

(No Model.)

5 Sheets—Sheet 1.

L. C. CROWELL.
NEWSPAPER WRAPPING MACHINE.

No. 500,117.

Patented June 27, 1893.

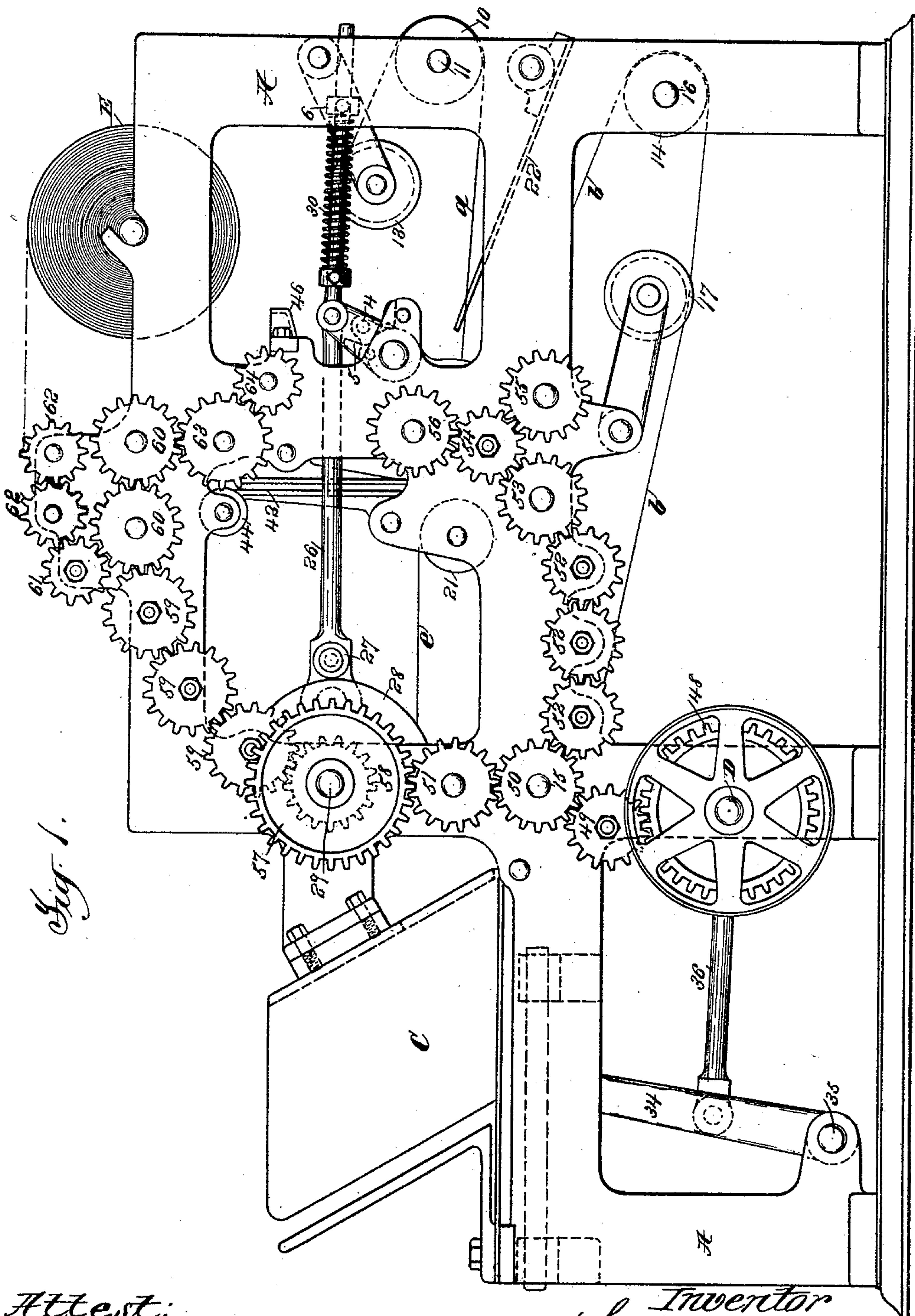


Fig. 1.

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Inventor
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(No Model.)

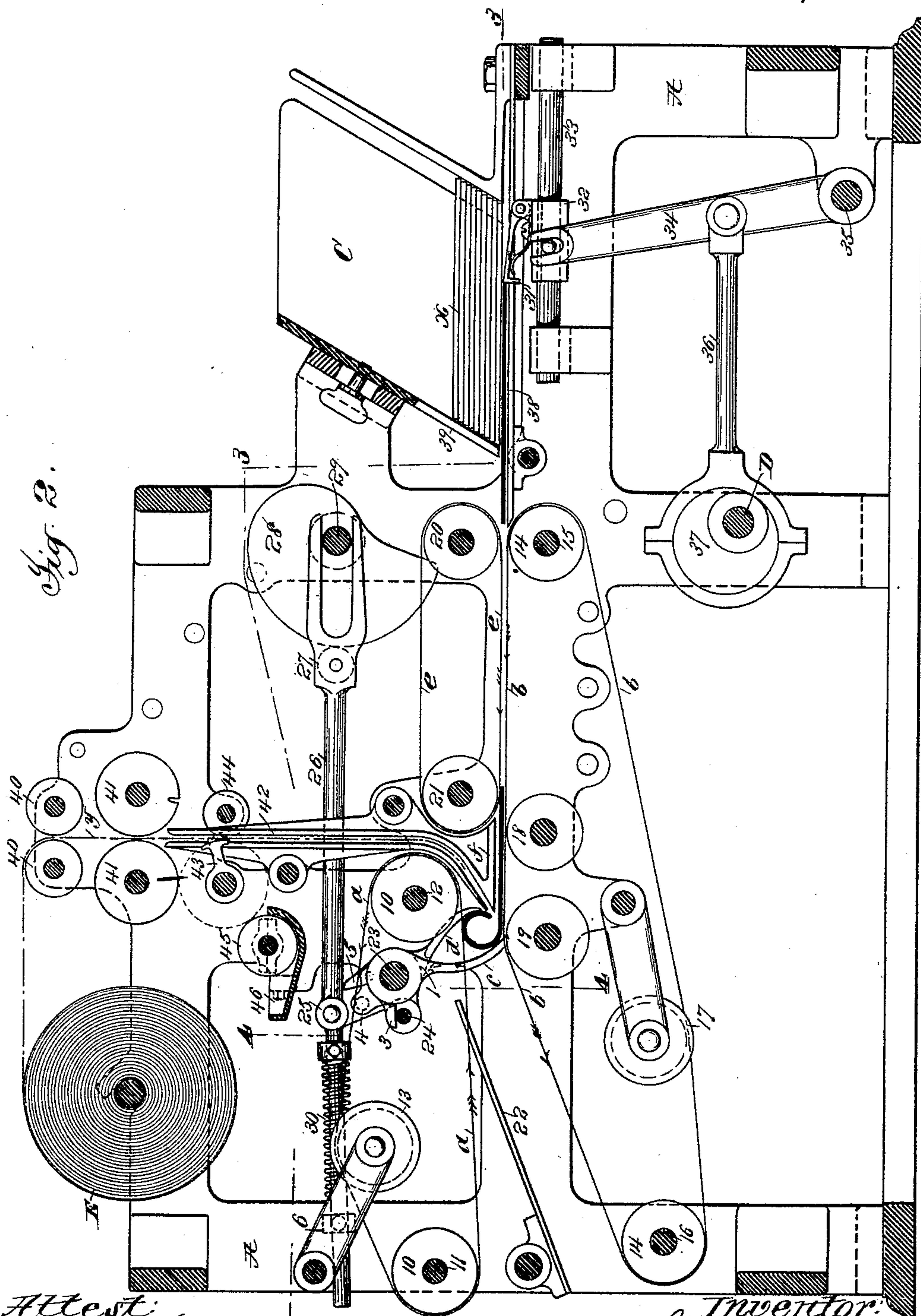
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Fig. 2.



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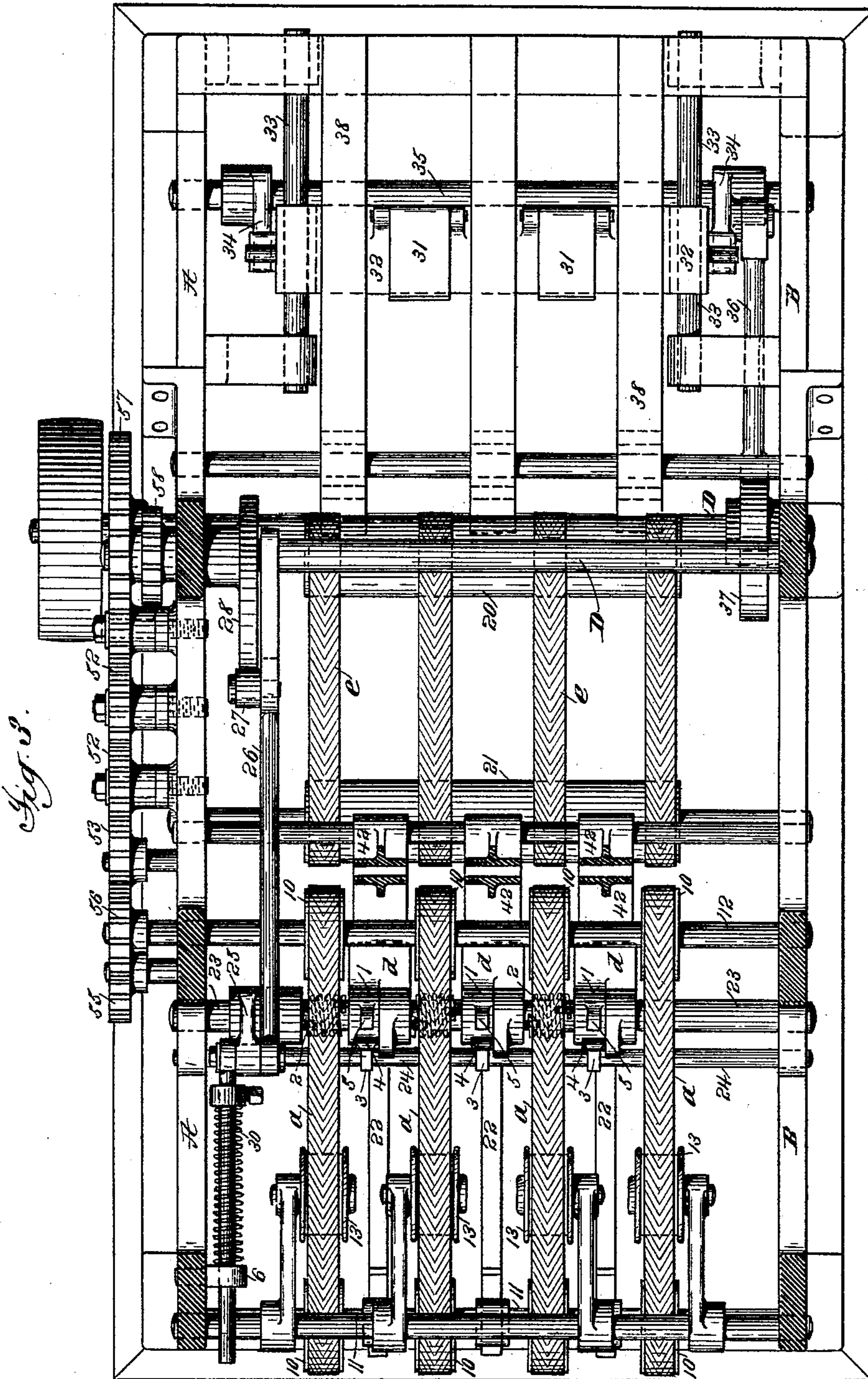
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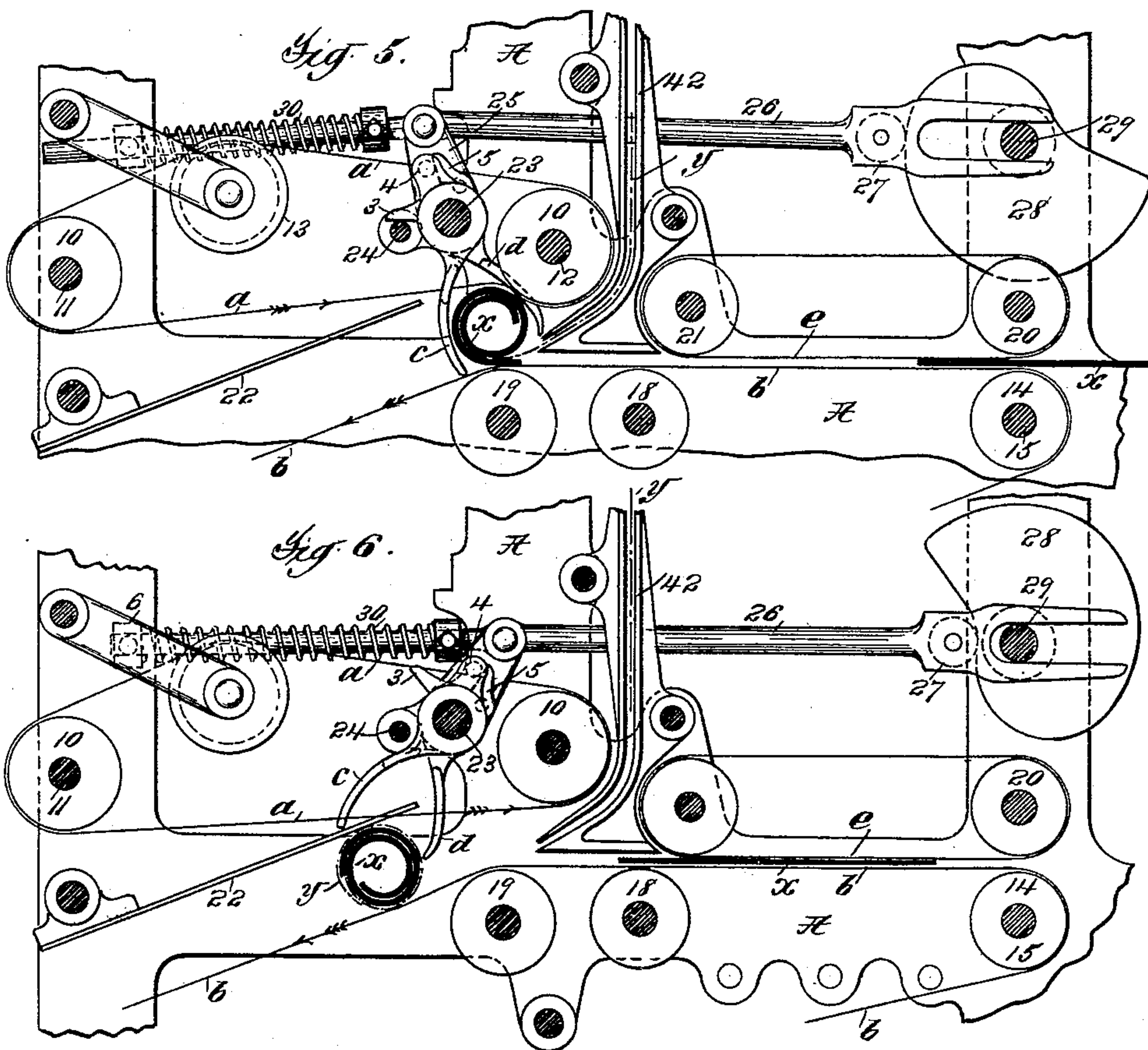
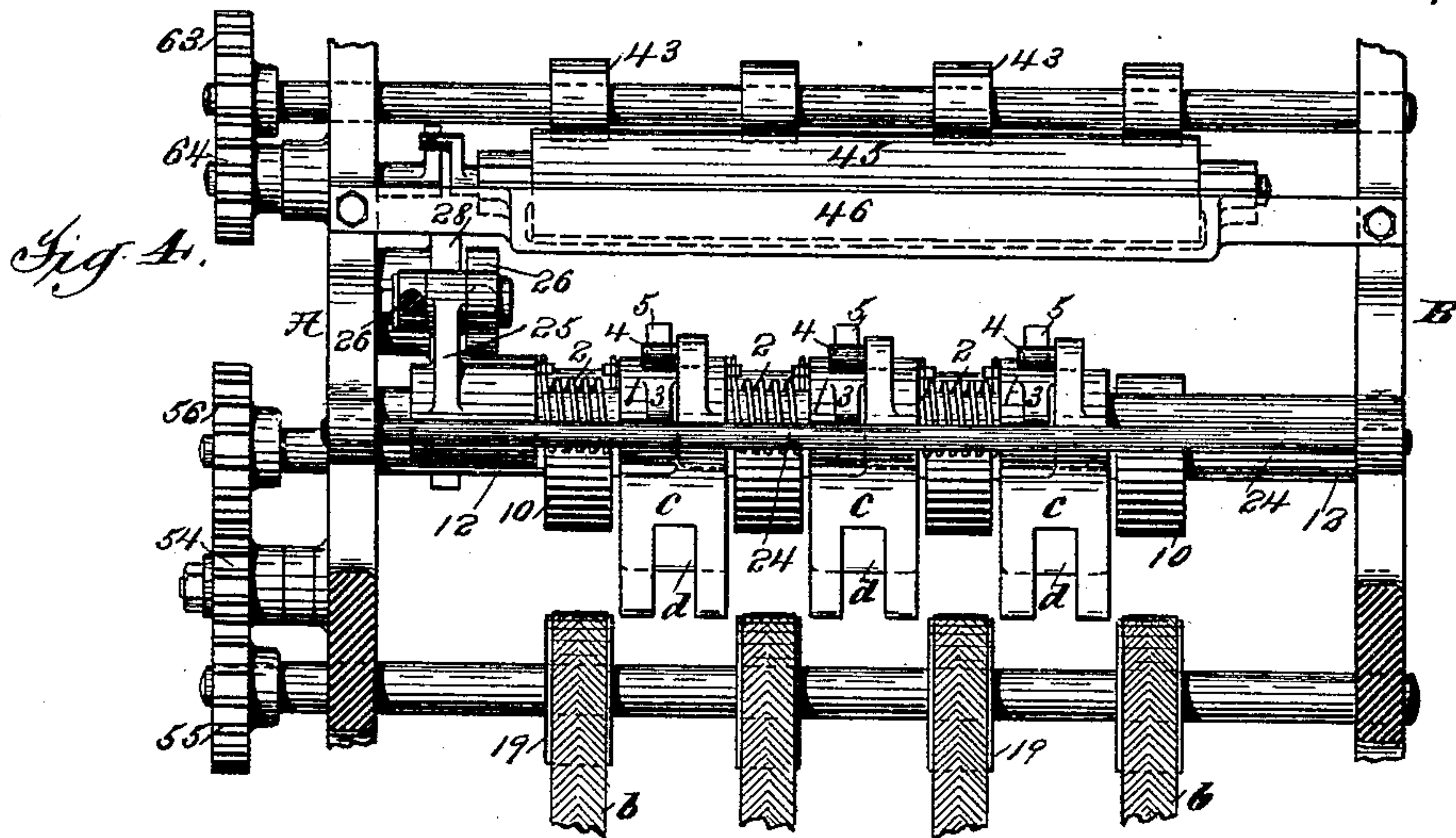
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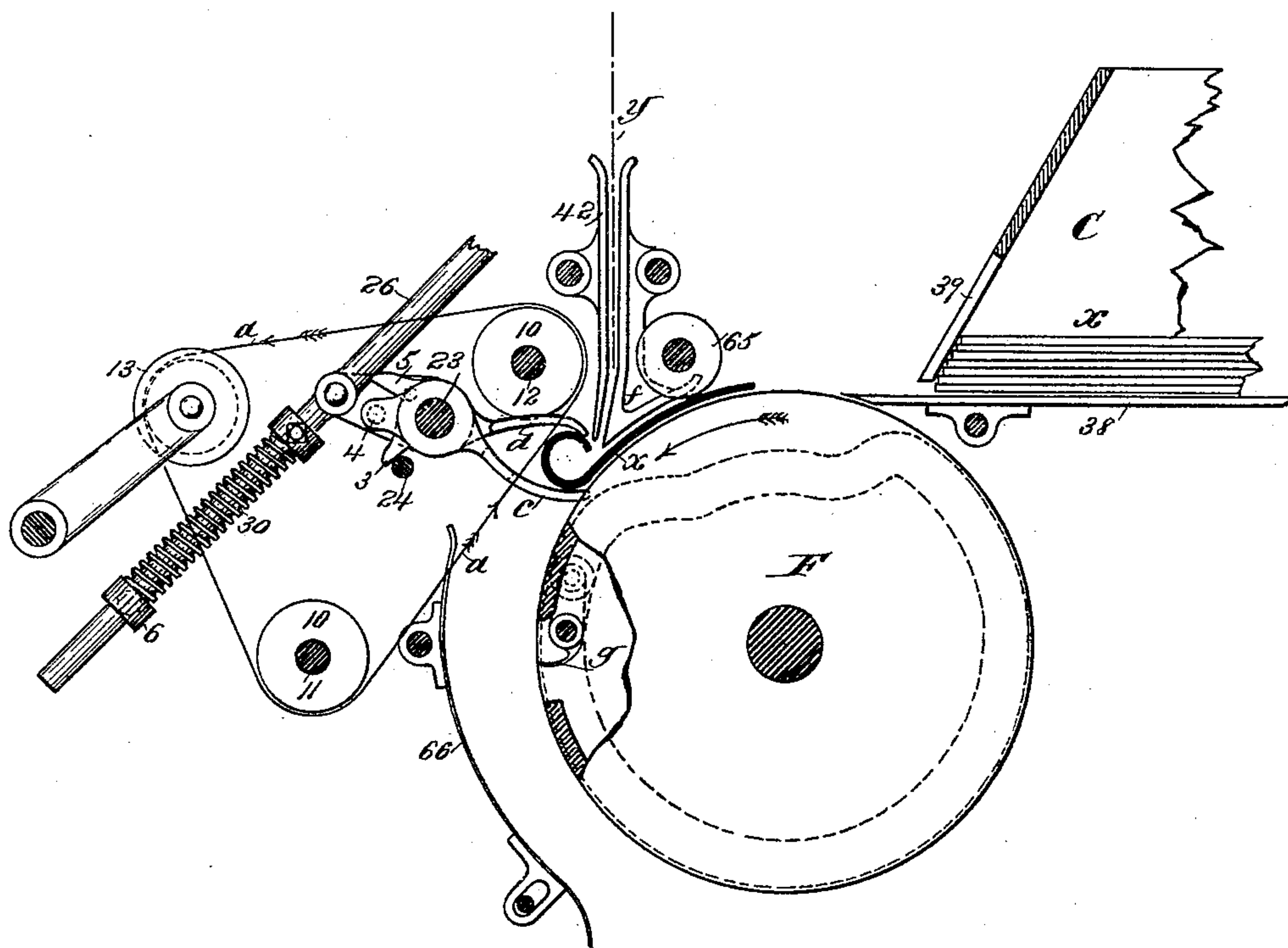
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Fig. 7.



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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO ROBERT HOE, STEPHEN D. TUCKER, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

NEWSPAPER-WRAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 500,117, dated June 27, 1893.

Application filed April 1, 1893. Serial No. 468,671. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Newspaper-Wrapping Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of the present invention is to provide an improved wrapping machine of that class used for wrapping newspapers and other publications for mailing, and generally known as newspaper wrapping machines, and especially to provide a simple and efficient wrapping machine of high capacity.

In other applications, Serial No. 432,363, filed May 9, 1892, Serial No. 446,782, filed September 24, 1892, and Serial No. 448,928, filed October 15, 1892, I have described and claimed broadly and specifically wrapping machines in which the paper is rolled into circular form by feeding rolls, belts, or other suitable feeding devices engaging the outer surfaces of the paper, a wrapper wound about the paper and its pasted end secured, and the wrapped product delivered either endwise or sidewise between the feeding devices.

The invention in the present case relates to machines operating on this principle in which the paper and wrapper are rolled and wrapped between guides by the feeding devices, which guides are actuated so as to release the wrapped paper for delivery, and the invention consists broadly in the combination with guides arranged on opposite sides of a wrapping space and actuated to open the wrapping space for the delivery of the wrapped paper, of feeding devices co-acting therewith to roll a paper and wrapper together within the wrapping space and secure the pasted wrapper, and in various constructions and combinations of parts, all of which will be fully described in the following specification, and specifically pointed out in the claims. It is evident that the guides and operating means therefor, and the feeding devices co-acting therewith to roll the paper and wrapper to-

gether within the wrapping space formed by the guides and secure the wrapper may be varied, and that the wrapped paper may be delivered in different ways. It is preferable, however to use belts as the feeding devices, or a part thereof, and it is preferable that the paper be delivered sidewise, that is, in a direction parallel with the movement of the feeding devices, not only on account of the shorter delivery movement required, but also because the belts have a tendency to hug the wrapped paper, and its delivery endwise, that is, in a direction transverse to the movement of the belts would require a complicated construction of the parts co-operating therewith. I preferably arrange the feeding devices and guides in such a manner that the guides carry the paper in the line of movement of the feeding devices, and release the paper in such a manner that the action of the feeding devices tends to carry the wrapped paper out from between the guides, the parts being preferably so arranged that the wrapping space between the guides is opened on the lower side so that gravity tends to force the wrapped paper from the wrapping space, and this, together with the feed of the feeding devices, insures the quick delivery of the wrapped paper. The belts or other feeding devices may be of any suitable width and number, but I prefer to use belts of moderate width, and to place them quite close together, so that a considerable surface of the paper is engaged thereby. The wrapped papers may be delivered directly from the wrapping devices, but I prefer to transfer them from the wrapping devices to feeding and delivery devices arranged to hold the paper and pasted wrapper in position a sufficient time to secure the setting of the paste, thus increasing the speed at which the papers may be wrapped and delivered. The papers and wrappers, or either of them, may be fed to this wrapping mechanism by hand, but suitable feeding devices for automatically advancing both the papers and wrapper to the wrapping mechanism will preferably be combined therewith, so as to form an automatic high capacity machine. The papers may be supplied to the machine

folded or partially folded, or may be folded by mechanism embodied in or forming a part of the machine. The wrappers also may be previously cut to the desired size and fed to the wrapping mechanism as sheets, or fed from the web and severed in the machine. The wrapping mechanism may be combined with suitable devices to form an independent wrapping or folding and wrapping machine, or the paper feeding mechanism may be combined with any of the ordinary forms of folding and delivery mechanism now in use in printing machines, so that the papers may be printed, folded, wrapped and delivered by a single machine, my improved wrapping mechanism being of sufficient capacity to be applicable to high speed web printing machines.

In the accompanying drawings forming a part of this specification I have shown for the purpose of illustration a complete, independent wrapping machine employing a wrapping mechanism of the preferred form, which machine will be found a simple and efficient embodiment of the present invention, and a modified form of the wrapping mechanism, and a detailed description of the same will now be given, and the features forming the invention specifically pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of the machine. Fig. 2 is a vertical section taken inside the frame looking in the opposite direction to Fig. 1. Fig. 3 is a horizontal section on line 3 of Fig. 2. Fig. 4 is a section on the line 4 of Fig. 2. Figs. 5 and 6 are detail sections of the wrapping mechanism corresponding to Fig. 2, but showing the parts in different positions during the operation of wrapping and delivering a paper. Fig. 7 shows a modification.

Referring now particularly to Figs. 1 to 6 the frame may be of any suitable construction. As shown, it consists of two vertical side frames A, B in which all the operative parts of the machine are mounted, the wrapping mechanism being mounted in the lower front or delivery portion of the machine, the paper feeding mechanism at the rear end, and the wrapper feeding and pasting mechanism above the wrapping mechanism. The wrapping mechanism proper consists of two series of belts *a*, *b* by which the paper is advanced during the operation of rolling, and two series of curved fingers *c* *d* forming guides between which is the wrapping space in which the paper is rolled by the belts *a*, *b* these guides being constructed and arranged preferably so as to yield to successive layers of the paper as the latter is rolled up and to open and deliver the fully wrapped paper therefrom. The belts *a* are carried by a series of belt pulleys 10, mounted on shafts 11, 12 mounted in the side frames of the machine and are held under proper tension by means of adjustable belt tightening pulleys 13 as usual in such constructions. The belts *b* are carried by a series of belt pulleys 14 mounted

on shafts 15, 16, and held under tension by adjustable belt tightening pulleys 17. The belts *b* are led over rolls or pulleys 18, 19 so as to be supported and guided in proper position for the rolling operation, and these belts *b* co-act during a portion of their length with a series of belts *e* carried by belt rolls 20, 21, to form feeding belts by which the papers are advanced to the wrapping mechanism. The portion of the belts *b* in advance of the fingers *c* operate also to advance the wrapped paper which is delivered thereon, this portion of the belts *b* co-acting with a fixed guide 22 mounted in the frame above the belts.

The fingers *c*, *d* are carried by a rock shaft 23, the fingers *c* being mounted rigidly on said shaft and the fingers *d* being carried by sleeves 1 loose on said shaft, the sleeves 1 being normally turned so as to hold the fingers *d* in the position shown in Fig. 2 by springs 2 pressing the stops 3 on the sleeves 1 against the bar 24 mounted in a fixed position in the frames A, B. The hubs by which the fingers *c* are mounted rigidly on the shaft 23 are each provided with studs 4, which studs are adapted to engage lugs 5 on sleeves 1 carrying the fingers *d*, the studs 4 and lugs 5 being normally a short distance apart, as shown in Fig. 2 so that the rocking of the shaft first moves fingers *c* away from fingers *d* enlarging the wrapping space as the paper increases in size during wrapping, meanwhile winding up the spring 2 and increasing the tension on fingers *d*, and then by the engagement of stud 4 with lug 5 moves both fingers *c* and *d* to the position shown in Fig. 6 for the delivery of the wrapped paper. When the shaft is returning to the normal position shown in Fig. 2, the springs 2 cause lugs 5 of the fingers *d* to follow closely the studs 4 and secure the return of the fingers *d* so that the fingers *c*, *d* move together until the fingers *d* are fully returned to position and the lugs 3 engage shaft 24 when fingers *d* stop and the shaft and fingers *c* continue their movement until the studs 4 are separated from the lugs 5, as shown in Fig. 2, thus reducing the tension of springs 2.

The shaft 23 is operated by the following means:—At one end it is provided with a crank arm 25 which is pivoted to the two sections of a two part pitman 26, one part of which carries a bowl 27 running on a cam 28 carried by shaft 29, so that the shaft 23 is rocked by the cam through the pitman, and the other part of the pitman slides in bearings 6 in the frame of the machine, and is normally pressed in a direction opposite to the throw of the cam 28 by a coiled spring 30 on the pitman.

With this wrapping mechanism any suitable paper and wrapper feeding devices may be combined to form a high speed automatic wrapping machine, and the wrappers may be previously pasted or a pasting mechanism added to paste the wrappers in the machine. It will be understood, also, that this wrap-

ping mechanism is well adapted to be combined with the final folding devices of a folding machine or combined printing press and folding mechanism of any of the common forms, so that their products are received therefrom by the wrapping mechanism, suitable wrapping, feeding and pasting devices being added. For the purpose of illustrating a complete machine, however, I have shown paper and wrapper feeding and wrapper pasting devices of a common form combined with my wrapping mechanism to form a complete, independent, wrapping machine, the papers previously folded or otherwise compacted to a form suited to the feeding devices shown being fed from a box or holder, and the wrappers fed from the web. In this construction, the holder C for the papers is mounted on the rear end of the machine and the bottom paper is advanced from the holder to the feeding belt *b, e* by a series of pivoted fingers 31 carried by slide 32 moving on rods 33 mounted in the frame A, B the fingers being pressed upward so as to engage the bottom paper when withdrawn, by means of springs mounted on the slide under the fingers. The slide 32 is reciprocated upon the rods 33 to advance the papers in proper time by means of slotted levers 34 carried by rock shaft 35 mounted in said frames A, B and operated from the main shaft of the machine D by means of a pitman 36 connected to one of the levers and an eccentric 37 on the shaft D. The holder C is open at the bottom and the papers are fed out by the fingers 31 over guides 38 between which the fingers play. In order that papers of different thicknesses may be fed out from the holder and the delivery of more than one paper at a time be prevented, the front end 39 of the holder C is preferably made adjustable to and from the guides by a set screw, as shown. The wrappers *y* are fed from the wrapper roll E by feeding rolls 40 and severed by a pair of feeding and cutting rolls 41, by which also they are advanced downward between guides 42 to the wrapping mechanism, a line of paste being applied to the rear end of each wrapper by a paster 43 co-acting with a roll 44 on the opposite side of the guide and receiving paste from a fountain roll 45 running in the usual paste fountain 46. The papers are advanced to the wrapping mechanism beneath a guide *f*, and the guides 42 are constructed to deliver the wrapper just in advance of the guide *f* and in position to be seized between two layers of the wrapper as the rear end of the paper is drawn in to complete the rolling.

The operative parts of the machine with the exception of the fingers 31 for feeding the papers from the holder C are operated as follows:—The shaft D carries a gear 48 which drives shaft 15 of belt roll 14 through an intermediate 49 and a gear 50 on the shaft of said roll, and belt roll 20 is driven by gear 51 meshing with gear 50. Feeding roll 18 is driven from gear 50 through a series of inter-

mediates 52 and gear 53 on the roll shaft, and roll 19 is driven from roll 18 through an intermediate 54 and a gear 55, intermediate 54 meshing also with gear 56 on shaft 12 carrying belt pulleys 10 by which the belts *a* are driven. Shaft 29 carrying the cam 28 is driven from a gear 51 on belt roll 20 by gear 57, and this shaft 29 carries a smaller gear 58 from which the feeding and cutting rolls 41 are driven through a series of intermediates 59 and gears 60 on the roll shafts. From gears 60 on one of the feeding and cutting rolls 41, the feeding rolls 40 are driven through intermediate 61 and gears 62 on the roll shafts, and the paster 43 and fountain roll 45 by gears 63, 64.

The operation of the machine will be understood from a brief description. The parts are so timed that the paper is rolled twice before delivery, but it will be understood that the feeding devices and devices for operating the fingers *c, d* to deliver the wrapped paper may readily be varied so as to roll the paper a greater or less number of times. The paper received from the holder C is advanced by the belts *b, e* and feeding rolls 18, 19 between the fingers *c, d*, which are then in the position shown in Fig. 2. As the paper is advanced between the fingers *c, d*, its leading end is curled over so as to roll the paper by the belts *a* and upon the second rotation of the paper the leading end passes inside the previous layer. When the paper is received by the fingers, the cam 28 is in the position shown in Fig. 2, and the fingers are held at the proper distance apart to secure the proper rolling of the paper. As the rolling operation is continued, the bowl 27 passes gradually off the higher part of the cam 28, and the spring 30 operates to rock the shaft 23 from the position shown in Fig. 2 to that shown in Fig. 5, and thus gradually moves the fingers *c* away from the fingers *d* and enlarges the wrapping space as the paper roll within it increases in size, the requisite pressure upon the paper during rolling being thus secured. The shaft 23 has been rocked sufficiently to bring the studs 4 into contact with the lugs 5 at the end of the second rotation of the paper, as in the position shown in Fig. 5, and the wrapper has just been led inside the rear end of the paper so as to be gripped thereby and carried about by the paper on its next rotation. The wrapper is then rolled about the paper and the pasted end of the wrapper is pressed down and secured upon the previous layer of wrapper on the paper as the paper is rolled about again by the belts, and when the pasted wrapper is fully secured, the bowl 27 passes by the point of cam 28 and is released, and the spring 30 presses the pitman 26 suddenly to the right in the figures from the position shown in Fig. 5 to that shown in Fig. 6, thus rocking the shaft 23 so as to carry the fingers forward in the line of delivery of the feed of the belts *b* and into such a position as to allow the

wrapped paper to be fed by the belts and gravity out from the wrapping space between the fingers previously opened, as above described, the wrapped paper then being advanced and held in form for the setting of the paste by the action of the belts *b* co-acting with the guides 22, which now extend between the fingers, as shown in Fig. 6, and thus the wrapped paper is delivered. Meanwhile another paper *x* has been advanced from the holder C to the belts *b*, *e* and is in position to be fed between the fingers *c*, *d* as they are returned to position by the rocking of the shaft 23 by the cam 28 pressing the pitman to the left in the figures, against the tension of spring 30, the proper return of the fingers *d*, being secured by springs 2, as previously described.

In Fig. 7 I have shown a modified construction in which a cylinder or roll is substituted for the belts *b*. In this construction the cylinder F provided with grippers *g* of any common construction, by which the bottom paper *x* is seized as it is fed from the holder C, and which release the paper at the proper time for its delivery to the fingers *c*, *d*, and belts *a*, the cylinder E being preferably grooved so that the fingers *c* project a short distance within its periphery, thus insuring the proper movement of the leading end of the paper, and the cylinder is preferably rubber faced, corrugated or otherwise roughened so as to co-act with belts *a* in feeding the paper during the wrapping operation. A feeding roll 65, also, is preferably used with the cylinder to secure a positive grip upon the paper for a time after it is released by the gripper *g*. As the paper is thus advanced between the fingers *c*, *d*, the leading end of the paper is directed in a circular path and the paper advanced by the belts *a*, as in the construction previously described, and the operation of the fingers *c*, *d*, in conjunction with the belts and cylinder is identical with that previously described in connection with Figs. 1 to 6, the fingers opening and then swinging outward to deliver the wrapped paper between the cylinder C and a curved guide 66 extending partially about the same, so that the wrapped paper is held and advanced by the cylinder and guide, with the wrapper pressed down to secure the pasted end before the final delivery of the paper. The guide 66 is preferably a spring guide, and in the construction shown is rigidly supported at one end and has a limited movement against its spring pressure at the other end.

It is evident that many other modifications may be made in the construction shown, that other arrangements of feeding devices may be used in connection with the guides *c*, *d*, to wrap and deliver the paper, and that the construction and operation of the guides forming the wrapping space and of the parts by which these guides are controlled and actuated may be varied widely without departing from the invention.

It will be seen that in the machines illustrated in the present case provision has been made for relieving the feeding pressure upon the rear end of the paper to permit the unequal movement of the inner and outer surfaces of the paper, which it is obvious must occur in wrapping thick papers or other matter consisting of a considerable number of sheets or plies, as in the constructions shown in Figs. 1 to 6, the rear end of the paper passes out of the positive grip of the rolls 18, 21, and in the construction shown in Fig. 7, out of the positive grip of roll 65 and cylinder F as the paper assumes a cylindrical form, so that these constructions may be used quite generally independently of the thickness of the paper. If desired, however, other devices for positively relieving the feeding pressure may readily be combined with the wrapping mechanism of these machines. This feature of allowing for unequal movement of the inner and outer plies of the thick paper is fully described and claimed in my application, Serial No. 432,363, above referred to.

It will be noticed that by the construction shown the pressure upon the wrapped paper is preserved as the paper leaves the wrapping space, so that there is no relief of the pressure until the wrapper has been held in position long enough for the paste to set, even at very high rates of speed. This result is attained in the construction shown in Figs. 1 to 6 by the belts *b* and plate 22, the latter continuing the pressure of belts *a*, and in the construction shown in Fig. 7, by the guide 66 co-acting with the cylinder F, there being no relief of the pressure in either case by which the paper would be allowed to spring out before the paste is set. This feature is applicable also to other constructions of wrapping devices, and is thus claimed.

What is claimed is—

1. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for moving said guides from a position in which the feeding devices tend to carry the paper between the guides to a position where the feeding devices tend to carry the wrapped paper from the guides, substantially as described.

2. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to roll the paper and wrapper together within said wrapping space and secure the wrapper, means for moving said guides from a position in which the feeding devices tend to carry the paper between the guides to a position where the feeding devices tend to carry the wrapped paper from the guides, and means for separating the guides for the delivery of the wrapped paper, substantially as described.

3. The combination with guides arranged on opposite sides of a wrapping space, of

feeding devices co-acting with said guides to advance a paper and wrapper into the wrapping space and roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for moving said guides from a position in which the feeding devices advance the paper into the wrapping space to a position in which the feeding devices carry the wrapped paper from the wrapping space, substantially as described.

4. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to advance a paper and wrapper into the wrapping space and roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for separating the guides for the delivery of the wrapped paper, substantially as described.

5. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to advance a paper and wrapper into the wrapping space and roll the paper and wrapper together within said wrapping space and secure the wrapper, means for moving said guides from a position in which the feeding devices carry the paper into the wrapping space into a position in which the feeding devices tend to carry the wrapped paper from the wrapping space, and means for separating the guides for the delivery of the wrapped paper, substantially as described.

6. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to roll a paper and wrapper together within said wrapping space and secure the wrapper, and means for separating the guides to enlarge the wrapping space as the paper roll increases in size, substantially as described.

7. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to roll a paper and wrapper together within said wrapping space and secure the wrapper, and means for opening the wrapping space by the movement of the guides for the delivery of the wrapped paper, substantially as described.

8. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices arranged to advance a paper and wrapper into the wrapping space, feeding belts on the opposite side of the wrapping space co-acting with said feeding devices to roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for moving said guides into position to open the wrapping space on the side normally closed by the feeding devices, substantially as described.

9. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices co-acting with said guides to roll a paper and wrapper together within said wrapping space and secure the wrapper, means for opening the wrapping space by the

movement of the guides for the delivery of the wrapped paper, and devices co-acting with said feeding devices to continue the pressure upon the paper as it is delivered from the wrapping space, substantially as described.

10. The combination with guides arranged on opposite sides of a wrapping space, of feeding devices advancing a paper and wrapper into the wrapping space and arranged to close the wrapping space on one side, feeding belts co-acting with said feeding devices to roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for moving said guides from a position in which the feeding devices close the wrapping space and feed the paper and wrapper into the wrapping space into a position in which the wrapping space is open on the side next the feeding devices and the feeding devices tend to carry the wrapped paper out of the wrapping space, substantially as described.

11. The combination with pivoted guides arranged on opposite sides of a wrapping space, of feeding devices advancing a paper and wrapper into the wrapping space and arranged to close the wrapping space on one side, feeding belts co-acting with said feeding devices to roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for swinging said guides in the direction of movement of the feeding devices from the position in which the feeding devices close the wrapping space and feed the paper and wrapper into the wrapping space into a position in which the wrapping space is open on the side next the feeding devices and the feeding devices tend to carry the wrapped paper out of the wrapping space, substantially as described.

12. The combination with paper and wrapper feeding devices and pasting devices for the wrapper, of guides arranged on opposite sides of a wrapping space, feeding devices co-acting with said guides to roll the paper and wrapper together within said wrapping space and secure the wrapper, and means for opening the wrapping space by the movement of the guides for the delivery of the wrapped paper, substantially as described.

13. The combination with the guides *c, d*, of feeding belts *a* at one end of the guides, feeding devices at the opposite ends of the guides co-acting with said belts, rock shaft 23 carrying said guides, and means for rocking said shaft to swing the guides in the direction of movement of the feeding devices for the delivery of the wrapped paper, substantially as described.

14. The combination with the guides *c, d*, of feeding belts *a* at one end of the guides, feeding belts *b* at the opposite ends of the guides, shaft 23 carrying said guides, and means for rocking said shaft to swing the guides in the direction of movement of the belts *b* for the delivery of the wrapped paper, substantially as described.

15. The combination with the guides *c, d*, of

feeding belts *a* at one end of the guides, belts *b* at the opposite ends of the guides, shaft 23 carrying the said guides, means for rocking said shaft to swing the guides in the direction 5 of movement of the belts *b* for the delivery of the wrapped paper, and feeding devices receiving the wrapped paper from the guides, substantially as described.

16. The combination with rock shaft 23, of 10 guides *c* rigid on said shaft, guides *d* mounted loosely on said shaft and spring pressed in a direction to separate the guides *c*, *d*, and actuating connections between the shaft 23 and the guide *d* provided with lost motion whereby 15 the movement of the shaft first increases the spring pressure on the guides *d* and then carries the guides with the shaft during the further movement of the latter, substantially as described.

20 17. The combination with rock shaft 23, of guides *c* rigid on said shaft, guides *d* loosely mounted on said shaft, and spring pressed in a direction to separate the guides *c*, *d*, lugs 3,

5 carried by said guides *d*, stop 24 engaging said lugs 3 to hold the guides *d* in position 25 against the tension of the springs, studs 4 carried by the rock shaft and engaging lugs 5 to carry the guides *d* with the rock shaft, lost motion being provided between the studs 4 and lugs 5, and means for rocking said shaft, 30 substantially as described.

18. The combination with devices arranged to roll a paper and wrapper together within a wrappingspace formed between the devices 35 and secure the wrapper, of delivery devices continuing the pressure upon the paper, whereby the paper is held in form without release until the paste has set, substantially as described.

In testimony whereof I have hereunto set 40 my hand in the presence of two subscribing witnesses.

LUTHER C. CROWELL.

Witnesses:

T. F. KEHOE,
C. J. SAWYER.