

(No Model.)

6 Sheets—Sheet 1.

L. C. CROWELL.
PRINTING MACHINE.

No. 325,197.

Patented Aug. 25, 1885.

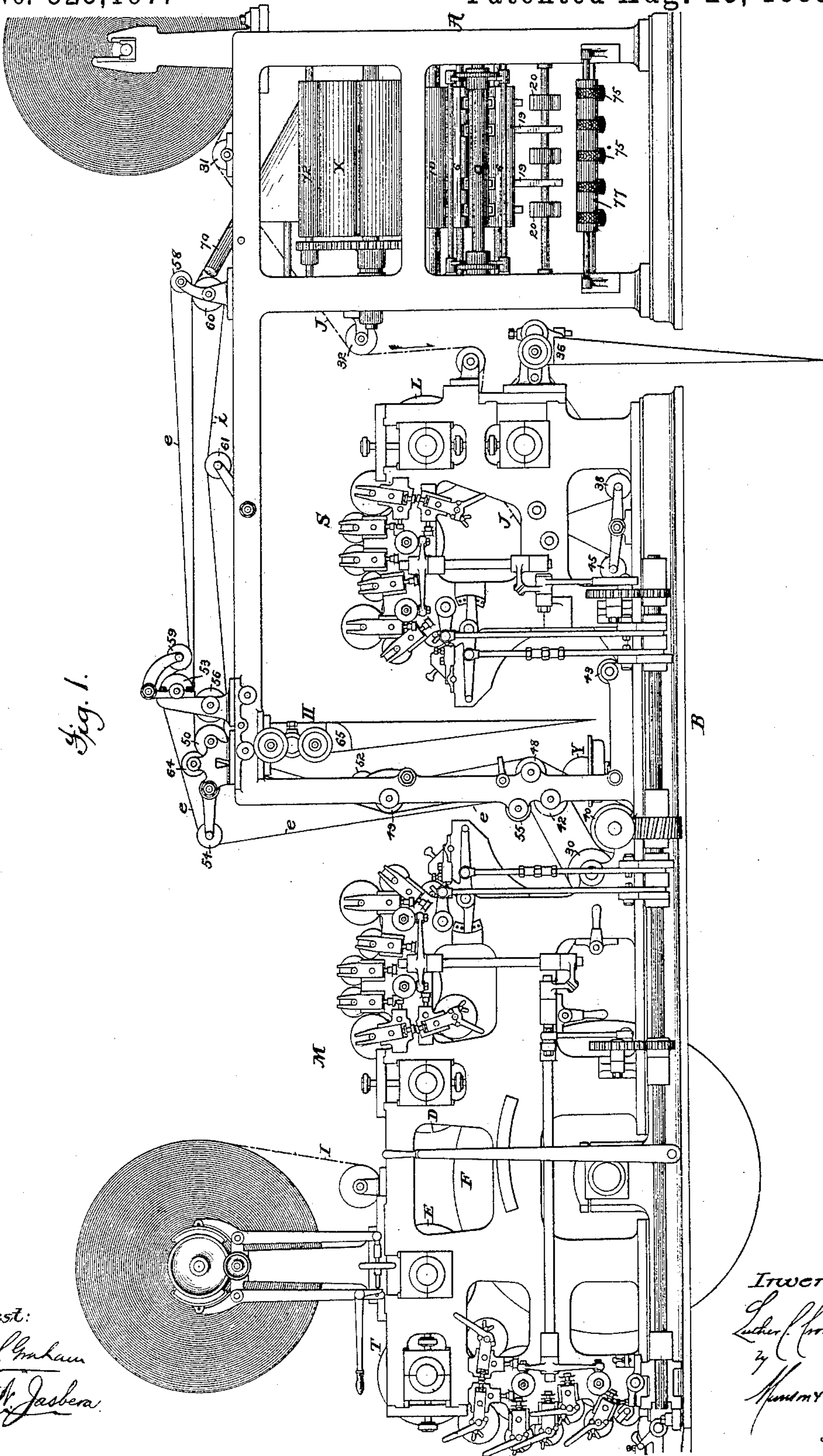


Fig. 1.

Attest:
Geo. H. Graham
A. St. Jasbera.

Inventor:
Luther Crowell,
by
Henry Philipp
Attys

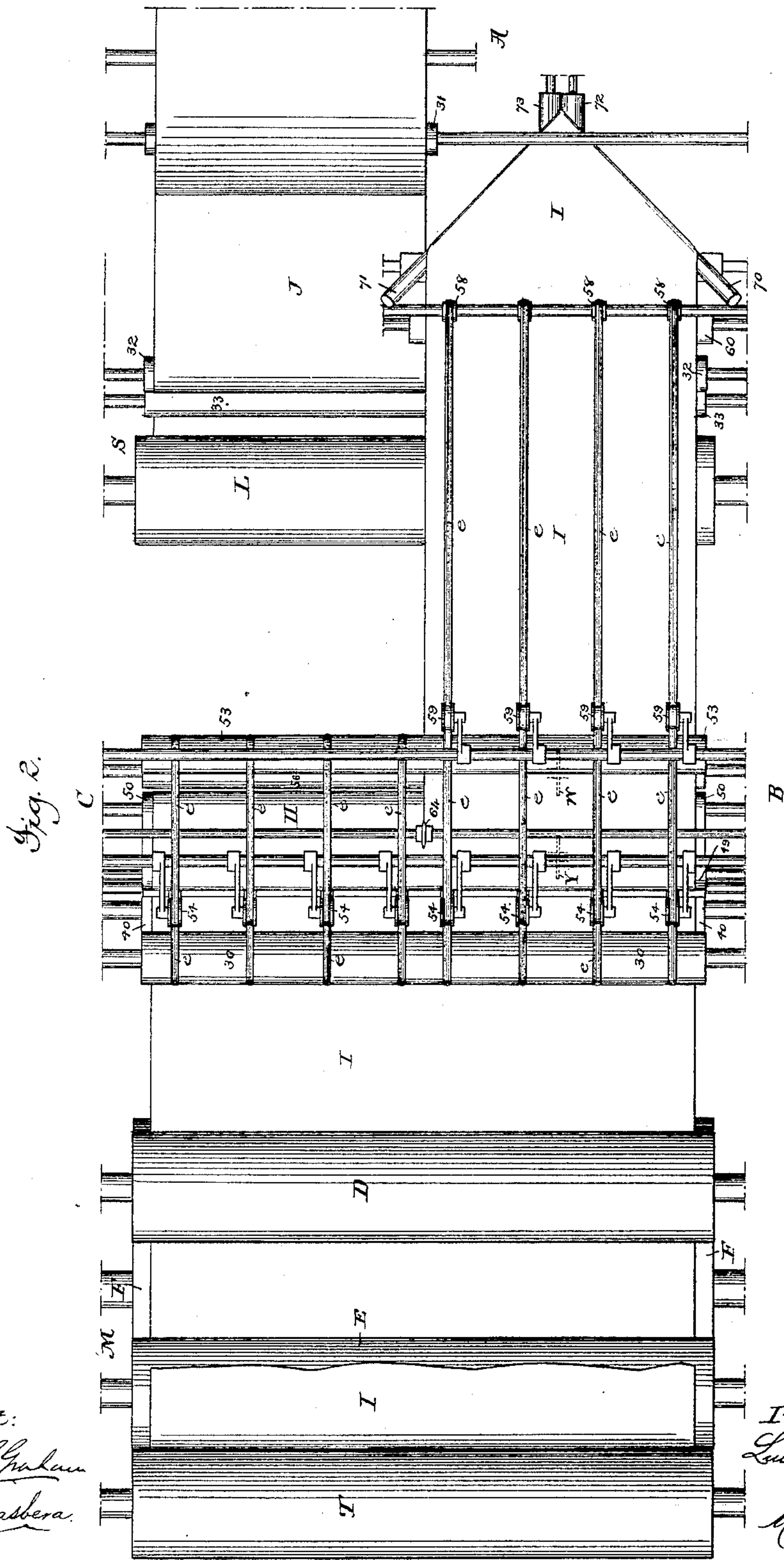
(No Model.)

6 Sheets—Sheet 2.

L. C. CROWELL.
PRINTING MACHINE.

No. 325,197.

Patented Aug. 25, 1885.



Attest:

Geo. H. Mahan
A. J. Jasbera

Inventor:

Luther C. Crowell
by
Newton S. Chapp
Attys

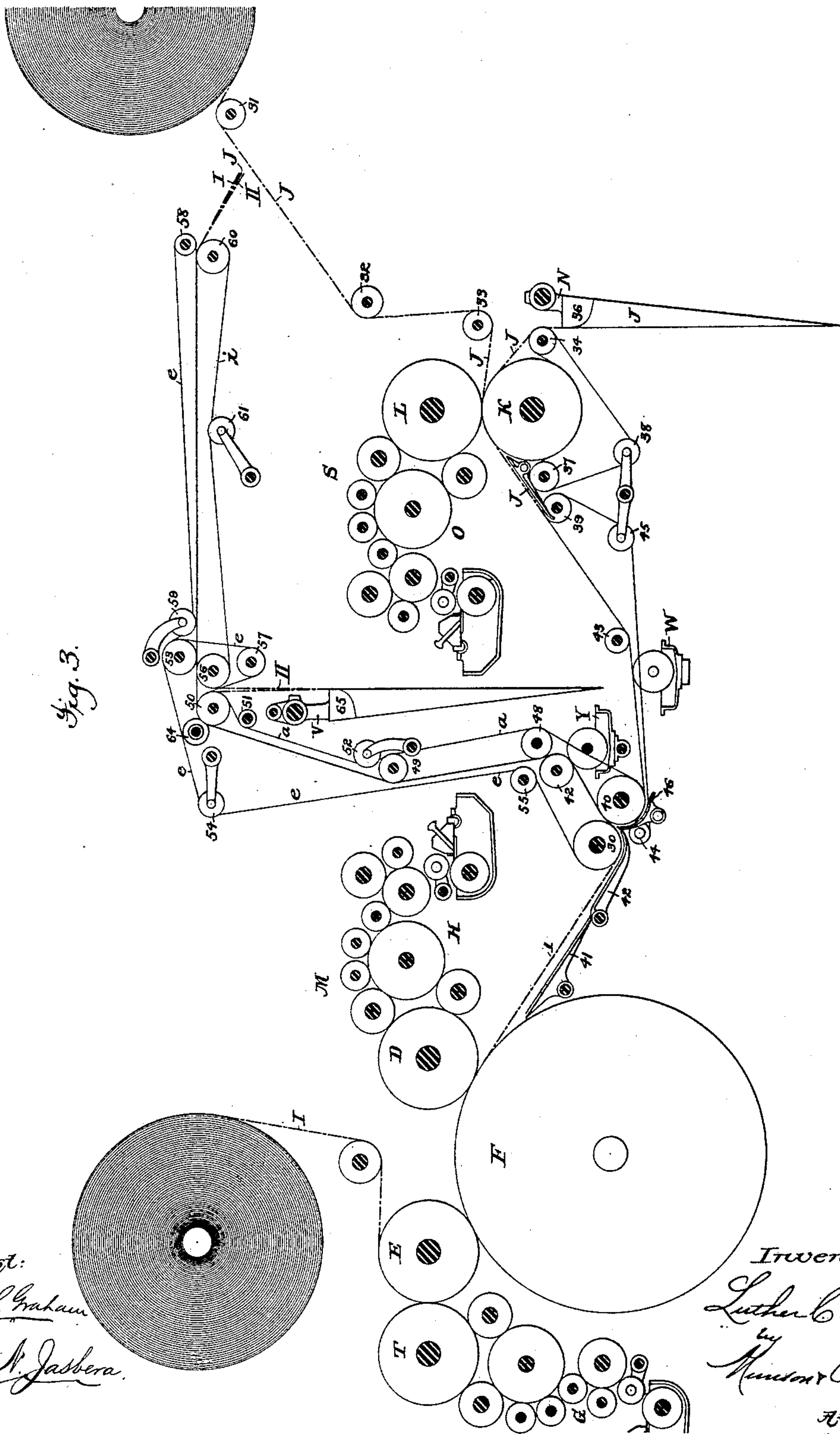
(No Model.)

6 Sheets—Sheet 3.

L. C. CROWELL.
PRINTING MACHINE.

No. 325,197.

Patented Aug. 25, 1885.



Attest:

E. H. Graham

A. N. Jasbera.

Inventor:

Luther C. Conwell
by
Minson & Philipp
Attys

(No Model.)

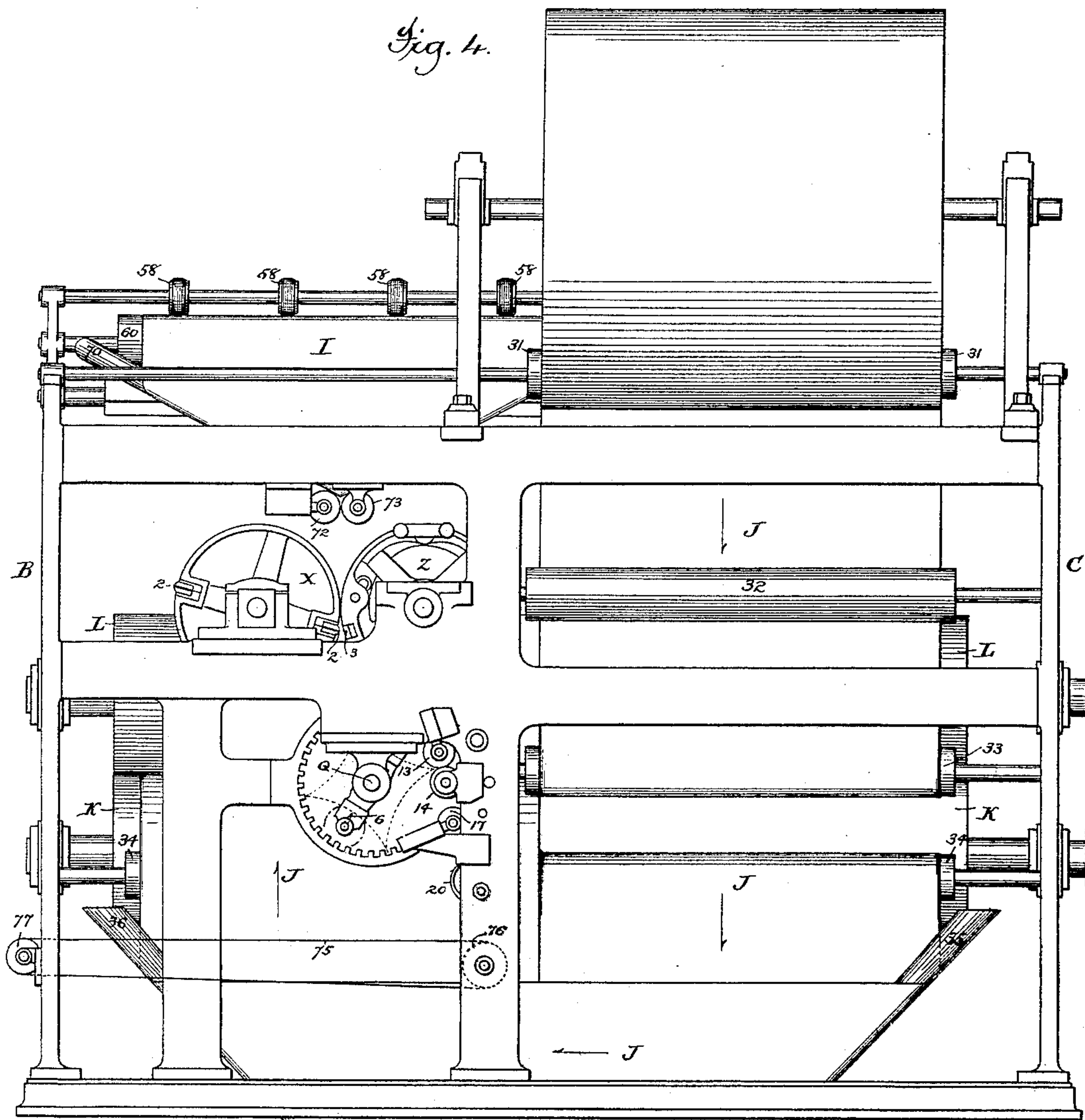
6 Sheets—Sheet 4.

L. C. CROWELL.
PRINTING MACHINE.

No. 325,197.

Patented Aug. 25, 1885.

Fig. 4.



Attest:

W. H. Graham

A. N. Jasbera

Inventor:

Luther C. Crowell

Mundorff & Phelps
Attys.

(No Model.)

6 Sheets—Sheet 5.

L. C. CROWELL.
PRINTING MACHINE.

No. 325,197.

Patented Aug. 25, 1885.

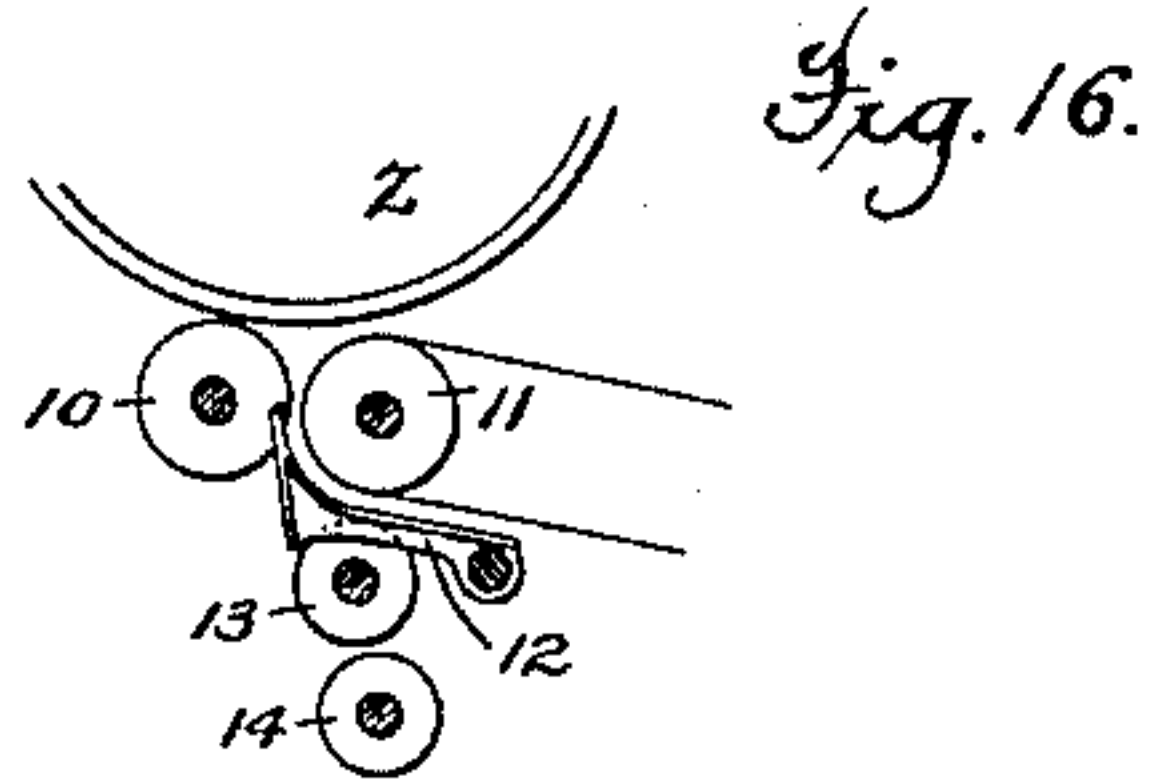
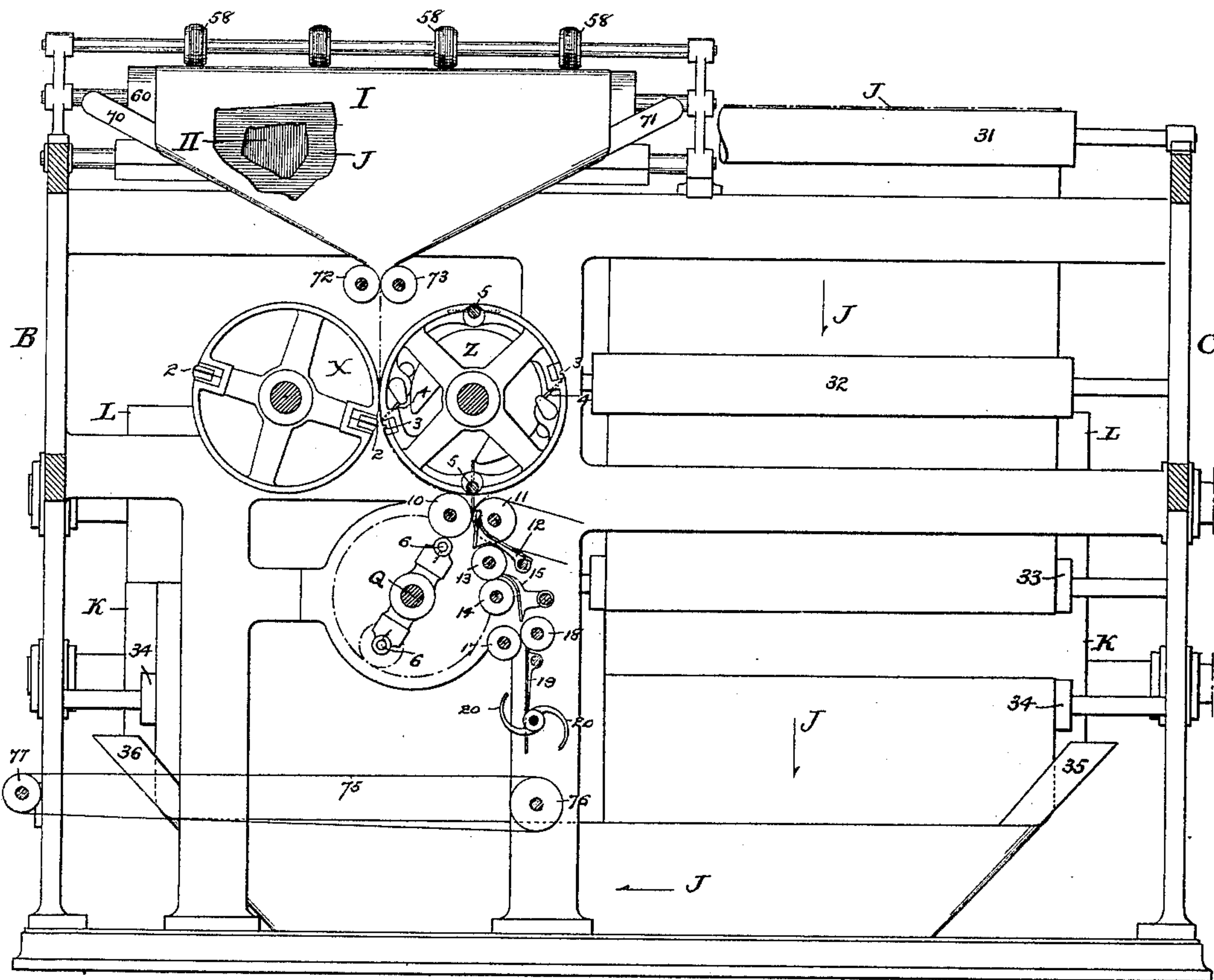


Fig. 5.



Attest:

Ed. H. Graham
A. N. Jasbera

Inventor:

Luther Crowell
Munson & Philp
Atty's.

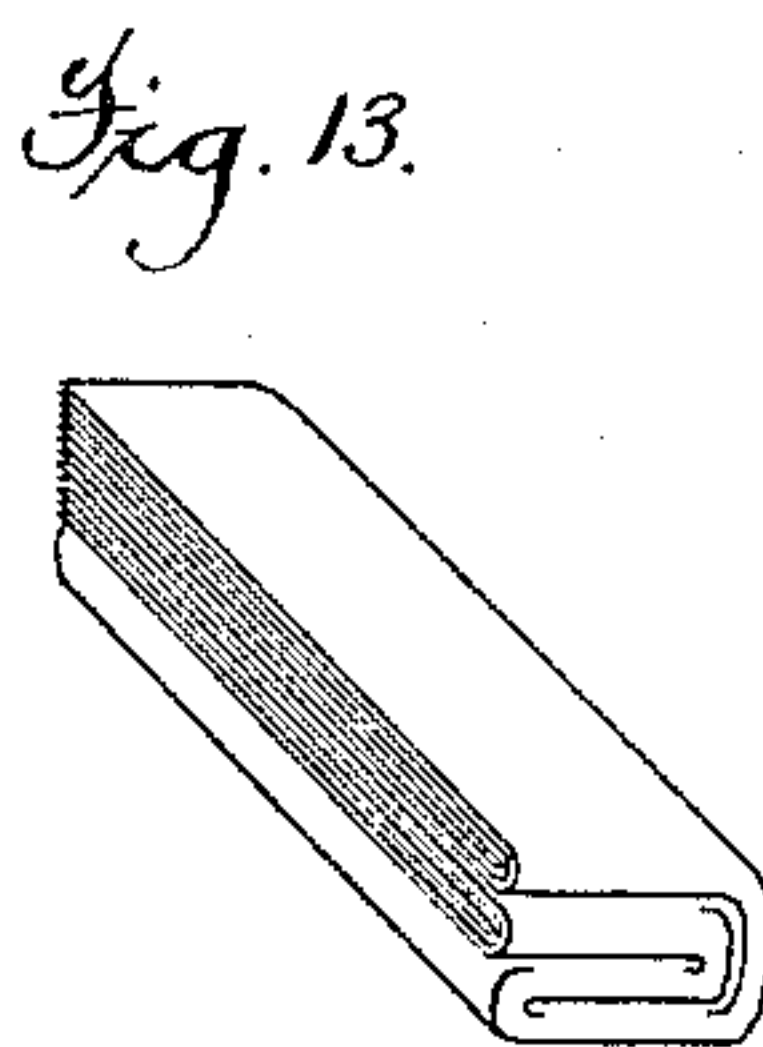
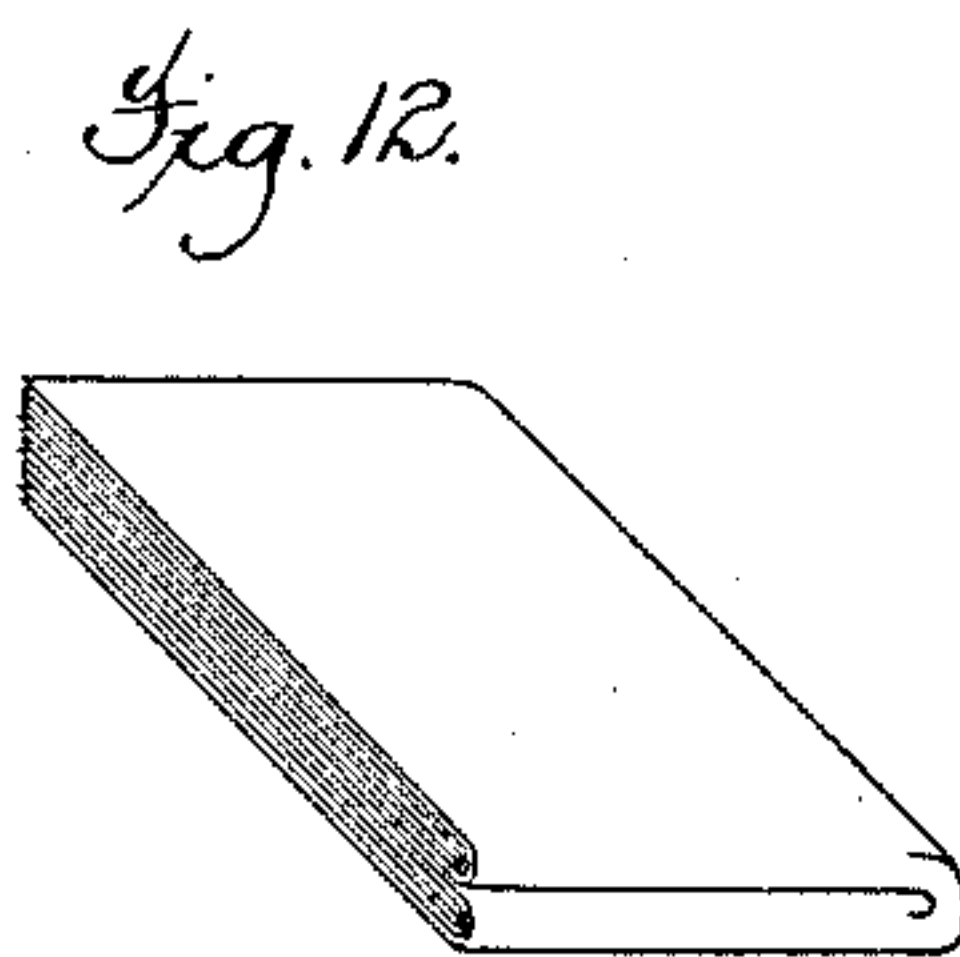
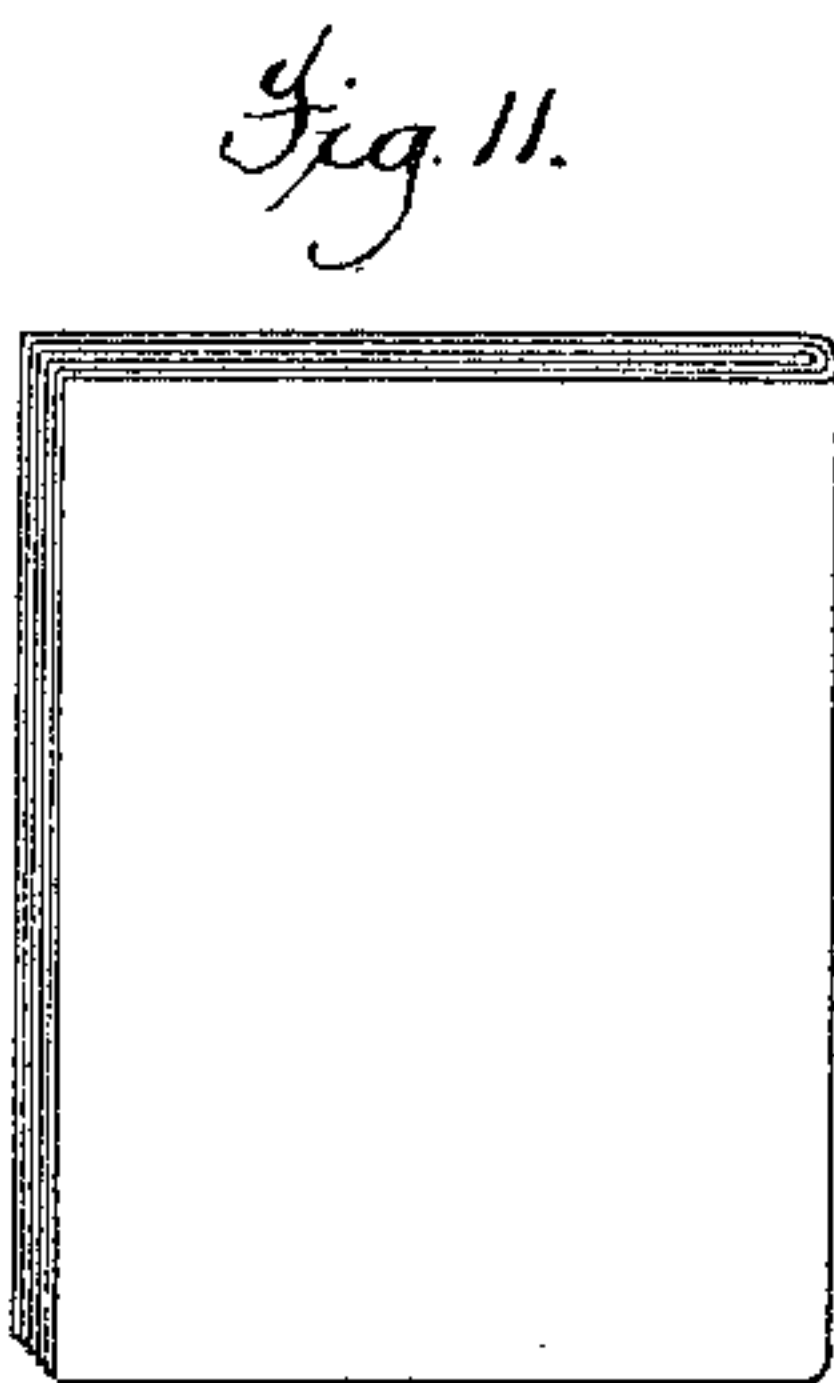
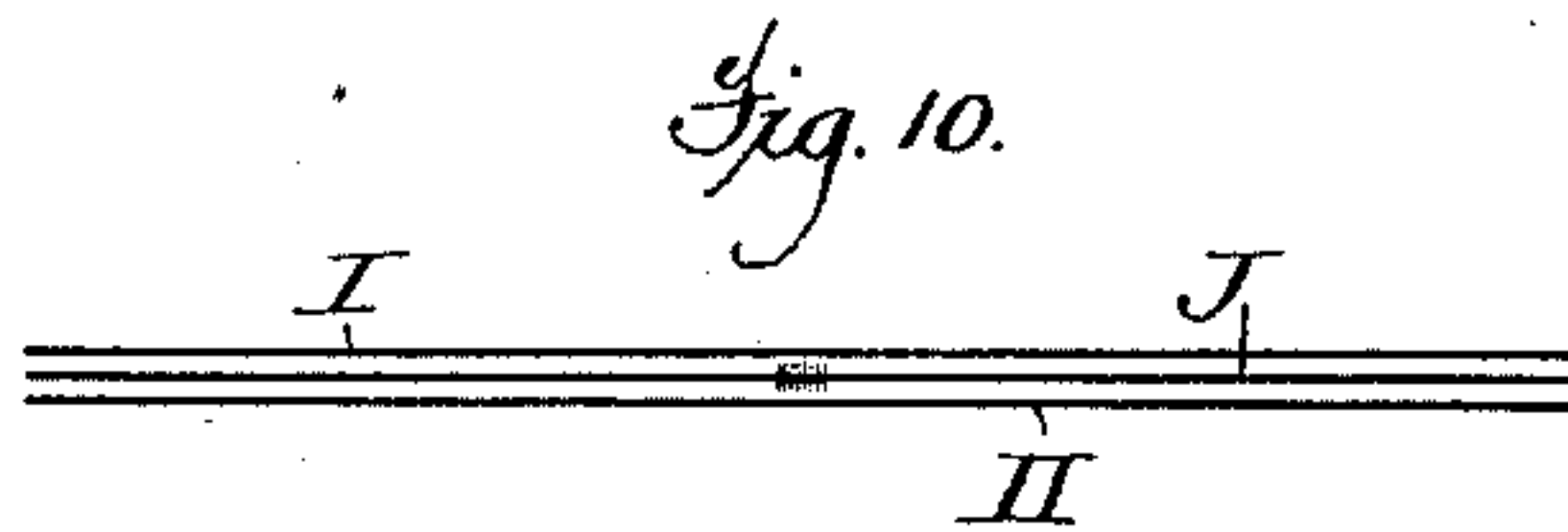
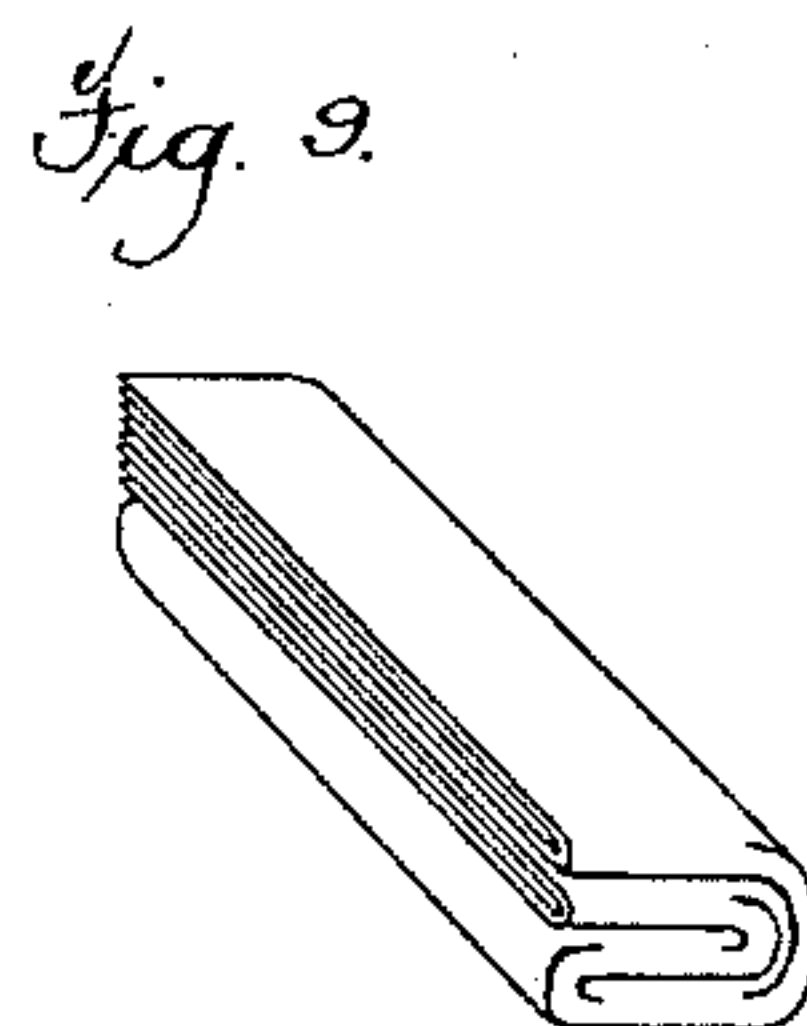
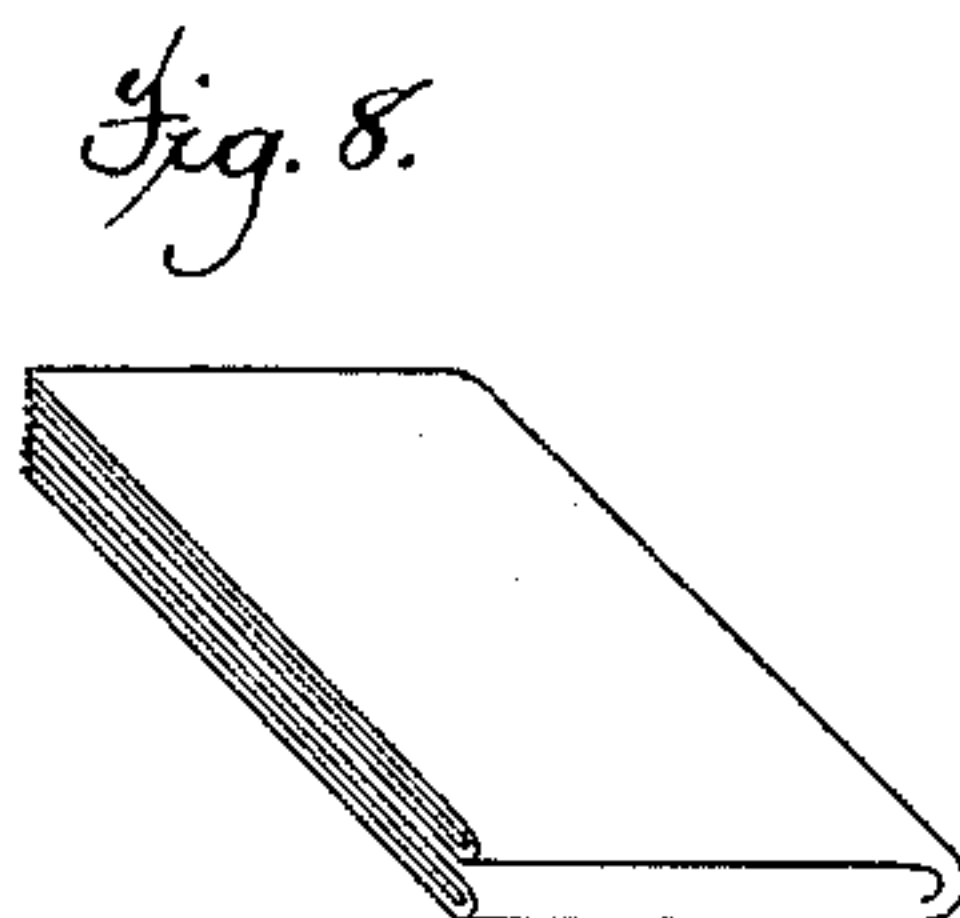
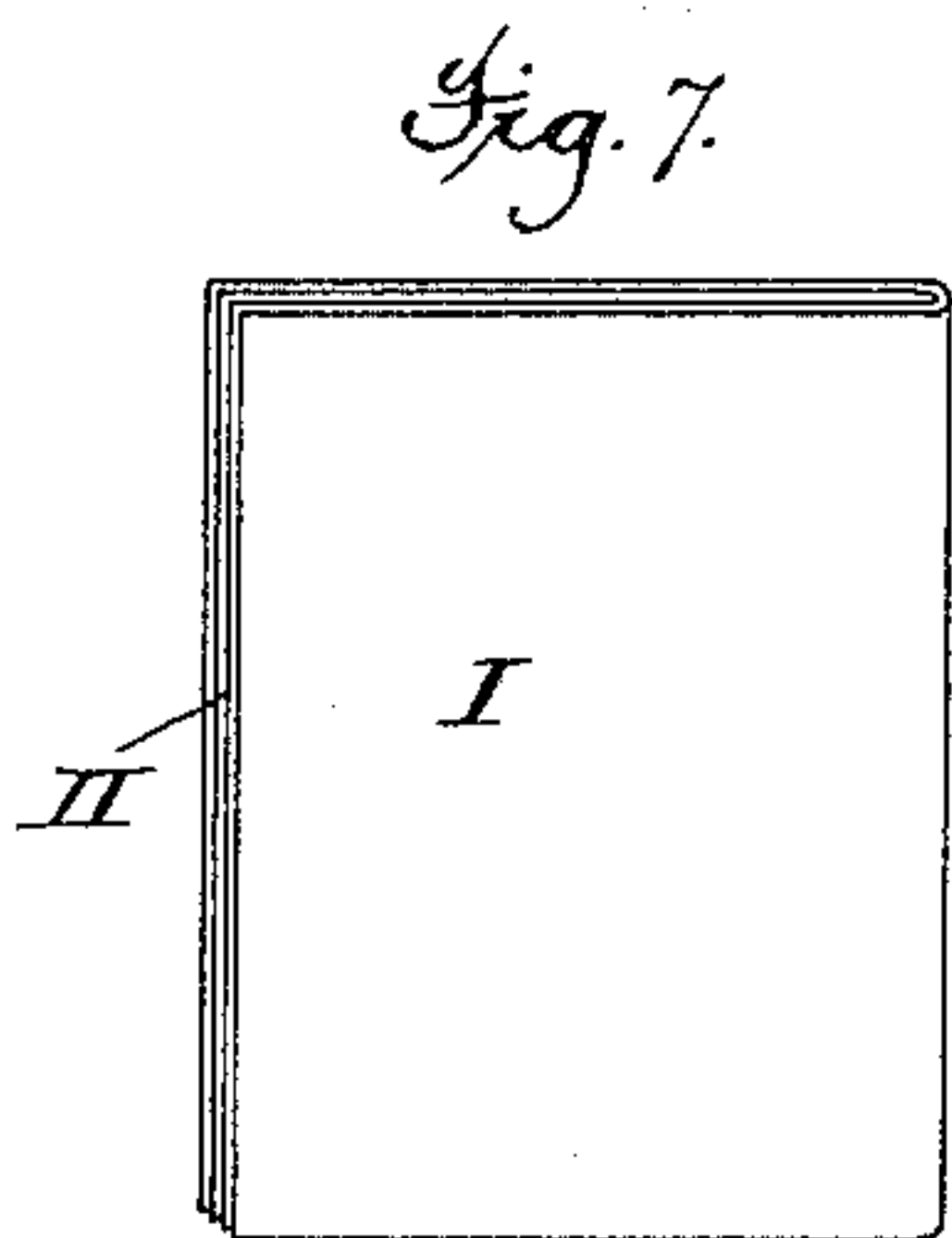
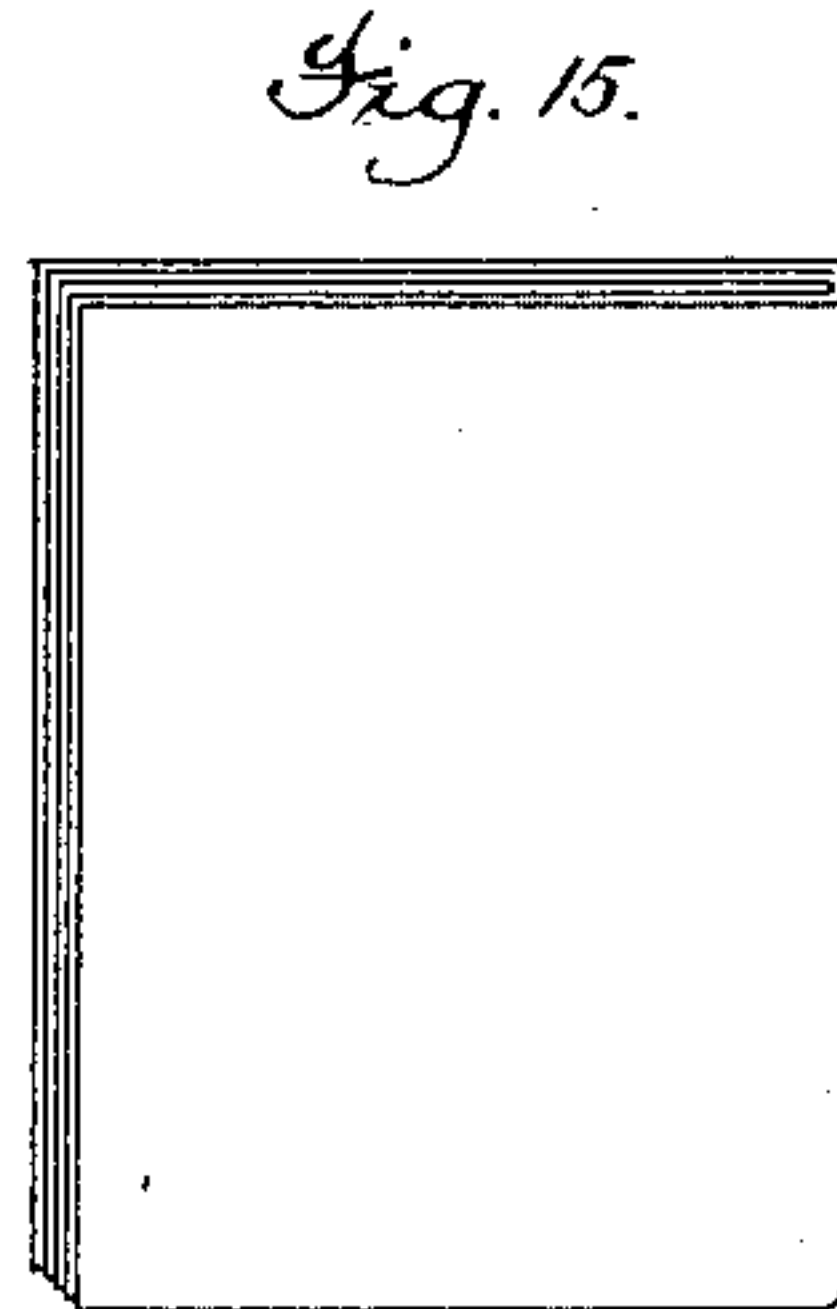
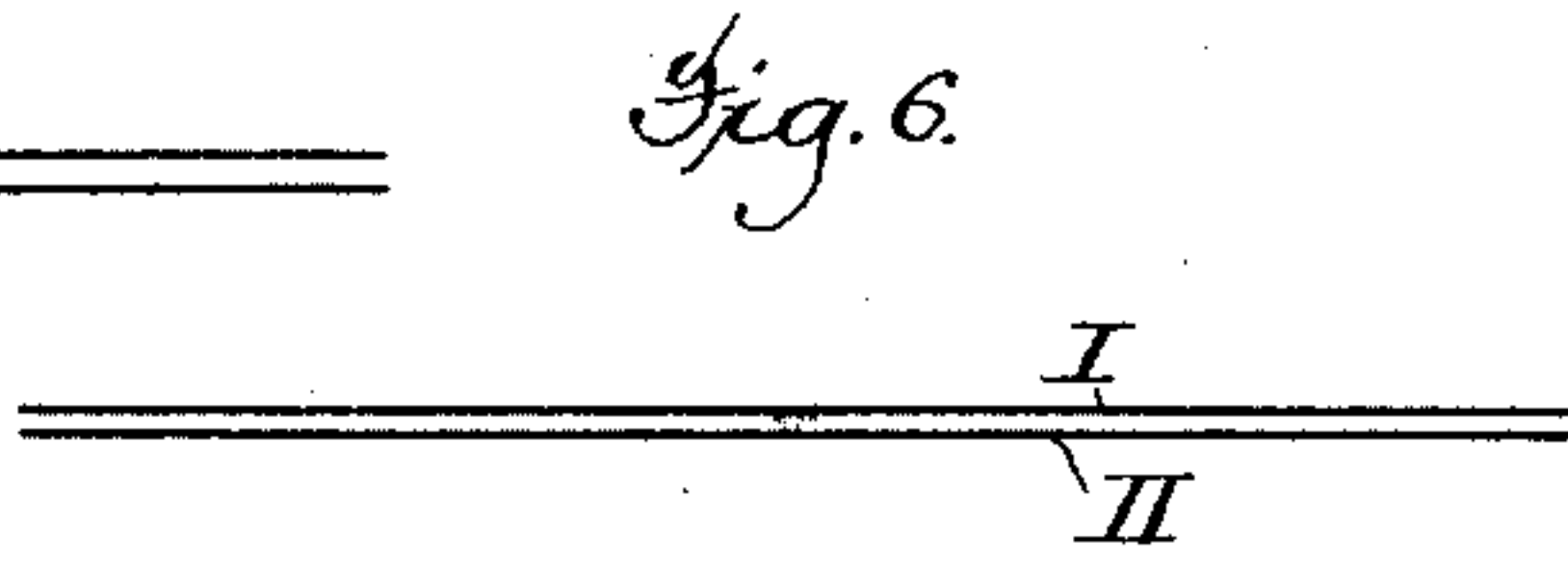
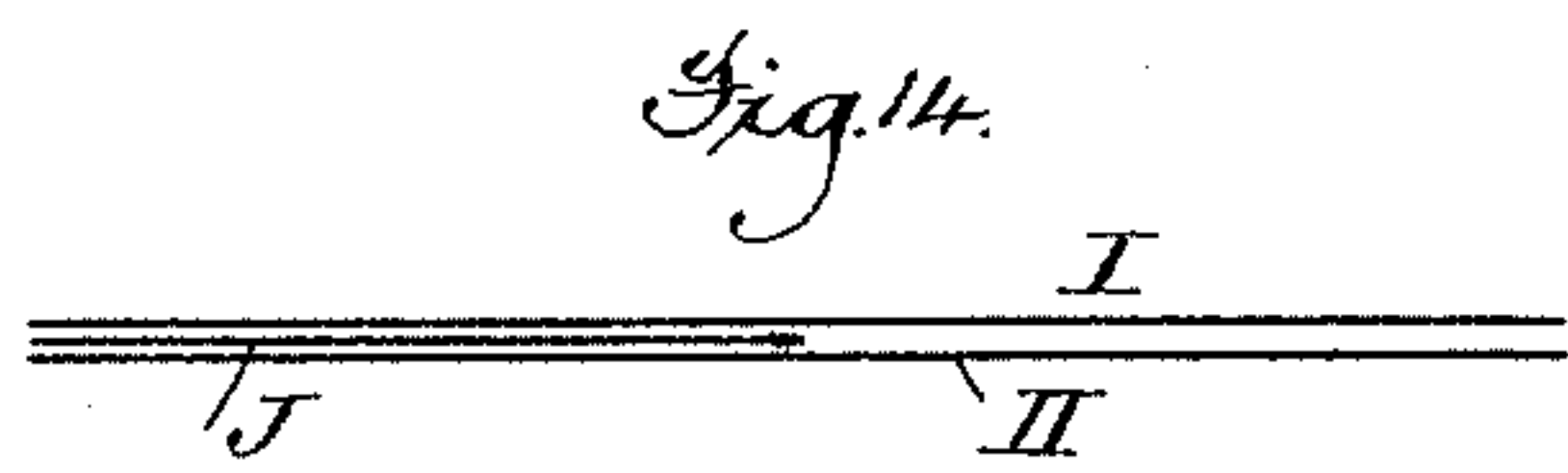
(No Model.)

6 Sheets—Sheet 6.

L. C. CROWELL.
PRINTING MACHINE.

No. 325,197.

Patented Aug. 25, 1885.



Attest:

Geo. H. Graham
A. H. Jasbera

Inventor:

Luther Crowell
by
Musson & Philipp
Attys.

UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, NEW YORK.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 325,197, dated August 25, 1885.

Application filed April 18, 1884. (No model.)

To all whom it may concern:

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

In said drawings, Figure 1 is a side elevation; Fig. 2, a top or plan view with the framework removed; Fig. 3, a longitudinal sectional elevation with the frame removed; Fig. 4, a delivery-end elevation; Fig. 5, a delivery-end elevation with the end frame removed. Figs. 6 to 9, inclusive, illustrate one product in its various stages of production. Figs. 10 to 13 illustrate another product in its various stages of production. Figs. 14 and 15 illustrate a ten-page product. Fig. 16 illustrates a modified delivery.

In the construction of web printing machines it has heretofore been necessary, in order to adapt them to the production at will of multiple products—such as newspapers composed of two or more sheets having 8, 10, 12, or more pages—to provide complex machinery.

It is the object of this invention to produce a machine capacitated to produce these various products by the aid of simple machinery, whereby less mechanisms are required, the cost of plant is reduced, and economy of room is made. This object is attained by combining together certain mechanisms in such co-operative relation that the various products may be made by the most simple adjustments and with great facility and rapidity, all of which is fully hereinafter described and claimed.

The apparatus embodying the present invention embraces two printing-machines, a main printing-machine (designated by the letter M) and an auxiliary printing-machine (designated by the letter S) with which are combined means for delivering the product of the main machine with or without its having associated with it the product of the auxiliary machine.

To aid this description the delivery end of the machine is marked by the letter A, and the two sides of the machine are marked, respectively, B C.

The main printing-machine M is an ordinary

web-perfecting machine adapted to print and perfect a web of desirable width; and it consists of type-cylinders T D, upon which the forms are carried, and impression-cylinders E F, that coact with said type-cylinders in printing the opposite sides of the web. The type-cylinders are furnished with the usual or any suitable inking apparatus, (indicated by the letters G H,) of which no explicit description need be given, for the reason that any inking mechanism suitable to the purpose may be used. The web I is led between the impression-cylinder E and the type-cylinder T, and is thus printed upon one side. It is thence led between the impression cylinders E F to and between said impression-cylinder F and the type-cylinder D, whereby it is reiterated or printed upon the opposite side, and the perfected printed web I is thence directed between carrying rollers or cylinders 30 40.

This printing-machine is provided with a conductor, 41, or conductors 41 42, bridging the space between the impression-cylinder F and the roller 30 on the inside or the pathway of the web, which conductors are provided for the purpose of aiding in threading the web or conducting its leading end through the machine.

The auxiliary printing machine S is adapted to print a single-width web, and consists of an impression-cylinder, K, and type-cylinder L, the latter being furnished with any suitable inking apparatus, the one shown being designated O. This printing-machine is in its construction and mode of operation substantially like that shown and described in Patent No. 212,444, to which reference is made—that is, it embodies a single set of printing devices, made capable, through the provision of a web-turner, N, of printing a single-width web upon one side, turning the same over and transferring it laterally to the same cylinder, to be reiterated or printed upon its opposite side. Thus a single-width web, J, mounted at the C side of the machine, passing over rollers 31 32 and under roller 33, is led between the impression cylinder K and type-cylinder L, and will be printed upon one surface by contact with the forms, disposed around the end of the type-cylinder L toward the C side of the machine, and after this printing said web passes around the cylinder K over one

and of the roller 34, and thence over the turner N, composed of the bars 35 36. (See Fig. 4.) In passing over this turner, the web is led from the inside over the turning-bar 35, thence transversely therefrom over the outside of the turning-bar 36, from the inside surface of which it passes up over the other end of the roller 34 and again between the impression-cylinder K and type-cylinder L, this time passing in contact with the forms on the end of the cylinder L toward the B side of the machine, and it is thereby reiterated or printed upon its opposite surface by contact with that portion of the type-cylinder at the end opposite to that carrying the forms for the first impression. The direction of the passage of this web is indicated in Fig. 4 by arrows. From this auxiliary printing-machine the web J, which is a supplement-web, passes between the rollers 30 40, where it underlies one-half of the main web. The impression-cylinder K is provided with sets of tapes covering the lower part of the cylinder, which tapes run over the roller 34, thence in contact with the cylinder, and return over rollers 37 and tightening-pulleys 38. There is another set of under tapes following the pathway of the web from the impression cylinder K to the roller 40, which tapes run from the rollers 39 under rollers 43 in contact with the roller 40, and return over rollers 44 and tightening-pulleys 45. These tapes are provided for the purpose of aiding in the threading or conducting the leading end of the web through the machine, and there is provided underneath the roller 40 a set of conductors, 46, that aid in delivering the supplement-web J into the nip of the rollers 30 40, as the curved ends of the conductors 42 guide or conduct the end of the main web. The delivering mechanism proper may be said to begin at these rollers 30 40, since both webs pass simultaneously through them.

For conducting the webs through the delivery mechanism two main sets of conducting-tapes are employed, an under set, *a*, and an upper set, *e*. The under set, *a*, consists of a number or series of tapes running parallel with each other, and they are arranged so as to conduct the entire double-width web. They extend from the pulleys 40, pass between rollers 42 48 in contact with roller 49, and return over roller 50, running over guide-roller 51 and tightening-pulleys 52. The upper tapes, *e*, are also arranged in parallel series horizontally, so as to conduct the entire double-width web. They pass from the roller 30 between the rollers 42 48, past the roller 49, and over roller 50. At this roller 50 these upper tapes divide into two gangs, each appropriated to one-half of the double web, and they all ultimately return over rollers 53, stretching-pulleys 54 and a guiding-pulley, 55. The gang of these tapes at the C side of the machine pass over roller 50, between it and its companion 56, and return over the roller 57 to the roller 53. The gang of these upper tapes at

the B side of the machine pass from the roller 50, between the rollers 53 56, and return over a roller, 58, and stretching-pulleys 59 over the roller 53. There is a third series of tapes, *i*. They are under tapes, and run from the rollers 56 to the rollers 60, and return in contact with stretching-pulleys 61. They form companion lower tapes for the gang of upper tapes, *e*, at the B side of the machine, and operate in connection with the tapes *a e* to form a pathway for the sheets from the pulleys 30 40 to the pulleys 58 60 at the B side of the machine.

In connection with the tapes *a e* there is arranged a turner, V, that is composed of turning bars in like manner as is the turner N, it being of the same dimensions, for the reason that its office is to turn one half of the main web, which half is of the same widthwise dimensions as the supplement-web J. For the purpose of dividing the main web I centrally there is a slit, 64, mounted to co-operate with the roller 50, the result of which is that as the main web is thus divided it forms two portions or webs, which will be considered hereinafter as main webs I and II. The portion II constitutes that half of the main web toward the C side of the machine. The main web I may be split centrally before the printing, or it may be composed of two narrow webs, I II, led side by side through the printing mechanism. In such case the slit 64 may be omitted. The half-web I is directed from the tapes *a e* to the tapes *i e*, and it passes between the rollers 58 60, as shown in Fig. 3. The half-web II passes down in front of the turning-bar of the turner V, (that corresponds with the turning-bar 35 of the turner N,) and is lapped horizontally from said turning-bar to and around the turning-bar 65, (which corresponds with that 36 of the turner N,) and thence passes up over the roller 56; and as in this operation it has been deflected laterally a distance equal to its own width, it follows that it exactly underlies the half-web I at the roller 56, and emerges from between the rollers 58 60 underneath said web I, as appears in Figs. 3 and 10.

It will now be apparent that as the supplement-web J, after being deflected or transferred laterally in passing over the turner N, must enter between the rollers 30 40, directly beneath that portion of the main web now called I, and consequently that as the main web is split by the slit 64 so as to detach the half-web II, the supplement-web J will continue as it is led out between the tapes *e i* to occupy this relative position to the half-web I, and it will also appear that, since the web II is transferred so as to be brought beneath the web I, it must, as the roller 56 is passed, also underlie the supplement-web J, the result being that the three webs I, J, and II become superimposed or laid one upon another, so that they may thereafter be manipulated as a single web, as in Figs. 3 and 6.

There is a pasting apparatus, W, of common construction, arranged so that its pasting-disk

may apply a line of paste to the under side of the supplement-web J as it passes in contact therewith at some point of said web intermediate of the supplement-printing mechanism and the roller 40; and at some point between the rollers 40 and 50 another pasting apparatus, Y, of common construction, will be arranged so that its disk will apply a central line of paste to the opposite side of the supplement-web as it passes onward toward the roller 50. These pasting devices are arranged so as to be in operation or out of operation, as may be desired, and they may have lateral adjustment to vary their position with respect to the central part of the supplement-web.

Beyond the rollers 58 60, and arranged at the B side of the machine, is a longitudinal folder composed of internal guides, 70 71, and external turners 72 73, whereby one or more of the webs I II J, may be longitudinally folded, and beneath this longitudinal folder there are provided carriers X Z, that are provided with mechanisms for cutting the web or webs into sheets and folding said sheets. To attain these objects, the carrier X is provided at opposite points of its periphery with cutting-blades 2, that co operate with cutting-slots 3, arranged at opposite points of the carrier Z. This carrier Z is also provided with sheet-manipulating carrying-pins, 4, for engaging and holding the severed end of the web and carrying it onward upon the carrier Z. Said carrier Z also has hung at opposite points double rotating folding-blades, the shafts of which are marked 5, which blades co operate with the folding-rollers 10 11. Beneath the roller 11 there is arranged a pair of folding-rollers, 13 14, with which the rotary folding-blades 6, supported by a revolving carrier, Q, co-operate. The sheets are prevented from passing between the rollers 11 13 by the guards 12, and when folded between the rollers 13 14 they are deflected and directed downward by the conductors 15, and they pass from the last-named folding-rollers, between guiding-rollers 17 18, and, guided by the conductors 19, they are received and delivered by a rotating fly, the arms of which are marked 20, and finally they are laid upon belts 75, that run over rollers 76 77.

The cutting mechanism in the carrier X is of common construction, and any other form of cutting device may be substituted for it. The sheet-holding pins 4 are arranged to be protruded from and withdrawn beneath the periphery of the carrier Z by a rock-shaft and cam arrangement, which is well described in Patent No. 269,021. The double folding-blades 5 are constructed and operated in connection with the folding-rollers 10 11 as fully set forth in Patent No. 171,196, and the rotating carrier Q, with its rotating single folding-blade 6, is constructed and operated in connection with the folding rolls 13 14 in substantially the manner fully described in Letters Patent No. 171,196, (see Fig. 15;) but the carrier is modified, substantially as shown in Fig. 37, of Pat-

ent No. 197,693. The fly 20 and piling-tapes 75 are constructed and arranged substantially as described in Letters Patent No. 269,021. All of these devices, therefore, need no particular description here.

Any other folding mechanism, or cutting and folding mechanism, or flying mechanism, may, however, be substituted for those shown, and the longitudinal folder may be constructed as shown and described in many patents granted to me.

It has been stated that the main printing-mechanism may run independently of the auxiliary printing-machine. This is accomplished by simply disconnecting the appropriate driving gear. When this is done, the main machine will produce an eight-page paper in book form, and this is accomplished as follows: The main web in passing through the tapes *a e* will receive a line of paste upon the center of the I section of the web, as in Fig. 6. Said web will be split longitudinally by the cutter 64. The I section will pass onward through the tapes *i e*, and the II section will make the transit of the web-turner B and be brought beneath the I section, as in Fig. 6, at the roller 56. The two webs, then being superimposed, pass together between the tapes *e i*, and, emerging from the rollers 58 60, pass over the longitudinal folder, whereby they are simultaneously doubled in their centers or on the pasted line laid upon the I section, as in Fig. 7. As the superimposed webs, after being folded longitudinally, pass between the carriers X Z, said folded webs are divided by the cutters 2 into sections that form sheets. At each cutting operation the leading end of these webs is impaled by the pins 4, and, thus held, is carried onward upon the carrier Z until the central portion of the sheet approaches the rollers 10 11, at which time a folding-blade, 5, is protruded to double the sheets between said rollers, during which folding operation the web is again severed by the cutting devices, and the pins holding its leading edge are withdrawn. When thus doubled into the nip of the rollers 10 11, the sheet will be carried between said rollers, and thus folded upon a line at right angles to the fold it received in passing the longitudinal folder, as in Fig. 8. Such twice-folded sheet will descend in front of the folding-rollers 13 14, and, when in proper position therefor, will be doubled on a central line into the nip of said rollers 13 14 by one of the rotating folding-blades 6, the fold thus received being parallel with the preceding fold, as in Fig. 9. The twice-folded sheet is then carried between rollers 17 18, and descends until its edge rests upon a series of arms, 20, when it is immediately thrust forward and laid flat upon the tapes 75 by the action of the other series of arms 20. Of course, the sheet might be delivered once folded, as in Fig. 7, by leading it directly from the carriers X Z, or twice folded, as in Fig. 8, by leading it directly from the rollers 10 11, in which lat-

ter case the guide 12 might be adjusted, as in Fig. 16, to act as a conductor. If, now, it is desired to insert a supplement sheet, whereby may be produced a twelve-page paper, the auxiliary printing-machine is brought into action, and appropriate forms are provided upon type-cylinders of both printing machines. The supplement web J will receive a longitudinal central line of paste upon its under surface in passing the pasting apparatus W, whereby it will be caused to adhere to the under side of the I section of the main web, and when, in conjunction with said web, it passes the pasting apparatus Y it will receive another line of paste coincident with the former line of paste, but upon the opposite side of the web, and when these two webs pass the roller 50 the I section of the main web and the supplement-web will pass onward into the tapes *e i*, while the II section of the main web will make the transit of the web-turner B and be brought directly beneath the webs I J, at the roller 56, said II web being united at that point to the web J upon the pasted line which the latter received from the apparatus Y, thereby joining the three superimposed webs upon a central longitudinal line, as in Fig. 10. Said webs, emerging together from the rollers 58 60, pass through the longitudinal folder, thus receiving a longitudinal central fold, as in Fig. 11, and thereafter are manipulated by the carriers X Z and their devices, so as to divide the folded triplicate web into sheets and transversely fold the same, in like manner as has been described with reference to the two webs, as is indicated by Figs. 12 and 13.

If it is desired to produce a ten-page paper, the supplement-web, as is shown in Fig. 14, will be one-quarter the width of the main web, and its roll will preferably be mounted so that one end shall be close to the C side of the machine. In this case the web J will take its first impression from the C end of the type-cylinder L, and be led thence around the turner N, and transferred to the B end of the type-cylinder L, and then will be associated with the main webs I II, occupying a longitudinal position therewith on the B side of the machine, so that a transverse section of the associated webs as thus brought together would be as represented in Fig. 14.

The pasting apparatus W is adjusted so as to lay a line of paste on the inner edge of said web, and thereafter the association and folding of the webs is substantially like that of the three webs, as is sufficiently indicated by Fig. 15, which shows the ten-page product after passing the longitudinal folder.

It has been said that the main printing mechanism will be of any construction of web-perfecting machine, and it is also to be understood that the auxiliary printing-machine may be of any construction of web-printing machines.

From the foregoing it will be seen that the present invention does not consist in improve-

ments in the particular mechanisms, but in the general combination or organization of mechanisms whereby the desired result is accomplished.

What is claimed is—

1. The combination, with a main printing mechanism which is adapted to perfect a main web, of a turner for superimposing the longitudinal sections of said web, and an auxiliary printing mechanism which is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web, all substantially as described.

2. The combination, with a main printing mechanism which is adapted to perfect a main web, of a turner for superimposing the longitudinal sections of said web, an auxiliary printing mechanism which is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web, and a longitudinal folder for folding said associated web and sections, all substantially as described.

3. The combination, with a main printing mechanism which is adapted to perfect a main web, of a splitter for dividing said web longitudinally into two narrow webs or sections, a turner for superimposing said sections, and an auxiliary printing mechanism which is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web, all substantially as described.

4. The combination, with a main printing mechanism which is adapted to perfect a main web, of a splitter for dividing said web longitudinally into two narrow webs or sections, a turner for superimposing said sections, an auxiliary printing mechanism which is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web, and a longitudinal folder for folding said associated web and sections, all substantially as described.

5. The combination, with a main printing mechanism which is adapted to perfect a main web, of a splitter for dividing said web longitudinally into two narrow webs or sections, a turner for superimposing said sections, an auxiliary printing mechanism which is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web, and the pasters W Y, all substantially as described.

6. The combination, with a main printing mechanism which is adapted to perfect a main web, of a splitter for dividing said web longitudinally into two narrow webs or sections, a turner for superimposing said sections, an auxiliary printing mechanism which is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web,

and a transverse cutting mechanism for severing said associated web and sections into sheets, substantially as described.

7. The combination, with a main printing
5 mechanism which is adapted to perfect a main web, of a slitter for dividing said web longitudinally into two narrow webs or sections, a turner for superimposing said sections, an auxiliary printing mechanism which
10 is adapted to perfect a web of lesser width than the main web and deliver the same associated with the sections of the main web,

a transverse cutting mechanism for severing said associated web and sections into sheets, and a transverse folding mechanism for fold- 15 ing said sheets, all substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

T. H. PALMER,
JAMES A. HOVEY.