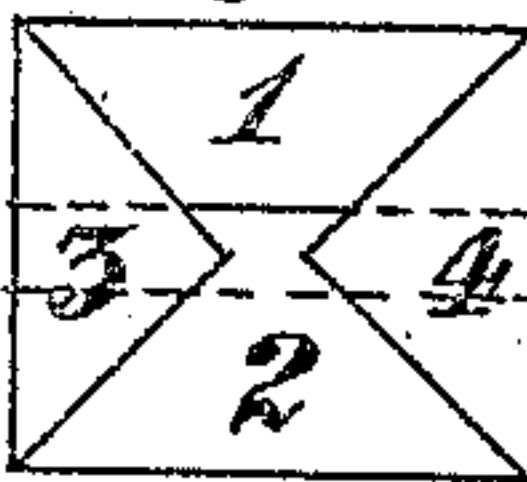


Fig. 5.



Fig. 2.

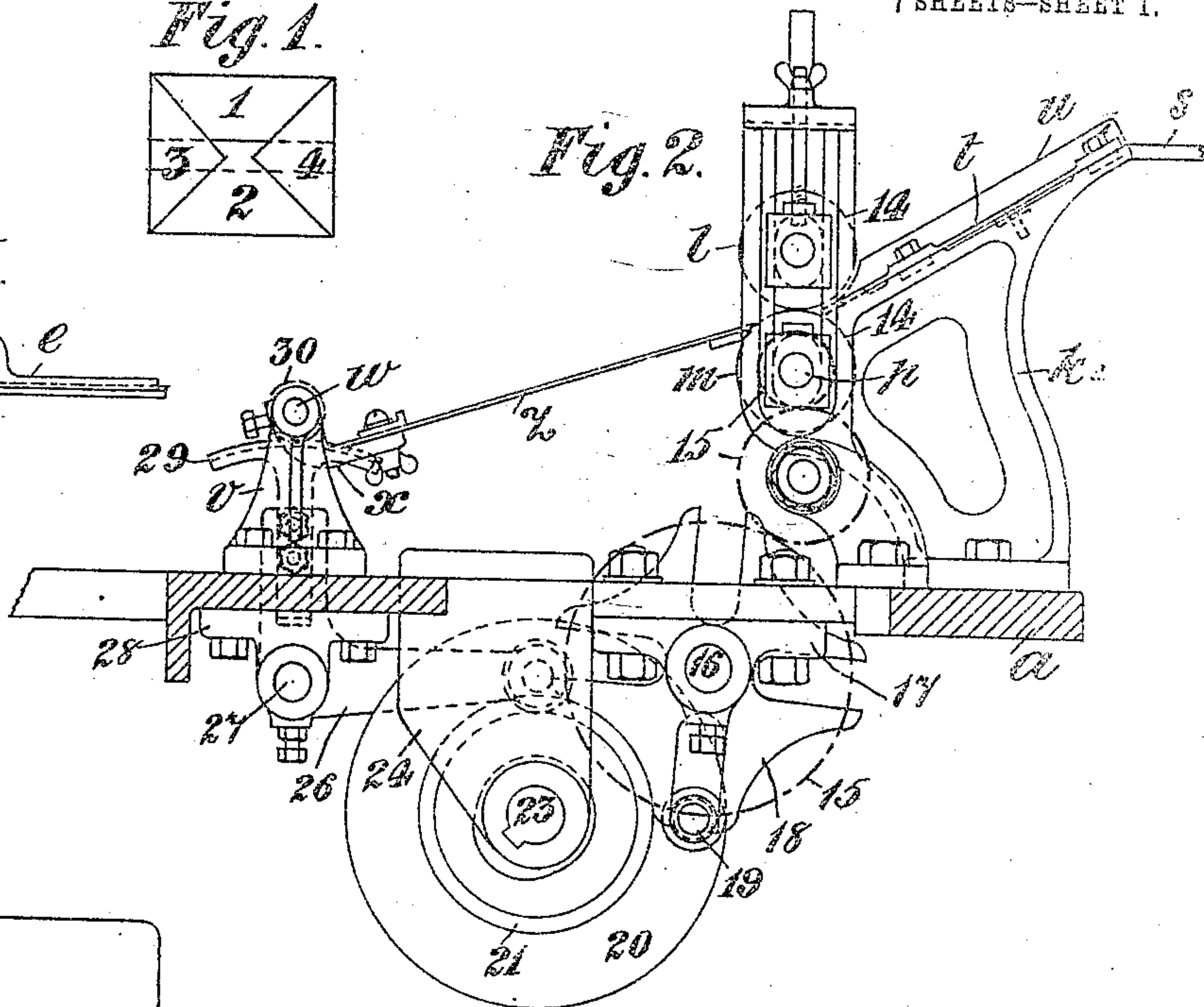
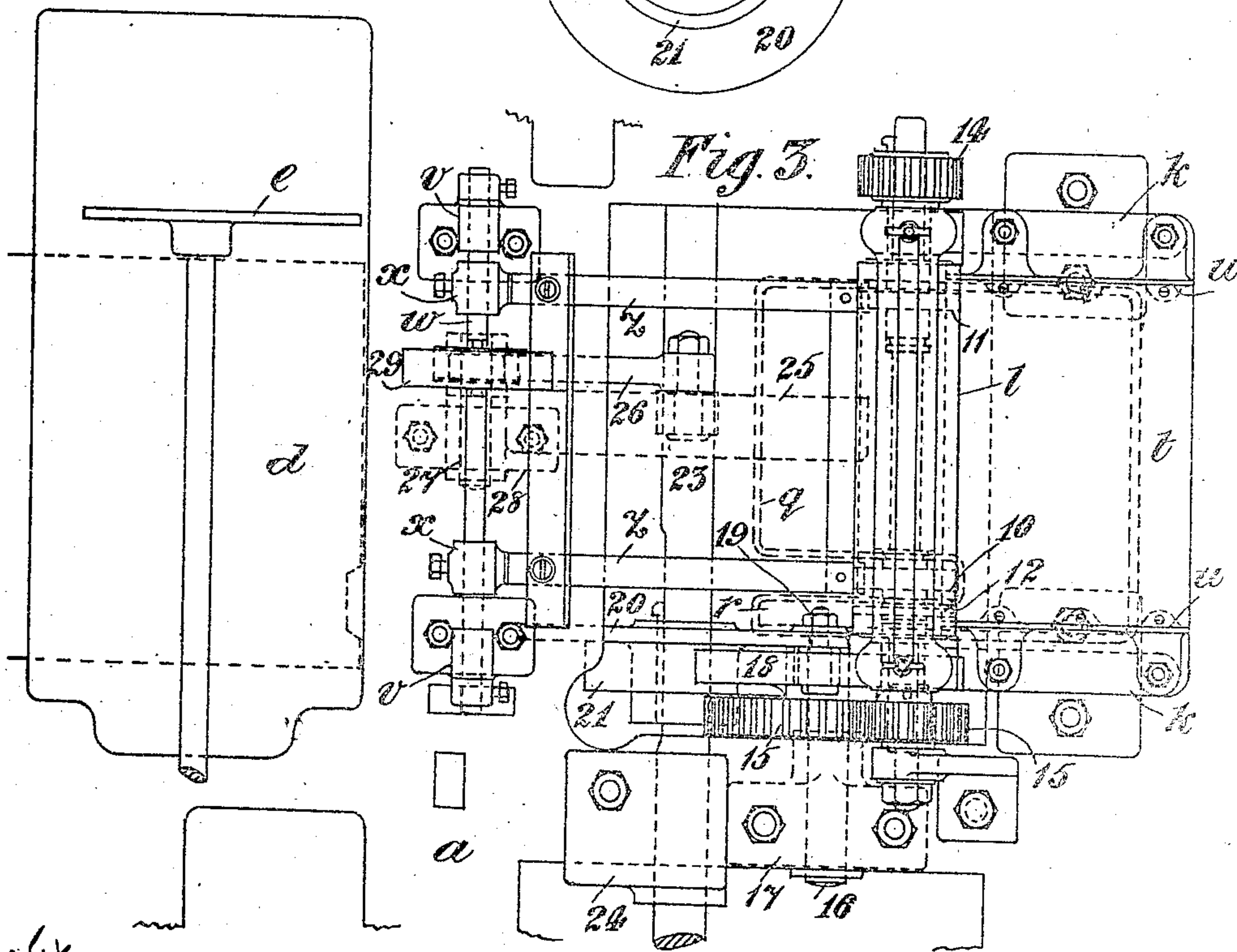


Fig. 3.



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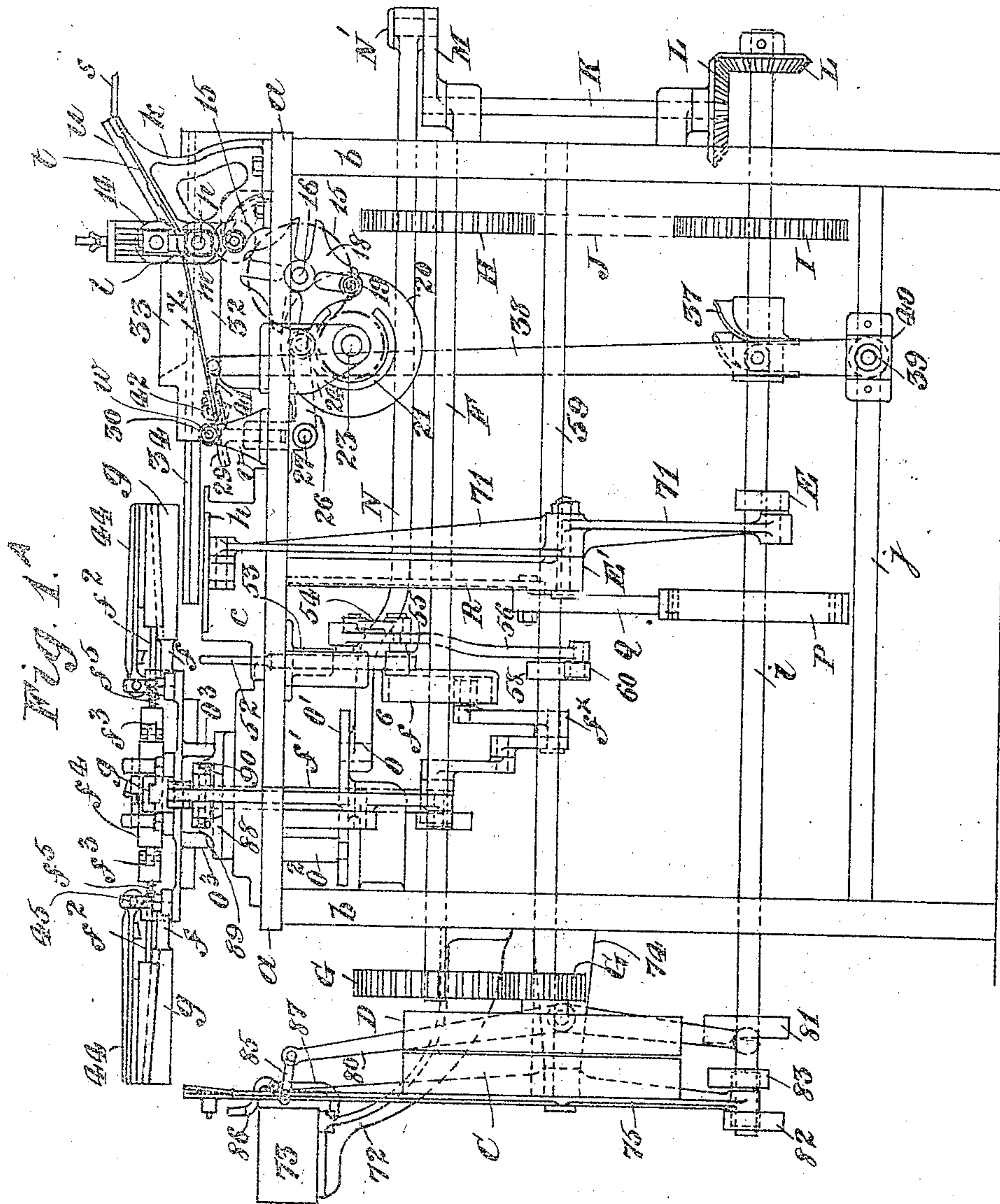
PATENTED JUNE 23, 1908.

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7 SHEETS—SHEET 2.



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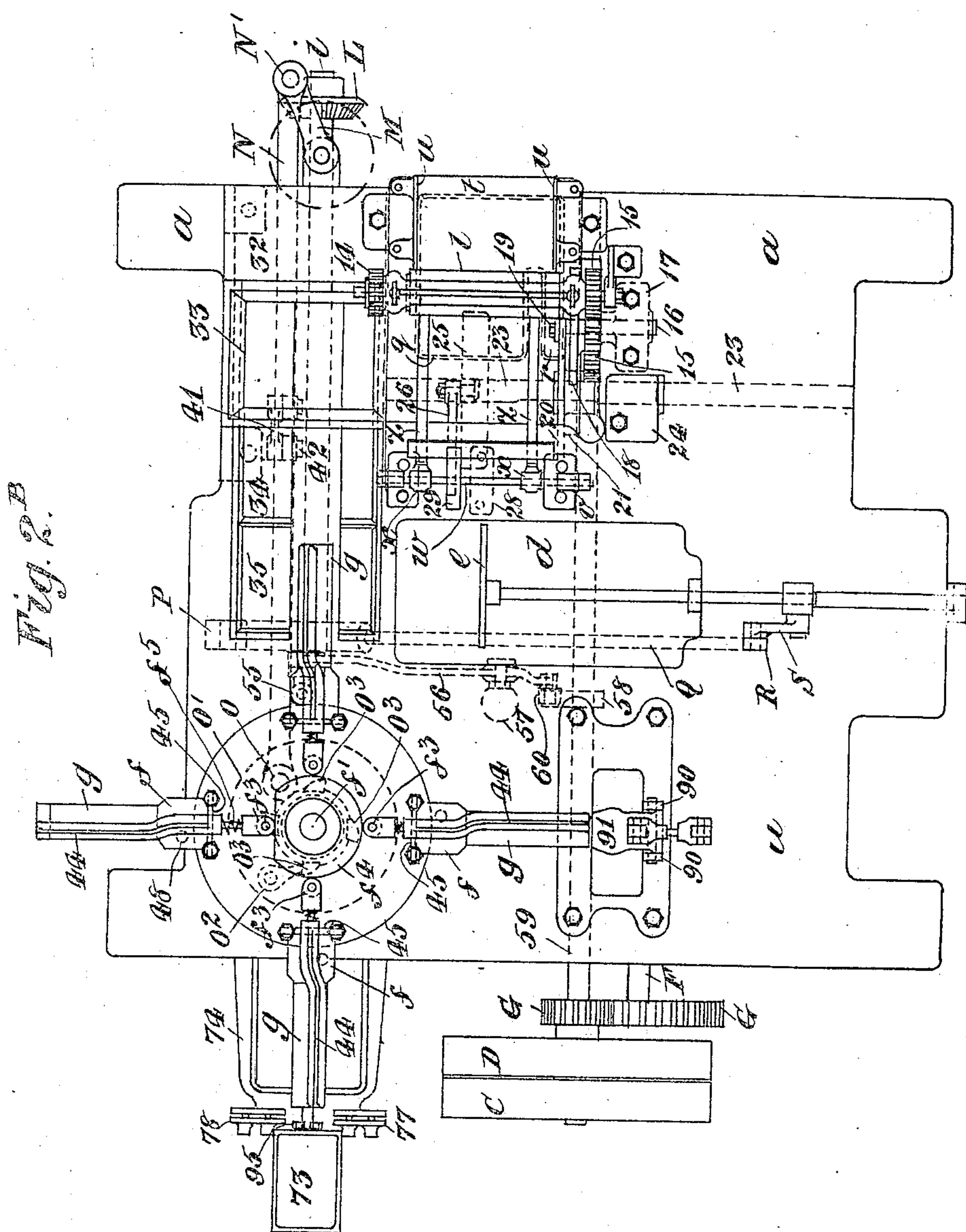
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7 SHEETS—SHEET 3.



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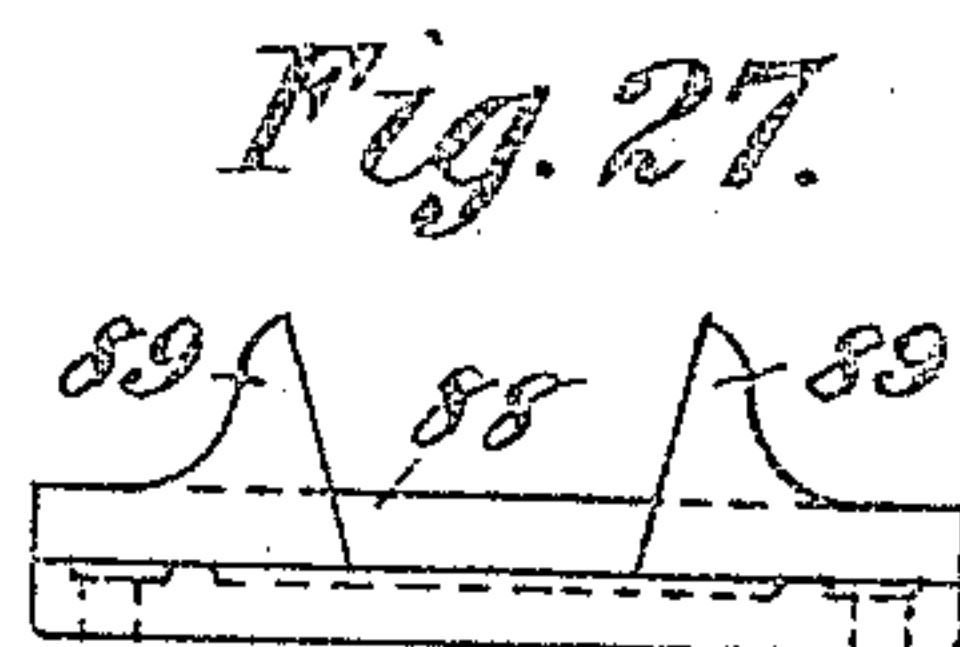
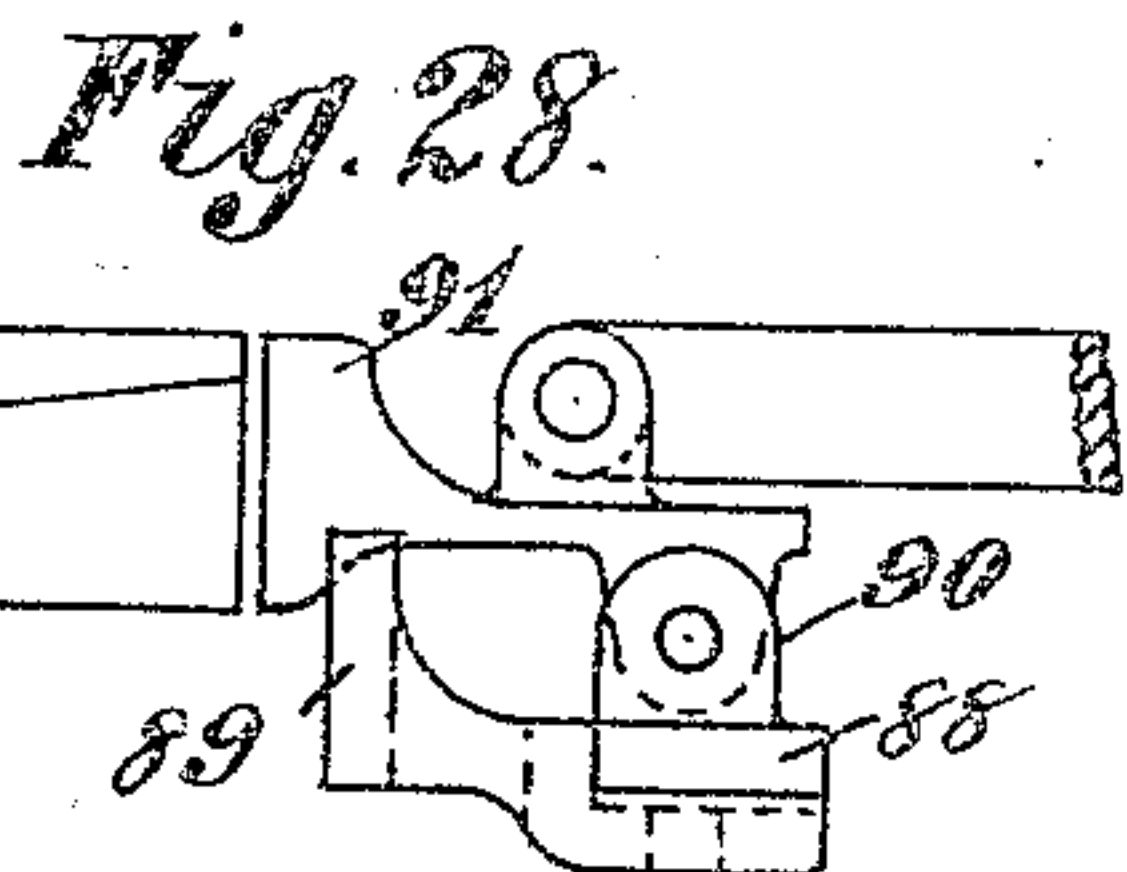
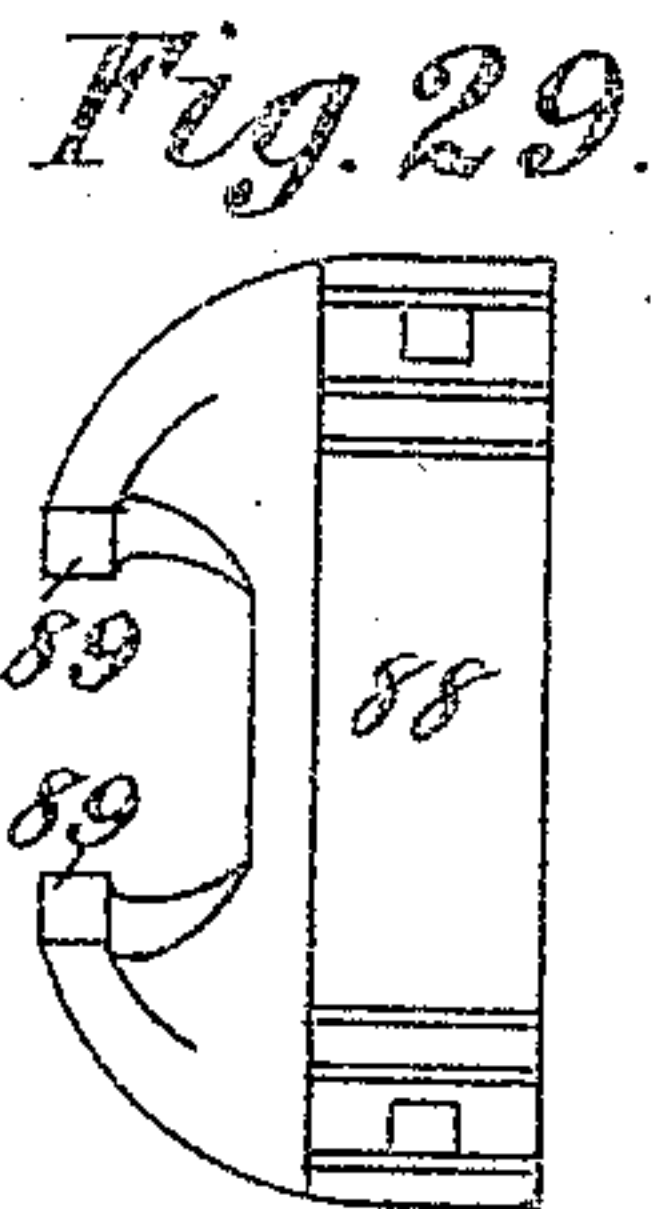
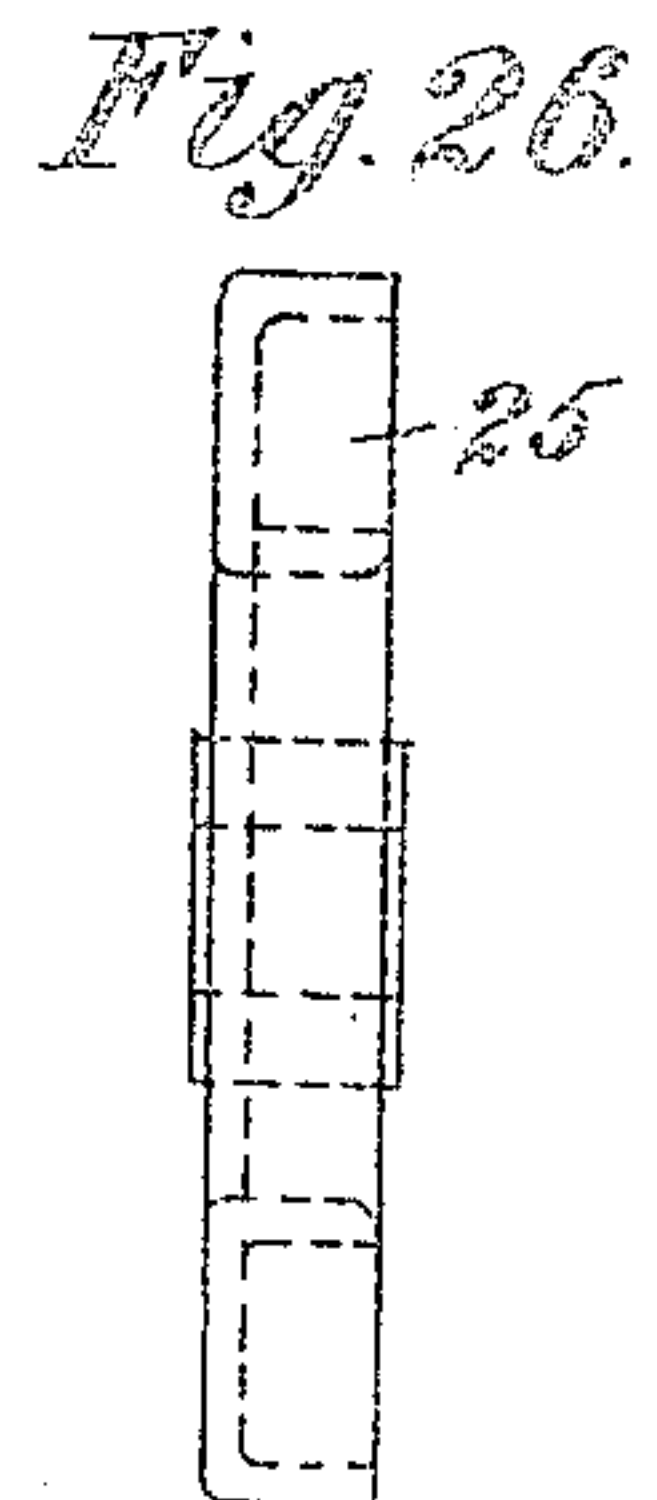
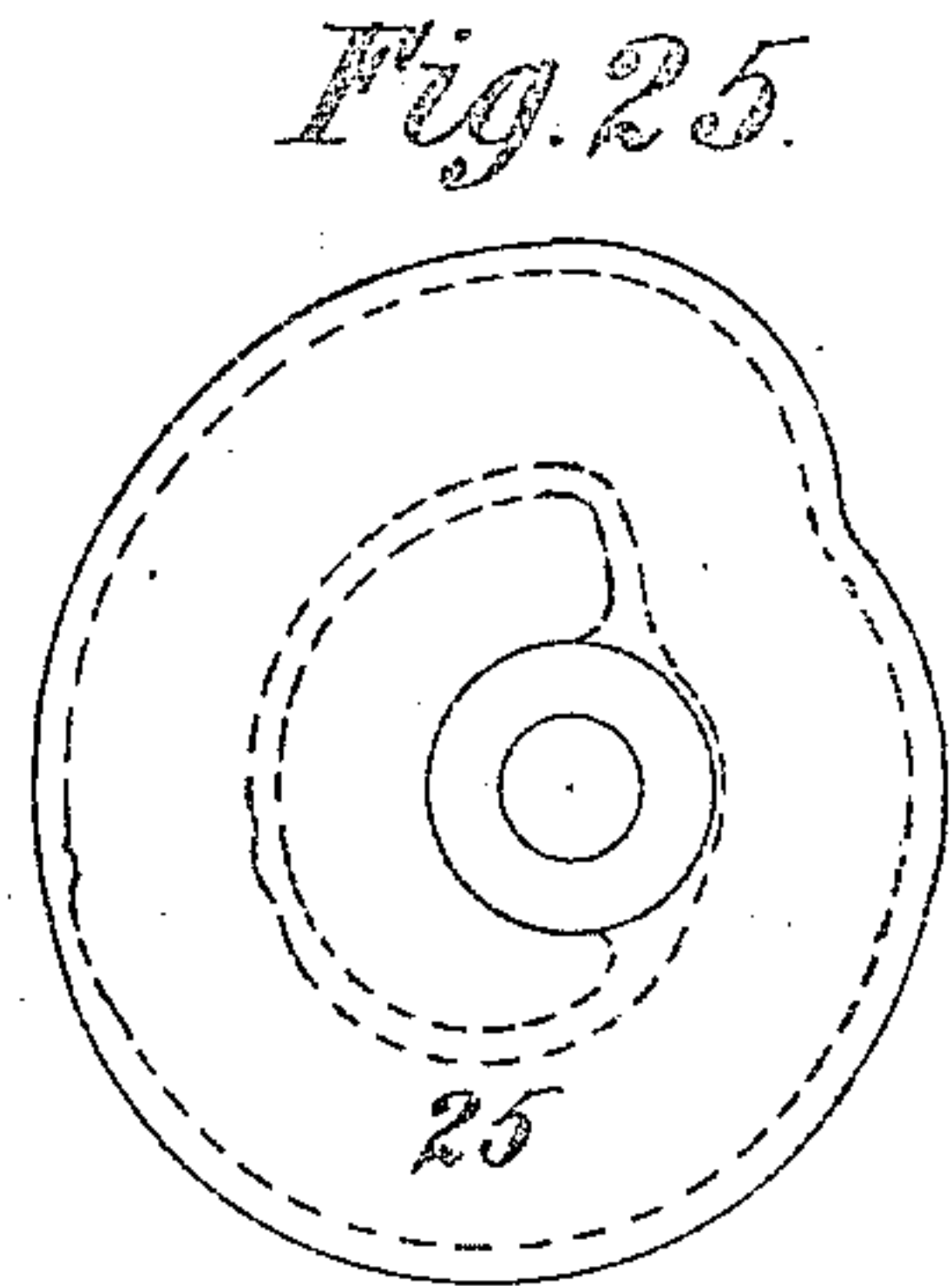
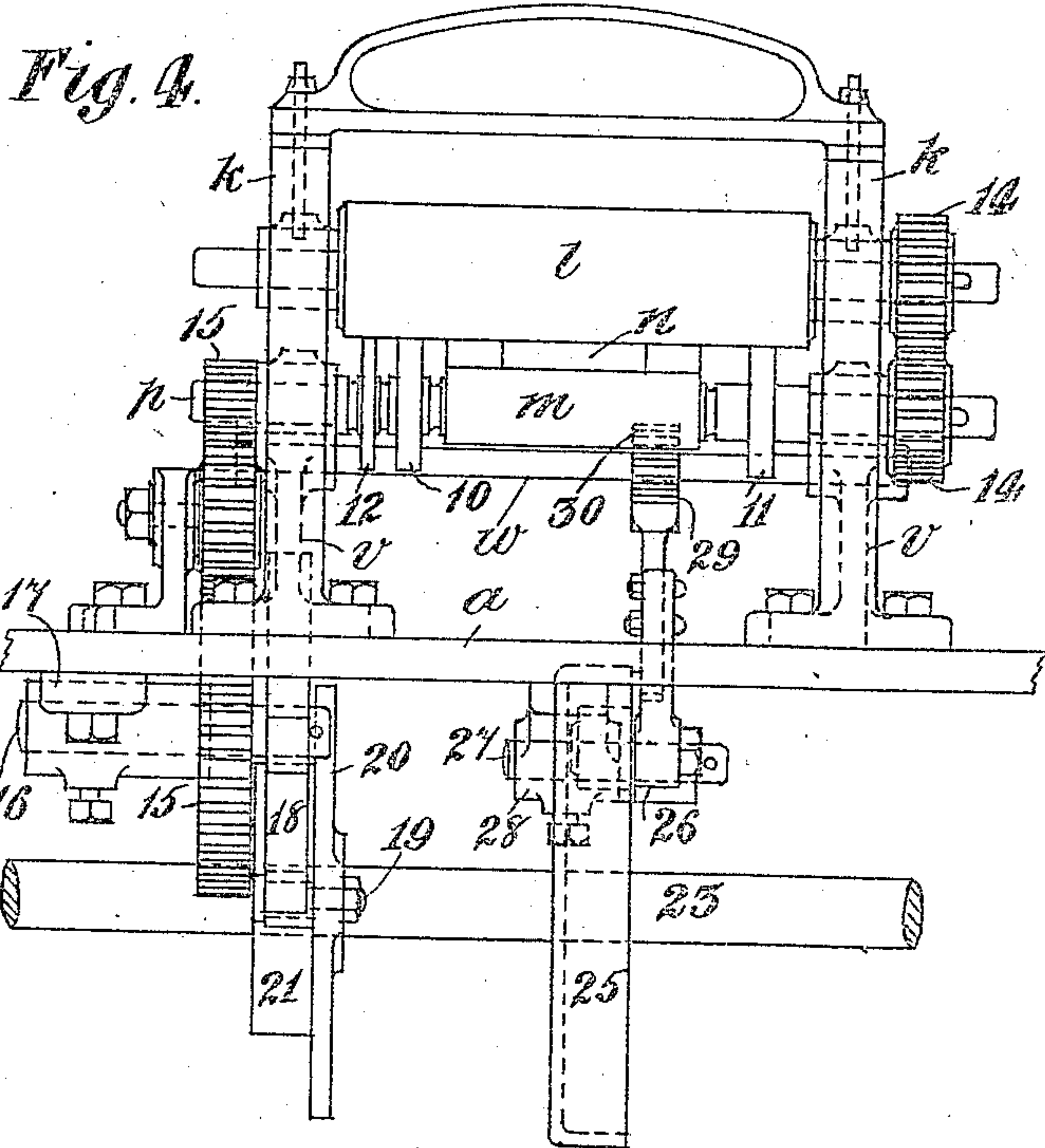
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7 SHEETS—SHEET 4.



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MACHINE FOR FORMING AND MAKING PAPER BAGS

APPLICATION FILED OCT. 26, 1905.

7 SHEETS—SHEET 5.

Fig. 7.

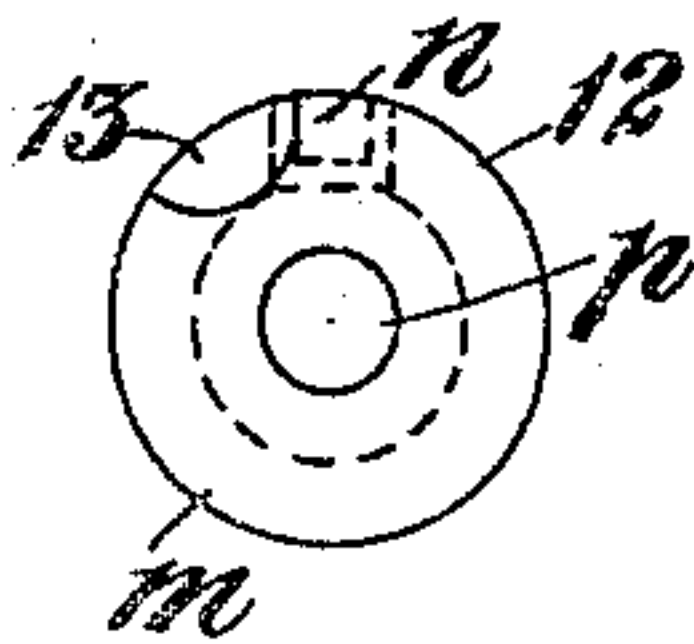


Fig. 6.

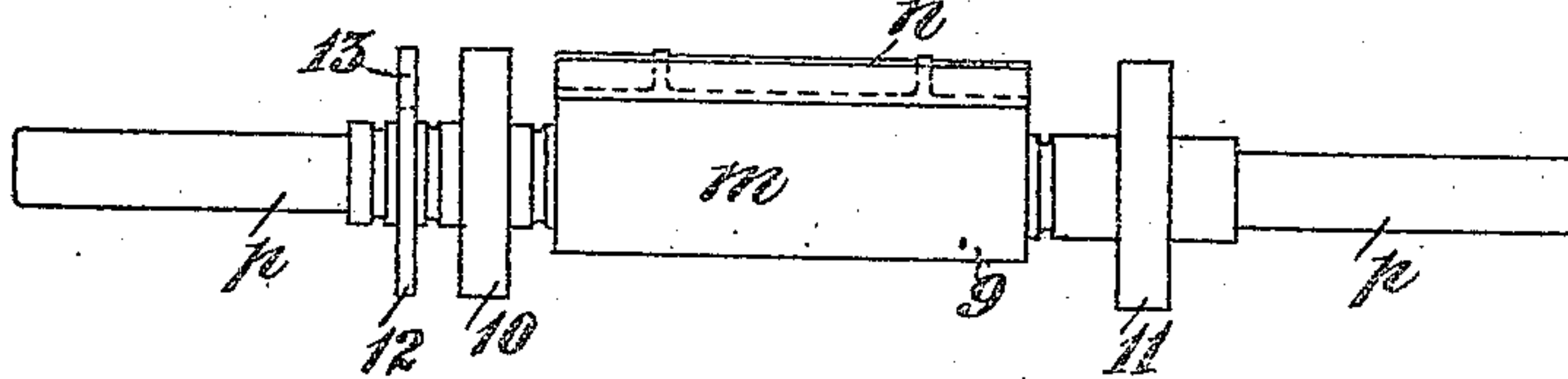


Fig. 8.



Fig. 9.

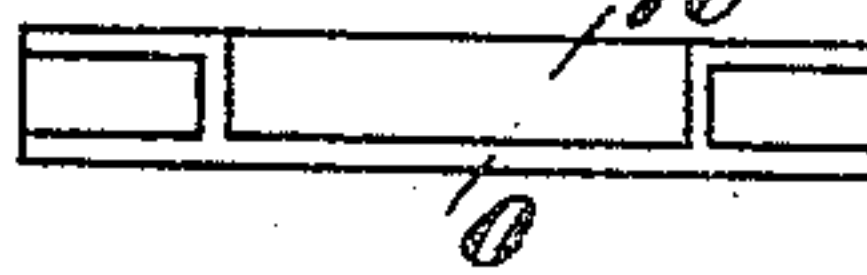


Fig. 10.

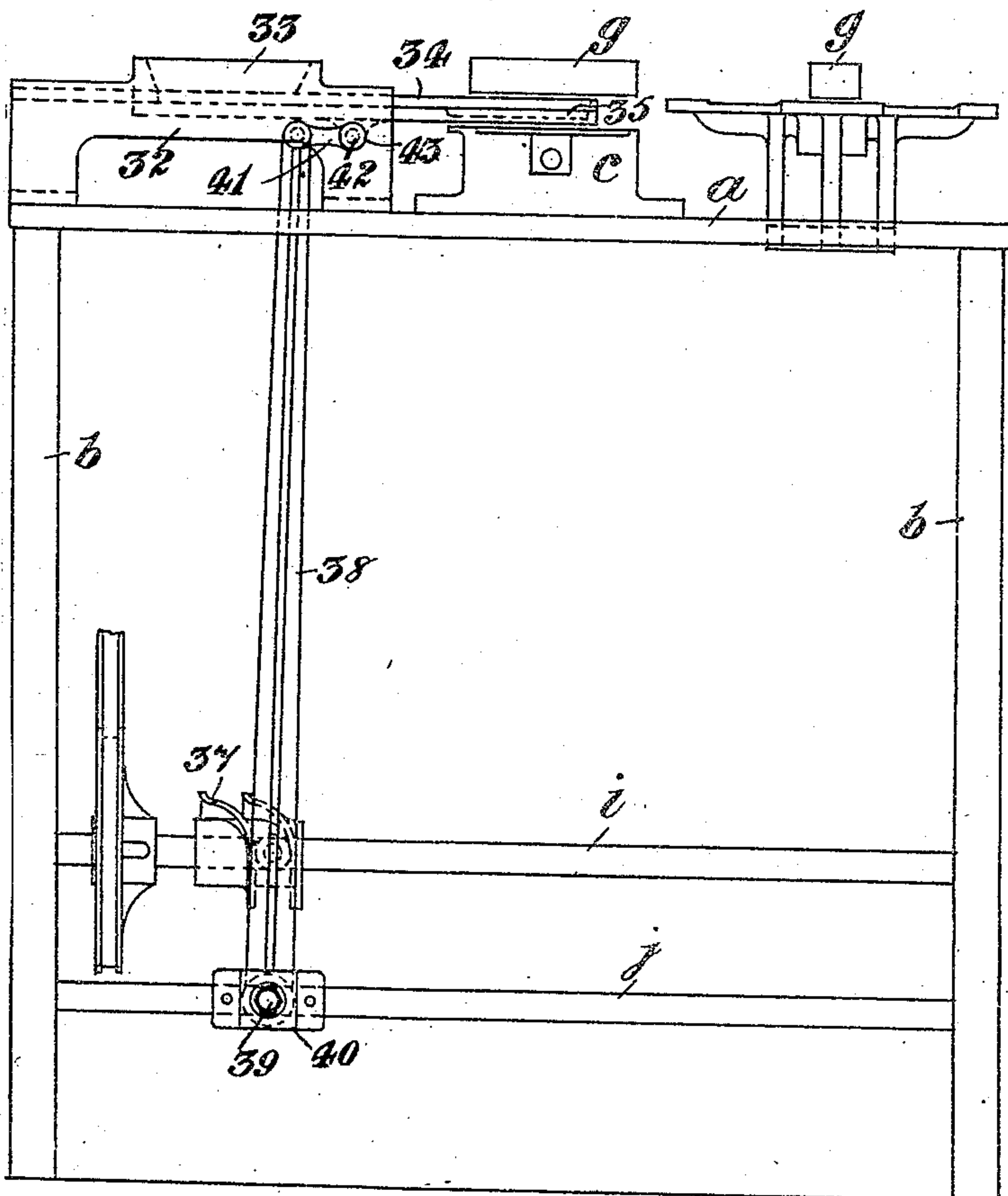
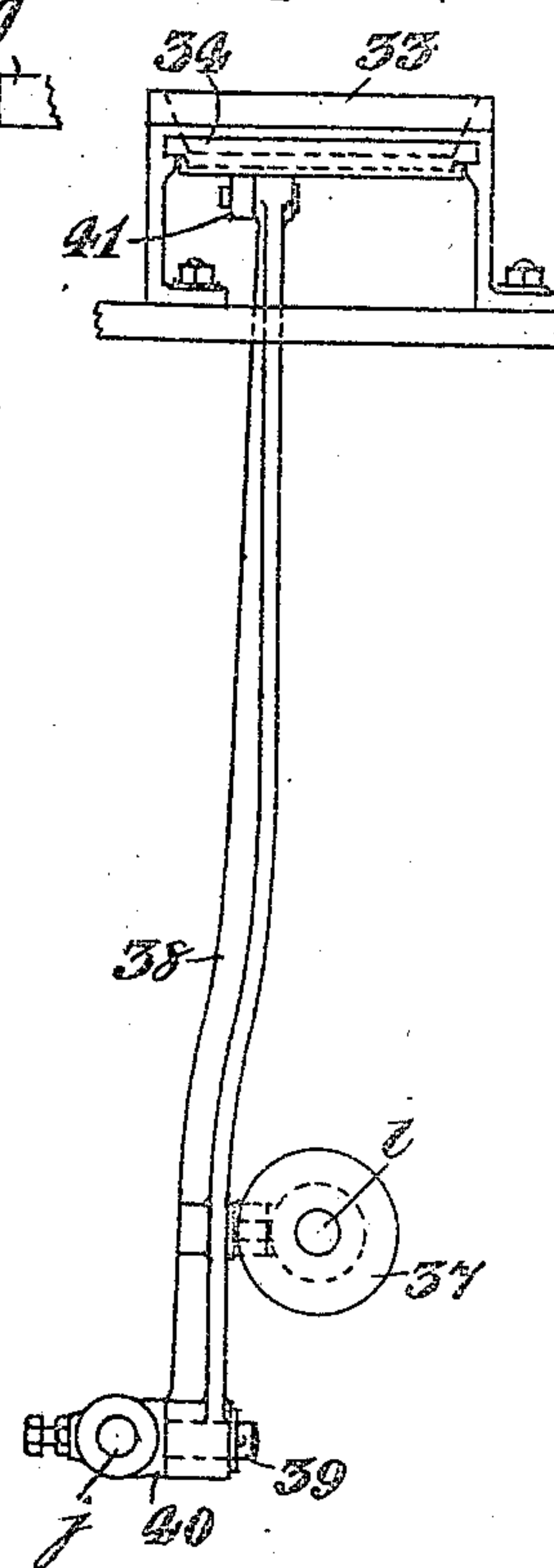


Fig. 11.



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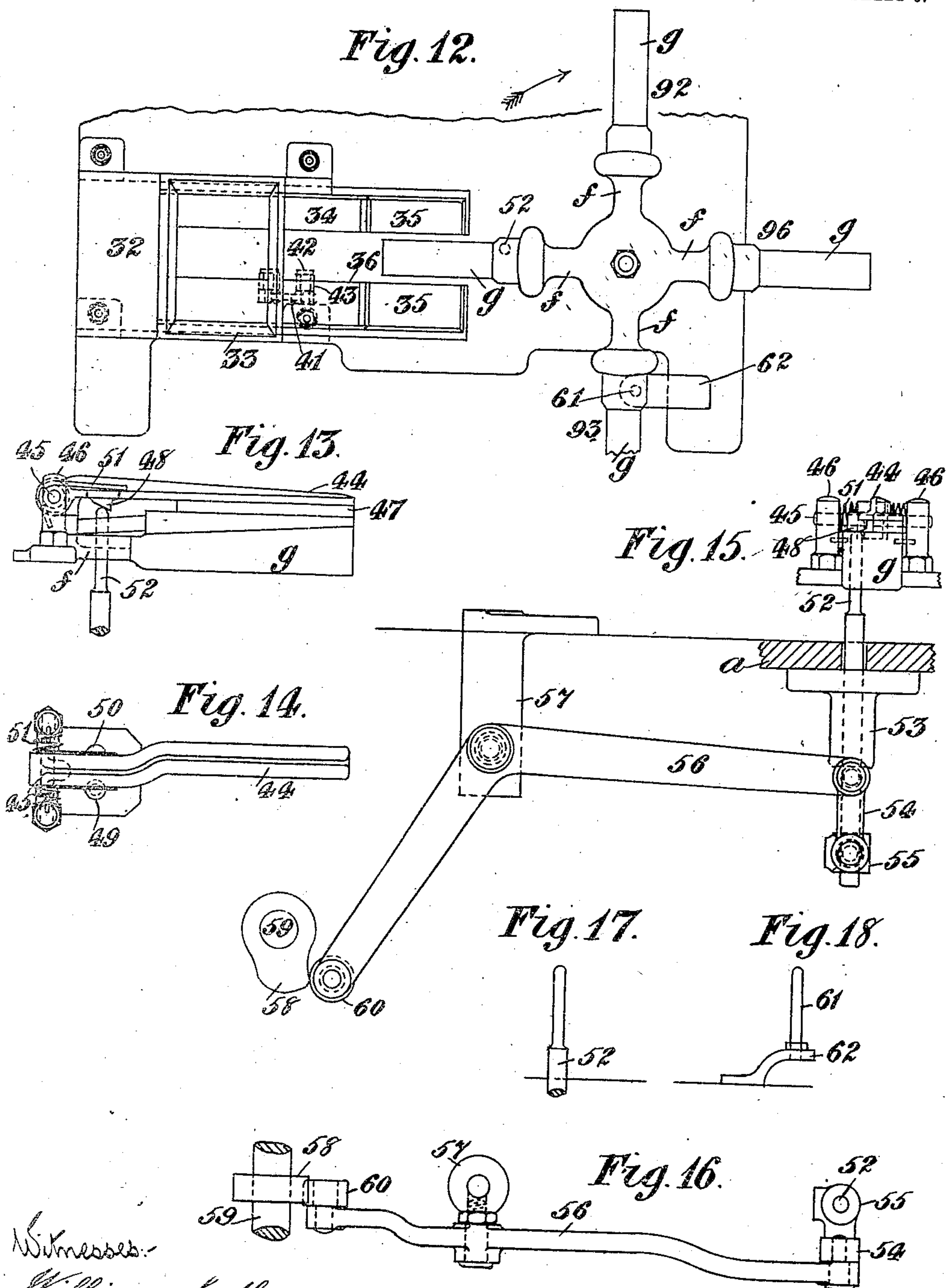
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MACHINE FOR FORMING AND MAKING PAPER BAGS.

APPLICATION FILED OCT. 28, 1905.

7 SHEETS—SHEET 6.



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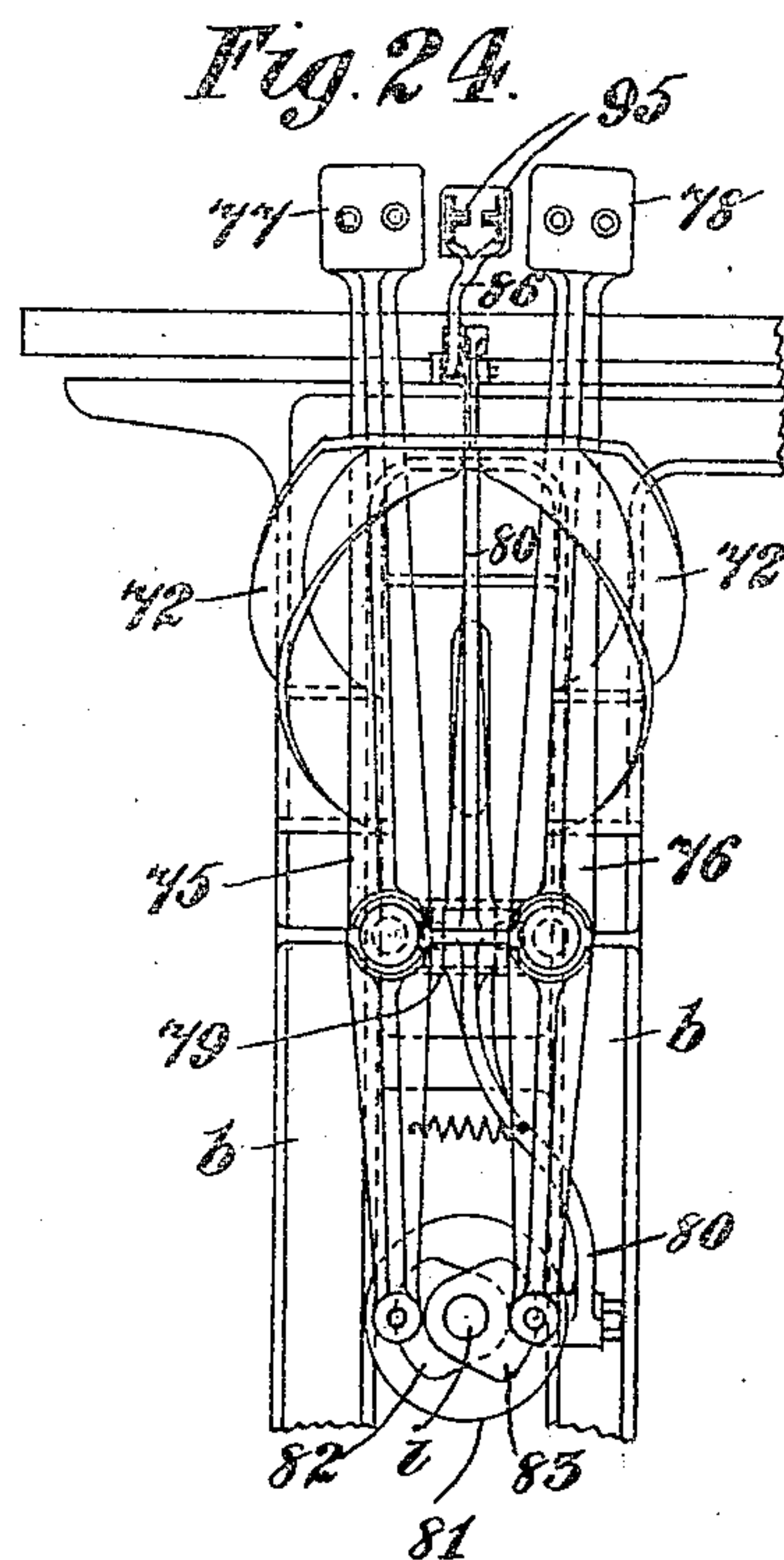
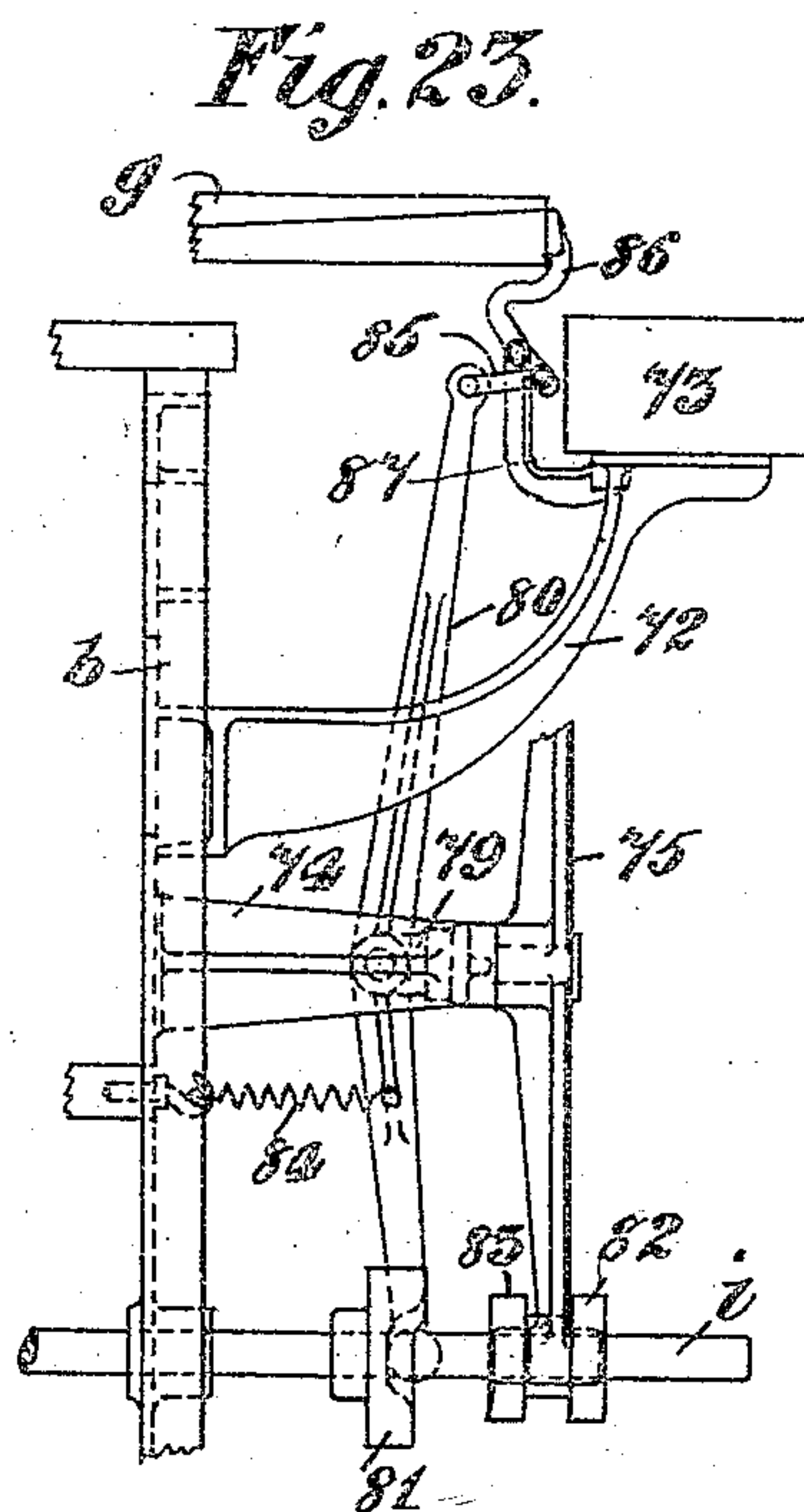
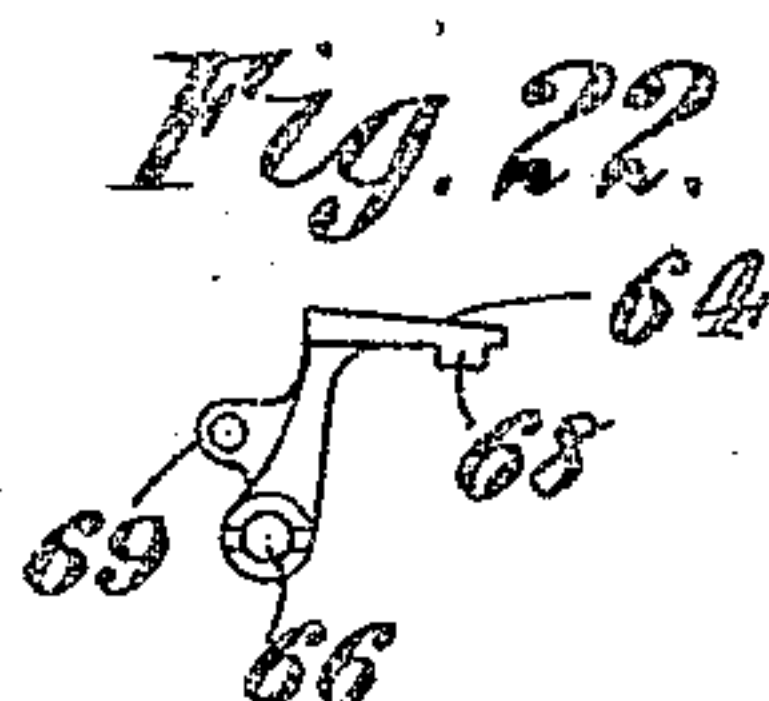
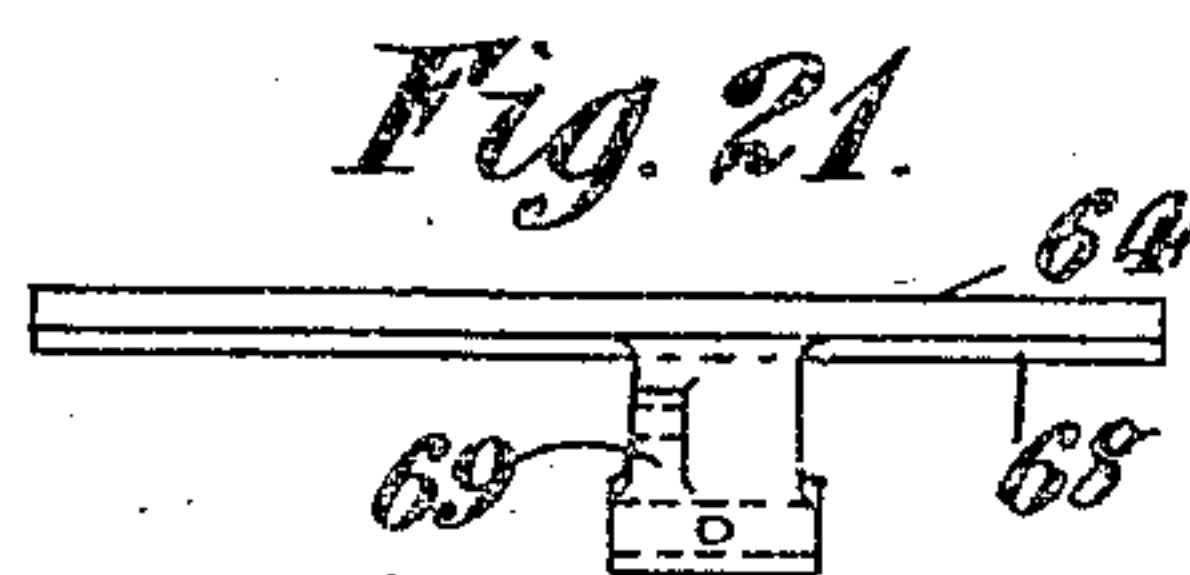
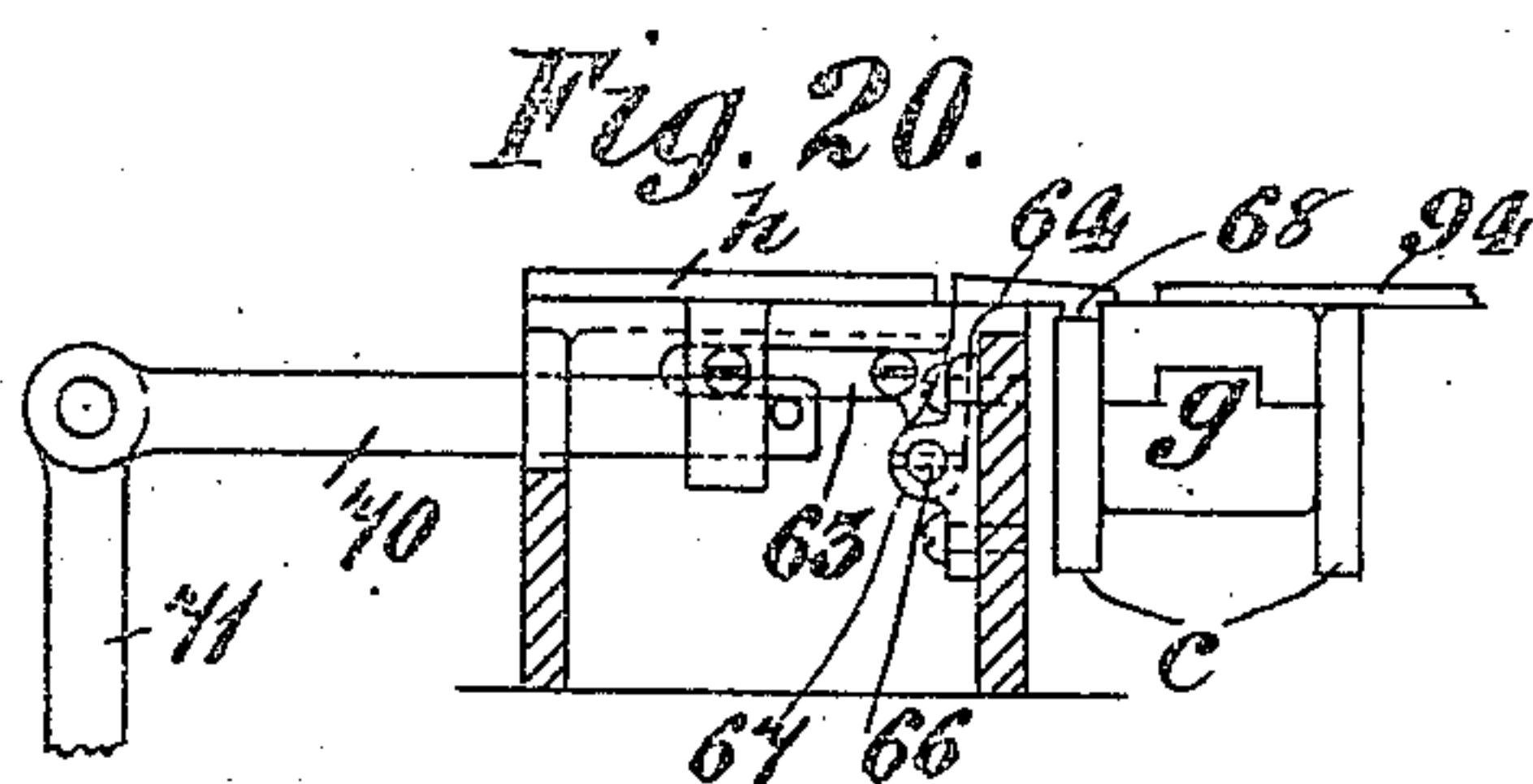
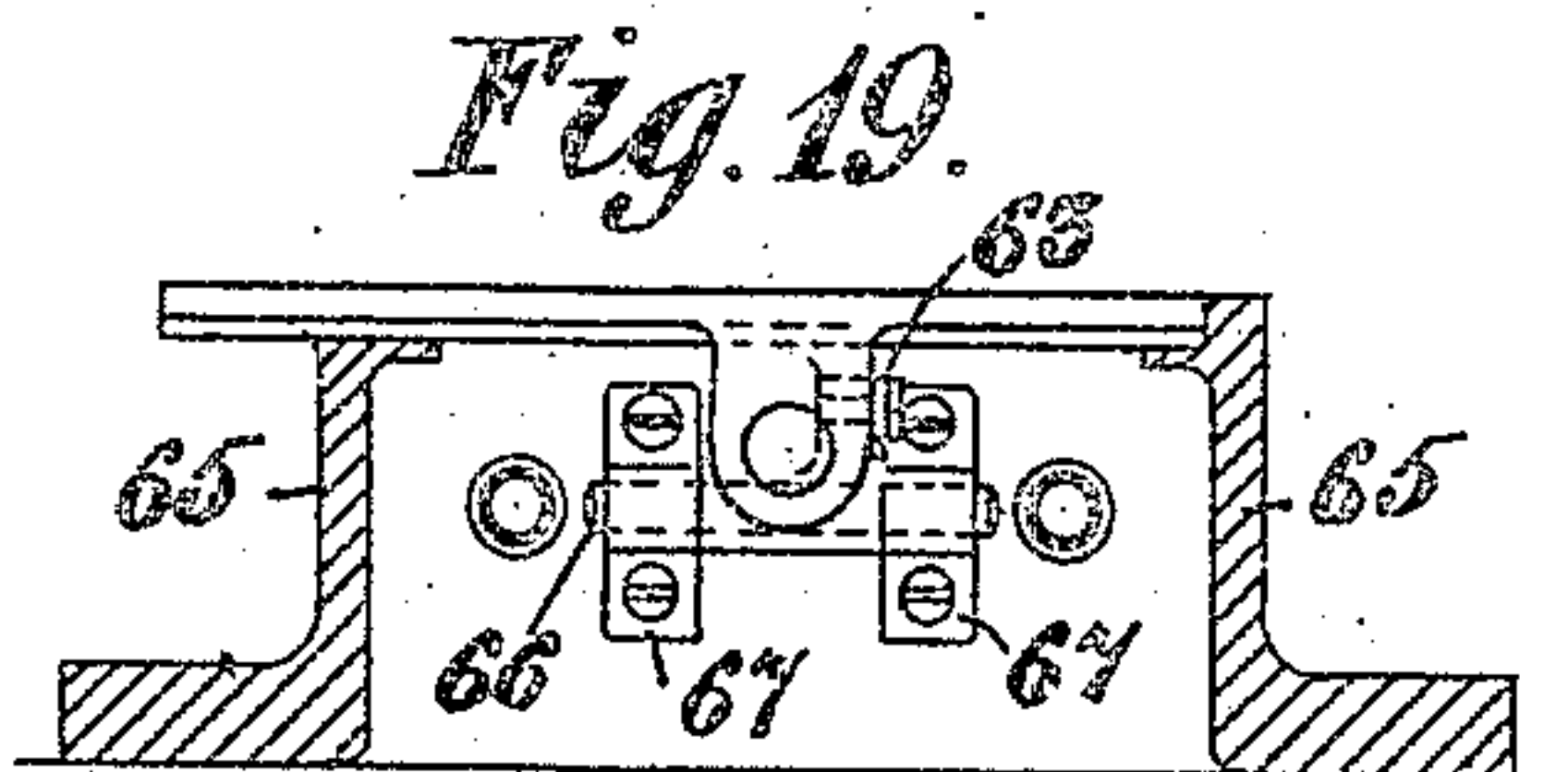
PATENTED JUNE 23, 1908.

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MACHINE FOR FORMING AND MAKING PAPER BAGS.

APPLICATION FILED OCT: 26, 1905.

7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

ALBERT DAY, OF LEEDS, ENGLAND.

MACHINE FOR FORMING AND MAKING PAPER BAGS.

No. 891,674.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed October 26, 1905. Serial No. 284,453.

To all whom it may concern:

Be it known that I, ALBERT DAY, a subject of the King of Great Britain and Ireland, residing at 21 Hartley avenue, Leeds, in the county of York, England, have invented new and useful Improvements in or Relating to Machinery for Forming or Making Paper Bags, of which the following is a specification.

This invention has reference to improvements in the machines described in the specification of Letters Patent of the United States granted to Charles Herbert Day and Albert Day on the twenty-ninth day of March 1904, No. 755754, for forming or making what are known as "open" bags. In the said specification means are described and shown for forming the bag from a roll of paper, and arranging the longitudinal edges of the paper, out of which the bag is formed, to be folded over each other at or about the center of the upper surface of the intermittently rotating "former."

The objects of the present invention are to provide means for first, feeding one or more sheets of paper,—which may, or may not, have been previously passed through a printing press,—separately to the folding box or mold and "former;" second, arranging for the longitudinal fold of the bag to be on one of the upper edges of the "former;" third, apparatus for holding the sheets of paper in position during the end creasing and folding operations; and fourth, supplying the gum or paste or other adhesive material to the end and other folds of the bag for retaining them in position. I attain these objects by mechanism illustrated in the accompanying drawings in which

Figure 1. is an end elevation of a "rectangular" bag showing its end folds. Fig. 1^A. an elevation of a machine with these improvements applied. Fig. 2^B. a plan of the same. Fig. 2. a side elevation of the gum applying and sheet feeding mechanism. Fig. 3. a plan of same. Fig. 4. an end elevation of the same. Fig. 5. an end elevation of slide or conveyer for transporting the sheet to the folding box. Fig. 6. a front of friction roller and gum device. Fig. 7. an end elevation of the same. Fig. 8. an end elevation of the gum pad. Fig. 9. a plan of same. Fig. 10. a part side elevation of arrangement for supplying a second sheet to the folding box. Fig. 11. an end elevation of same. Fig. 12. a plan of same. Fig. 13. a side elevation of a "former" with paper holding flap applied. Fig. 14. a plan

of same. Fig. 15. an end elevation of the "former" with mechanism applied for operating the holding flap. Fig. 16. a plan of the said operating mechanism. Fig. 17. a part elevation of a rod for operating the holding flap. Fig. 18. an elevation of a fixed rod for the same purpose. Fig. 19. a section of the edge or corner plate folder. Fig. 20. a transverse section of the same plate and means for actuating the same. Fig. 21. an elevation of the said edge or corner plate. Fig. 22. an end elevation of same. Fig. 23. a part elevation of mechanism for applying the glue to the end of the end folds of the bag. Fig. 24. an end elevation of same. Fig. 25. an elevation of cam for operating the sector. Fig. 26. an end elevation of same. Fig. 27. an enlarged elevation of horn. Fig. 28. an enlarged end elevation of same with end folder and link. Fig. 29. an enlarged plan of same with end folder and link removed.

Like parts in all the views are marked with similar letters of reference.

The folds made in the bag by the machine described in the aforesaid specification are formed with an end chiefly in the shape of a rectangle, as shown at Fig. 1,—such as is used for packeting dry soap,—in which the upper and lower projecting portions 1, 2, of the bag are folded and pressed against the end of the "former," then the two side pieces 3, 4, which by the foregoing operations would have been made to assume a pointed or triangular shape, are nipped or creased, and afterwards closed over the end of the "former."

In the machine described in the before mentioned specification the paper was described as being drawn by rollers from one or more continuous rolls and after being cut to length by an intermittently reciprocating knife was fed forward to an adjustable mold formed in the table of the machine. The piece of paper after being placed over the mold is carried down into the mold by intermittently reciprocating arms mounted upon a rising and falling shaft carried in bearings upon the framework. The piece of paper after an adhesive material has been applied to the longitudinal seam of the bag and while in the mold is closed over "formers" made in two parts sliding upon one another and mounted upon the said reciprocating arms. Afterwards the end is folded, pressed, and the adhesive material applied thereto before the bag leaves the "former." The same series of operations take place for each

"former," there being a "former" mounted upon each of the reciprocating arms.

In this invention the sheets of paper out of which the bags are formed, are fed separately to the machine instead of being cut from a roll as described in the first named aforesaid specification. This enables the guillotine or knife for cutting the papers to size to be dispensed with.

a is the table of the machine mounted upon standards or framework *b*. The table is provided with openings for the passage of mechanism for operating the hereinafter described parts.

c is the folding box; *d* the paper receiving table; *e* the slide that conveys the paper to the folding box; *f* radial arms mounted upon a shaft *f*¹ which is caused to rise and fall by a lever *f*^x and cam *f*^o mounted upon shaft *F*.

On each of the radiating arms *f* is mounted a rectangular shaped bag-former, hereafter termed "a former" *g* made in two parts, one of which parts is fixed to the arm *f*. The two parts of the "former" are made in, say, the

form of incline planes arranged so that the upper part of the former will slide upon the lower and fixed part, suitable dovetail or other guides or slides being formed therein or thereon for retaining them in the required

position. The inner end of the upper sliding portion of each former *g* is provided with a projecting rod *f*² in the inner end of which is mounted a runner *f*³, the periphery of which is retained in contact with a fixed cam *f*⁴,

through which shaft *f*¹ slides,—by a spring *f*⁵. The arms *g* are intermittently rotated, say, a quarter of a revolution as hereafter described. *h* the wiper or front plate; *i* the cam shaft of the machine, and *j* one of the

stays that connects portions of the framework together; 59 the driving shaft of the machine. C. D. fast and loose pulleys mounted upon the driving shaft. E a cam for operating the wiper *h* by means of lever 71 fulcrumed to the

pendent bracket *E*¹ fixed to the table *a*. F a counter shaft geared to the driving shaft 59 by spur gearing G. H. I. sprocket wheels mounted respectively upon shafts *F*, *i*, and connected together by endless chain J. K a

vertical shaft geared by miter wheels L with the shaft *i* at its lower end and having a crank M mounted upon its upper end for imparting an intermittent rotary motion to the shaft *f*¹ and arms *f* by means of lever N, pins

*N*¹, *O*, and disk *O*¹, carrying pawl *O*² which engages with the vertical bars *O*³ forming a ratchet wheel. P an eccentric mounted upon shaft *i* and connected by lever Q, rod R, and links S, for operating the slide *e*.

All the above described parts may be of a similar construction to those described in the before named specification, and the moving parts may be operated in a similar manner as therein described.

To feed the said sheets,—which may, or

may not, have printed matter upon them,—to the folding box or mold, hereafter termed "the folding box *c*," the following apparatus or mechanism is employed, namely:—At or about a right angle to the slide *e* that conveys the paper to the folding box *c* of the machine is mounted and fixed on the framework of the machine, say, a pair of standards *k*. In the said standards are provided bearings for the reception of a pair of guide rollers *l*, *m*. The guide rollers *l*, *m*, are arranged to draw a sheet of paper through them by friction, and one of them, say, the bottom roller, is arranged to apply the paste or gum, glue, or other adhesive mucilage or material,—all of which are hereafter termed and included in the term "gum,"—to the paper as it is drawn through the rollers. That is to say, the bottom roller *m* is not formed of one continuous diameter throughout, but is formed or built up in sections of two or more diameters—as shown at Figs. 4 and 6—and of different widths. The center portion 9 is of the smallest diameter and of the greatest width. To the central portion 9 is fixed a metal gum piece or pad *n* of any suitable shape at its top,—say, for example, but not necessarily so, with an upstanding portion in the form, as shown at Fig. 9, that is, with ends shaped somewhat like two U's placed with their bottom portions vertically to each other, but at a distance apart, and connected together by a strip *o* of suitable width,—that will supply, say, the gum in position for holding the portions of the sides of the bag when folded together, as follows:—The gum is applied to a sheet of paper out of which the fold 1 is produced so that when the fold 2 is turned over and pressed against the end of a "former" *g* and on to the fold 1, they are secured in position by the gum thereon in the shape described. The said gum pad *n* does not extend the full width of the sheet of paper. At each end of and at a distance from the ends of the center portion 9 of the bottom roller, is formed or fixed on the spindle *p*,—the ends of which project beyond the roller,—that carries the center portion, a narrow friction or drawing portion 10 and 11. These last named portions 10, 11, are each larger in diameter than the center portion, but they are slightly above the upper edge or surface of the said gum piece *n*. The friction or drawing portions 10, 11, of the bottom roller are arranged, if so desired, but not necessarily so, to work in watertight compartments (not shown in the drawings), so as to prevent any gum adhering to their peripheries. Another portion 12,—a gum or mucilage supplying portion,—formed at a distance from the friction or drawing portion 10 of the bottom roller, is provided, and it is provided with a suitable recess 13 in its periphery. This last named portion is employed for supplying the gum in a narrow

strip to the paper along the portion forming the longitudinal seam of the bag when on the "former" *g*, and therefore at or about a right angle to that supplied by the gum piece *n* for the end folds. The recess 13 in the periphery of the portion 12 provides for the insertion of the sheet of paper, as well as preventing the strip of gum from extending the full length of the sheet of paper. The said gum piece *n* and portion 12 are arranged to work or rotate in one or more gum troughs *q*, *r*, shown in dotted lines at Fig. 3. The said troughs are provided with one or more adjustable or other scrapers of ordinary construction for removing the surplus gum from it or them. The trough *q*, *r*, may be water jacketed and provided with suitable gas or other heating apparatus for keeping the gum or mucilage in a liquid state.

The standards *k* are provided with a flat horizontal portion *s* for receiving a pile of sheets of paper; and also with an incline *t* down which the sheets are fed separately to the rollers *l*, *m*. On the incline *t* are provided one or more adjustable guides *u* so that each sheet of paper may be fed accurately to the said rollers and gum applying mechanism. At a suitable distance from and in front of the said rollers two bearings in the form of brackets *v* are fixed to the framework *b*. In the said brackets *v* a spindle or short shaft *w* is mounted so as to be capable of oscillating freely. On the said spindle *w* a number of partly curved lifter brackets *x* are mounted and fixed at convenient distances apart. Two of such brackets are shown at Fig. 3. To each of the brackets *x* a long narrow strip of metal, or wood, or other material is fixed to form the fingers of an oscillating lifter grid *z* that receives the paper as it issues from between the rollers *l*, *m*, and gum apparatus *n*. The oscillating grid *z* conveys the paper as it issues from the rollers *l*, *m*, to the slide *e* that works on the table *d* and in connection with the folding box *c*. The lifter grid *z* is arranged during its oscillating motion to turn the paper over so that when a sheet 31 of paper is deposited upon the said slide the gummed side is uppermost. The action of the slide is similar to that described in the hereinbefore mentioned specification for conveying the paper to the folding box *c*. The "formers" *g* are in a raised position when the sheet 31 of paper is laid over the top of the folding box.

The above described parts are arranged to be operated as follows:—The rollers *l*, *m*, are so geared as to remain stationary, say, for about three-fourths of a revolution of the driving or other convenient shaft of the machine, say, the cam shaft *i*, and during the remaining, say, one-fourth of the revolution of the said shaft the rollers make a complete revolution for drawing in, gumming, and de-

livering the sheet of paper with the gummed side downwards on to the grid. The rollers *l*, *m*, are geared together by spur wheels 14 at one end. On the opposite end of the spindle *p* which carries one of the spur wheels 14 is mounted one of a train of spur wheels 15 to a shaft or spindle or pin (a spindle 16 is shown at Fig. 4) carried in a suitable bearing or bearings 17 fixed to the framework. On the spindle 16 which carries one of the spur wheels 15 mounted thereon, is a star wheel 18, or Geneva stop as it is sometimes called. The star wheel 18 is fixed to the said spur wheel, and it is provided with, say, four slotted arms, one of which is arranged to engage a runner or pin 19 on a disk 20 provided on one side thereof with a projecting rim or ring 21. The diameter of the rim or ring 21 is such that it fits the curves between each of the slotted arms of the star wheel. The disk 20 is mounted and fixed on a shaft 23 carried by brackets 24 fixed to the framework, and it receives motion from any rotating part of the machine, such as driving or cam shafts of the machine and gearing, whenever the rollers are required to make a revolution.

The lifter grid *z* is timed to operate in conjunction with the rollers *l*, *m*, and the required motion for oscillating the same is imparted by means of a cam 25 mounted and fixed upon the last named shaft 23 acting upon one end of a bell crank or other lever 26, working on a pin 27 fixed to the framework, or to a bracket 28 attached thereto. To the other end of the bell crank lever is fixed (adjustably or otherwise) a spur segment 29 which gears with a spur wheel 30 mounted and fixed upon the same spindle *w* that carries the grid finger lifter brackets *x*. When a second sheet of paper, which is usually of a smaller size than the hereinbefore first mentioned sheet 31, is required to be used as, say, a lining for the bag, then it may be fed to the folding box *c* after the first sheet has been conveyed thereto by the hereinbefore mentioned slide *e* and placed upon the first sheet before the latter passes into the folding box, whereby the two sheets are folded together simultaneously. The mechanism for feeding the second sheet is arranged as follows:—On the framework *b* and at or about a right angle—or in any other suitable position—to the longitudinal length of the folding box *c*, is a small framework 32 (Figs. 10, 11, 12) provided with a small hopper 33 at its top into which a sheet of paper is deposited by hand, or by any other suitable means. In the framework 32 carrying the hopper a horizontal slide 34,—working in suitable guides,—is arranged to be intermittently reciprocated for carrying the second and slightly smaller sheet of paper over the folding box after the first sheet 31 has been conveyed thereto.

The said slide is arranged to work immediately under the lower orifice of the hopper, and it is provided with a recess 35 at its inner end for receiving the second sheet that requires to be conveyed to the folding box *c*. The said horizontal slide 34 may, when required, be made to rise in its guide—but such is not shown in the drawings—while the “former” is descending into the folding box to prevent gum adhering to the underpart of slide. The front or inner end of the said slide is also slotted or bifurcated at 36 to permit a “former” *g* passing into the folding box *c* and carrying the papers with it. An intermittent reciprocating motion is imparted to the said slide 34 from a barrel or other cam 37,—mounted and fixed upon, say, the “former” cam shaft *i*,—through a lever 38 mounted,—so as to work freely,—at its lower end on the pin 39 of a fixing 40 attached to one of the stay rods *j* of the machine. The upper end of lever 38 is connected at its upper end by a link 41, pin 42, and lug 43 to the said slide 34.

When a sheet or piece of paper is folded into a bag with, say, the edges of its longitudinal fold (when on the “former” *g*) at or near one of the edges of the said “former,” instead of at or about the center of the latter as in the hereinbefore mentioned specification, then in addition to holding it in position at one point by the wiper plates *h*, as in the aforesaid specification, to the arm *f* carrying the stationary portion of each “former” is attached a hinged flap or lever 44 (Figs. 13, 14, 15), for holding the folded edges of the paper securely in position. The said flap or lever 44 is suitably shaped and curved, as shown at Figs. 13 and 14, and it is mounted upon a pin 45 arranged to pass through lugs or projections 46 fixed to the arm *f* carrying the stationary portion of the “former.” To the underside of the flap or lever at its front end is fixed a piece of india-rubber 47 for enabling the flap or lever to bed itself to its work and also to tightly hold the folded portion in position. At or near the opposite end of the underside of the flap or lever 44 is provided an incline or cam piece 48. Projections 49, 50, are also provided respectively on each of the longitudinal edges of the flap or lever 44 at a suitable distance from its joint or hinge for purposes to be presently described. Upon the upper surface of each of the said projections the free end of spring 51 coiled round the pin 45 is made to work for retaining the flap or lever in a closed position. The said flap or lever is operated for raising the same and causing it to turn upon its hinge,—when the “former” has been rotated into position for passing into the folding box *c* prior to the upstanding portions of the sheet or sheets being folded over by their respective wipers,—by a vertical pin 52,—carried in suitable bearing 53 which

is fixed to the table *a* of the machine,—connected by a link 54, and fixing 55 to the end of a bell crank lever 56,—fulcrumed to a bracket 57, which is fixed to the table.

The lower end of lever 56 has fixed to it a runner 60 which works against a cam 58 mounted say, upon the shaft 59. The lever is actuated by the cam for intermittently raising the pin 52 employed for operating the lever or flap. As the said vertical pin 52 is raised it is made to come in contact with the incline or cam piece 48 formed upon the underside of the flap or lever 44, and thereby raises the front end of the same. The operating cam 58 is so timed to act upon the bell crank lever 56 that the flap or lever will be allowed to descend upon the folded paper as soon as the wipers *h* have folded the paper on the “former.” The arm *f* carrying the “former” *g* is then raised out of the folding box *c* and rotated for permitting the end of the bag to be folded. The flap or lever 44 is retained by the ends of spring 51 in a closed position until the bag is ready to be removed from the “former.” When the point at which the bag is to be removed from a “former” is reached, as the arm *f* carrying the “former” descends, the projection 50 on the flap or lever 44 is made to come in contact with a vertical pin 61 carried by a bracket 62 which is fixed to the table which raises the flap or lever for releasing its hold upon the bag. The intermittently reciprocating vertical pin 52 is arranged at or near the folding box *c* and the fixed pin 61 at the bag discharging point 93 as shown at Fig. 12. A separate flap or lever is provided for each “former.” The whole of the flaps or levers are operated upon by the pins 52 and 61 as the folding box and bag discharging points are respectively reached.

To fold the portion of the sheet or sheets, what is termed the longitudinal seam when the bag is being made on the “former,”—but which is really the vertical seam of the bag when in use,—and which according to this invention is folded a short distance over the edge of the “former,” the mechanism is arranged as follows:—To the underside of the existing front wiper or folding plate *h*,—which works in the guides 65,—is connected, by a link 63, (Fig. 20) a closer plate 64, as shown at Figs. 20 to 22. The closer plate is formed at its center, in cross section, somewhat like an inverted letter L, and it is mounted on a pin 66 carried in bearings 67 attached to the guides 65 below the front wiper or folding plate *h*. The guides are fixed to the table *a*. The front portion of the closer plate 64 is made to extend the full length of the “formers” and to project each side of the guides 65 to which it is jointed. The link 63 is attached to a projection 69 formed at the back of the closer plate. On the underside of, and at the required dis-

tance from the closer plate 64 is a projection 68 which extends the full length of the said plate. The said projection rests upon the upper edge of the folding box *c* when the closer plate has been moved into position for folding the longitudinal seam, as shown at Fig. 20, for enabling a recess to be formed, whereby the paper may be folded tightly against the side and upper surface of the "former." The existing front wiper or folder plate *h* is operated by link 70 and lever 71 actuated by cam *E* mounted upon shaft *i*, and the existing opposite or back folding plate 94 will require a slightly increased traverse imparting to it.

To supply the gum for securing the two side lugs 3, 4, to the bottom portion of the bag after the top and bottom folds 1, 2, have been closed and the two side lugs have been creased and folded ready for closing, a bracket 72 (Figs. 23 and 24) is fixed to the framework *b*. On the top of the bracket the gum box or pot 73 is mounted and fixed with or without a heating arrangement of any ordinary construction. The gum box or pot may, or may not, be partially covered at the top. To one of the brackets 74 to which the levers 75, 76,—carrying the end wipers 77, 78,—are fulcrumed, a small bracket or bearing 79 is fixed to which a suitably shaped double ended lever 80 is fulcrumed and arranged to work in a vertical position. The lever 80 is actuated at its lower end by a cam 81 mounted upon, say, the same shaft *i* that carries the cams 82, 83, for operating the end wiper levers. A spring 84 is employed for keeping the end of each lever in contact with its operating cam. The upper end of the lever 80 is connected by a link 85 to a suitably shaped curved and cranked lever 86 which is fulcrumed to a fixing or arm 87 which is either formed on or attached to the bracket 72 which carries the gum box or pot 73. On the inner face of the upper end of lever 86 are provided projections 95 (Fig. 24) shaped somewhat like the letter *H* for applying the gum in this shape to the end folds 1, 2, of the bag. The free or upper end of the lever 86 is so arranged that when it is tilted over by the double ended lever 80 it will dip into the gum box or pot for raising the required amount of gum that is required to be placed and deposited by it,—when it is raised from the gum box,—on to the folded portions 1, 2, of the bag upon the end of the "former."

To secure the end fold 1 of the bag being properly closed and formed, below the bracket 90 carrying the end folder 91 is provided and fixed a plate 88, shown at Figs. 27 to 29. From the side of the plate 88 a pair of horns 89 is made to project both outwardly and upwardly. The inner face of each of the horns 89 is made to taper downwardly, that is to say, the space between the inner faces of the two horns 89 is larger at the top than at the

bottom. This tapering of the horns enables the folder 91 as it descends between the horns to crease and fold the paper to the required form for more perfectly folding as well as facilitating the folding of the remaining portions of the end of the bag. The just mentioned descent of the "former" *g* takes place when it has been rotated,—after rising from the folding box *c*,—with the sheet or sheets of papers wrapped around it and the longitudinal seam formed,—to point 92, Fig. 12.

The other parts of the machine may be of a similar description to those described in the herein before mentioned specification and they may be arranged to operate in a similar manner.

The action of the above named several parts is as follows:—The sheet 31 of paper which forms the main portion of the bag is passed down incline *t* to the rollers *l*, *m*,—where it is gummed by the pad *n* and portion 12,—on to the finger *z* by which it is turned over and carried to the table *d* to be conveyed by the slide *e* to and over the folding box *c*, but under the raised arms *f* and "formers" *g*. After the slide *e* has been withdrawn and when a second paper lining is required, this is placed in the hopper 33 and falls into the recess 35 of the slotted slide 34. The slotted slide conveys the second sheet over the folding box *c* immediately after the first sheet 31 has been deposited there by the slide *e*. The arms *f* are then caused to descend carrying with them one of the "formers" *g* through the slotted slide 34 into the folding box *c*. At the same time the sheets of paper are carried down into the folding box, they are wrapped around the underside and the two sides of the "former" with the paper projecting on each side above its upper surface. When the "former" has descended into the folding box *c* the vertical pin 52 is caused to rise and fall for raising the front portion of the flap or lever 44 to permit of the upstanding portions of the sheets being folded on to the top of the "former" and acted upon by wiper plate 94 and closer plate 64. After the wiper plate 94 has been operated and while the closer plate 64 is still in contact with the folded sheets, the flap or lever 44 is allowed to descend for holding the paper in position upon the "former" until the end forming the bottom of the bag has been closed. The "former" is then raised out of the folding box and rotated to position 92 (Fig. 12) when it is again made to descend against the horns 89 and to be afterwards acted upon by the end folder 91 for forming fold 1. The "former" is again raised and rotated to position 96 (Fig. 12) and in its descent the folds 3, 4, are made by the end wipers 77, 78, and the gum for the last folds applied by double ended crank lever 86. The "former" is then raised and rotated to position 93 (Fig. 12) and after the folds have been closed against the end of the

"former," the free end of the flap or lever 44 is raised by the fixed pin 61 and the bag ejected from the "former."

What I claim as my invention, and desire to secure by Letters Patent, is:—

1. The combination in a bag forming machine of standards fixed to the framework of the machine and having an inclined paper guide fixed thereto, adjustable bearings sliding in the standards, a pair of intermittently rotating rollers mounted in said bearings and geared together, one of said rollers being divided into sections for drawing the sheet of paper through the rollers, and for gumming the sheet at different points, a gum pad fixed to the central portion of said roller, a gum pot fixed below the pad into which it dips, an intermittently oscillating grid for receiving and turning over the gummed paper, a table for receiving the paper from the grid, and means for intermittently operating the said rollers and the grid the said means consisting of a shaft mounted in bearings below the table, a train of spur wheels for gearing the said shaft and one of the said rollers together, a slotted star wheel mounted upon the boss of one of said spur wheels, a disk mounted upon the said shaft, a runner fixed to the disk and adapted to engage with the slots of the star wheel, a cam mounted upon the cam wheel shaft, a spindle carried in bearings below the table, a bell crank lever mounted on the said spindle engaging with said cam, a spur segment fixed to the bell crank lever, a pinion mounted on a shaft carried in bearings above the table, brackets mounted upon said shaft having grid fingers fixed thereto, substantially as set forth.

2. The combination in a bag forming machine of standards fixed to the framework of the machine and having an inclined paper guide fixed thereto, adjustable bearings sliding in the standards, a pair of intermittently rotating rollers mounted in said bearings and geared together, one of said rollers being divided into sections for drawing the sheet of paper through the rollers, and for gumming the sheet at different points, a gum pad fixed to the central portion of said roller, a gum pot fixed below the pad into which it dips, an intermittently oscillating grid for receiving and turning over the gummed paper, a table for receiving the paper from the grid, and means for intermittently operating the said rollers and the grid, a slide for conveying the gummed sheet of paper to the folding box, a folding box mounted upon the table, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating the said shaft and for causing it to rise and fall, arms mounted upon the said rising and falling shaft, a series of "formers" mounted upon said arms, each "former" being made in two parts adapted to slide one upon the other, means for inter-

mittently reciprocating the sliding parts of the "formers" guides arranged at right angles to the folding box, a hopper at one end of said guides, an intermittently reciprocating slotted and recessed slide working under the hopper for receiving a second sheet of paper as it falls from the hopper and conveying it over the top of the folding box and placing it upon the first sheet before the latter passes on to the folding box, whereby the two sheets are folded simultaneously, and means for intermittently reciprocating the said slide, substantially as set forth.

3. The combination in a bag forming machine of standards fixed to the framework of the machine and having an inclined paper guide fixed thereto, adjustable bearings sliding in the standards, a pair of intermittently rotating rollers mounted in said bearings and geared together, one of said rollers being divided into sections for drawing the sheet of paper through the rollers, and for gumming the sheet at different points, a gum pad fixed to the central portion of said roller, a gum pot below the pad into which it dips, an intermittently oscillating grid for receiving and turning over the gummed paper, a table for receiving the paper from the grid, and means for intermittently operating the said rollers and the grid, a slide for conveying the gummed sheet of paper to the folding box, a folding box mounted upon the table, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating the said shaft and for causing it to rise and fall, arms mounted upon the said rising and falling shaft, a series of "formers" mounted upon said arms, each "former" being made in two parts adapted to slide one upon the other, means for intermittently reciprocating the sliding parts of the "formers" guides arranged at right angles to the folding box, a hopper at one end of said guides, an intermittently reciprocating slotted and recessed slide working under the hopper for receiving a second sheet of paper as it falls from the hopper and conveying it over the top of the folding box and placing it upon the first sheet before the latter passes on to the folding box, whereby the two sheets are folded simultaneously, and means for intermittently reciprocating the said slide, a series of "formers" each "former" being made in two parts sliding one upon the other, one of each of said parts being attached to each of the said arms, means for intermittently reciprocating the sliding part of the "formers" a flap lever jointed to each of said arms, and arranged to work over the sliding portion of the "former," and means for intermittently releasing the same, substantially as described.

4. The combination of the table of the machine and of the folding box, with a platform mounted and fixed upon the said table against

the folding box, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating said shaft and for causing it to rise and fall, arms mounted upon said rising and falling shaft, a series of "formers" mounted upon said arms, each "former" being made in two parts adapted to slide one upon the other, a wiper plate adapted to work partially over the top of the folding box, a wiper working upon the platform, a corner plate jointed to the platform, a link for connecting it to the last named wiper and means for intermittently actuating the same, substantially as described.

5. The combination of the table of the machine and of the folding box, with a platform mounted and fixed upon the said table against the folding box, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating said shaft and for causing it to rise and fall, arms mounted upon said rising and falling shaft, a series of "formers" mounted upon said rising and falling arms each "former" being made in two parts adapted to slide one upon the other, a wiper plate adapted to work partially over the top of the folding box, a wiper working upon the platform, a corner plate jointed to the platform, a link for connecting it to the last named wiper, means for intermittently actuating the same, guides arranged at right angles to the folding box, a hopper at one end of said guides, an intermittently reciprocating slotted and recessed slide working under the hopper for receiving a second sheet of paper as it falls from the hopper and conveying it over the top of the folding box, and placing it upon the first sheet before the latter passes into the folding box, whereby the two sheets are folded simultaneously, and means for intermittently reciprocating the said slide, substantially as set forth.

6. The combination of the table of the machine and of the folding box, with a platform mounted upon and fixed to the said table against the folding box, the two slides for supplying the two sheets of paper separately to and over the folding box, means for operating the said two slides, guides arranged at a right angle to the folding box, a hopper at one end of the guides for receiving and supplying the second sheet of paper to its slide, end folders jointed to the table of the machine, means for actuating the same, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating said shaft and for causing it to rise and fall, arms mounted upon the said rising and falling shaft, "formers" made in two parts to slide one upon the other and attached to said arms, means for operating the "formers," and a horn fixed to the framework of the machine, and having inner faces

tapering downwardly for creasing and folding the paper forming the end fold of the bag as the folder descends between them, substantially as described.

7. The combination of the table of the machine and of the folding box, with a platform mounted upon and fixed to the said table against the folding box, the two slides for supplying the two sheets of paper separately to and over the folding box, means for operating the said two slides, guides arranged at a right angle to the folding box, a hopper at one end of the guides for receiving and supplying the second sheet of paper to its slide, end folders jointed to the table of the machine, means for actuating the same, a horn fixed to the framework of the machine, and having inner faces tapering downwardly for creasing and folding the paper forming the end fold of the bag as the folder descends between them, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating the said shaft and for causing it to rise and fall, arms for supporting the formers mounted upon said shaft, the "formers" made in two parts to slide one upon the other and fixed to the said arms, a gum box mounted upon brackets fixed to the framework, a tilting lever with gum pieces shaped as described for applying the gum to the end folds of the bag, means for actuating the tilting lever, side wipers for closing the side lugs of the bag after the gum has been applied, substantially as described.

8. The combination in a bag forming machine of standards fixed to the framework of the machine and having an inclined paper guide fixed thereto, adjustable bearings sliding in the standards, a pair of intermittently rotating rollers mounted in said bearings and geared together, one of said rollers being divided into sections for drawing the sheet of paper through the rollers, and for gumming the sheet at different points, a gum pad fixed to the central portion of said roller, a gum pot fixed below the pad into which it dips, an intermittently oscillating grid for receiving and turning over the gummed paper, a table for receiving the paper from the grid, means for intermittently operating the said rollers and the grid, a slide for conveying the gummed sheet of paper to the folding box, the folding box mounted upon the table, a rising and falling shaft mounted in bearings on the framework of the machine, means for intermittently rotating the said shaft and for causing it to rise and fall, arms mounted upon the said shaft, guides arranged at right angles to the folding box, a hopper at one end of said guides, an intermittently reciprocating slotted and recessed slide working under the hopper for receiving a second sheet of paper as it falls from the hopper and conveying it over the top of the folding box

and placing it upon the first sheet before the latter passes into the folding box, whereby the two sheets are folded simultaneously, means for intermittently reciprocating the said slide, a series of "formers," each "former" being made in two parts sliding one upon the other, one of each of said parts being attached to each of the said arms, means for intermittently reciprocating the sliding part of the "formers," a flap lever jointed to each of said arms, and arranged to work over the sliding portion of the "former," means for intermittently releasing the same, the end folders, means for operating the same, a horn fixed to the framework of the machine, and having inner faces tapering downwardly for

creasing and folding the paper forming the end fold of the bag as the folder descends between them, a gum box mounted upon brackets fixed to the framework, a tilting lever with shaped gum pieces for applying the gum to the end folds of the bag, means for actuating the tilting lever, side wipers for closing the side lugs of the bag after the gum has been applied, substantially as described. 20 25

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT DAY.

Witnesses:

WILLIAM SADLER,
ANNIE PARK.