

(No Model.)

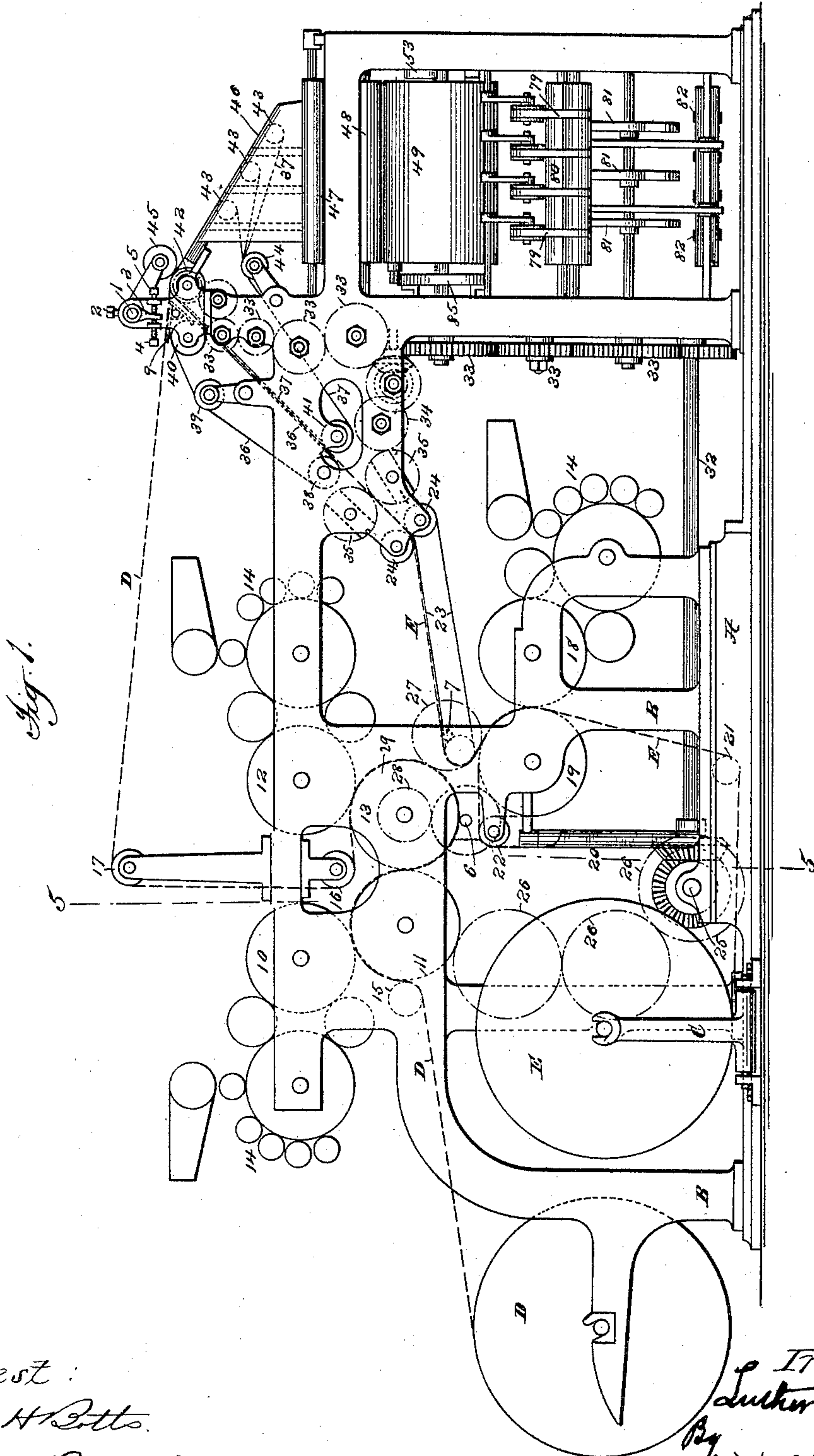
6 Sheets—Sheet 1.

L. C. CROWELL.

WEB PRINTING AND DELIVERING MACHINE.

No. 431,840.

Patented July 8, 1890.



Attest:

Chas. H. Bette.

John B. Bette.

Inventor
Luther C. Crowell
By *Philip P. Phipps*
Attys

(No Model.)

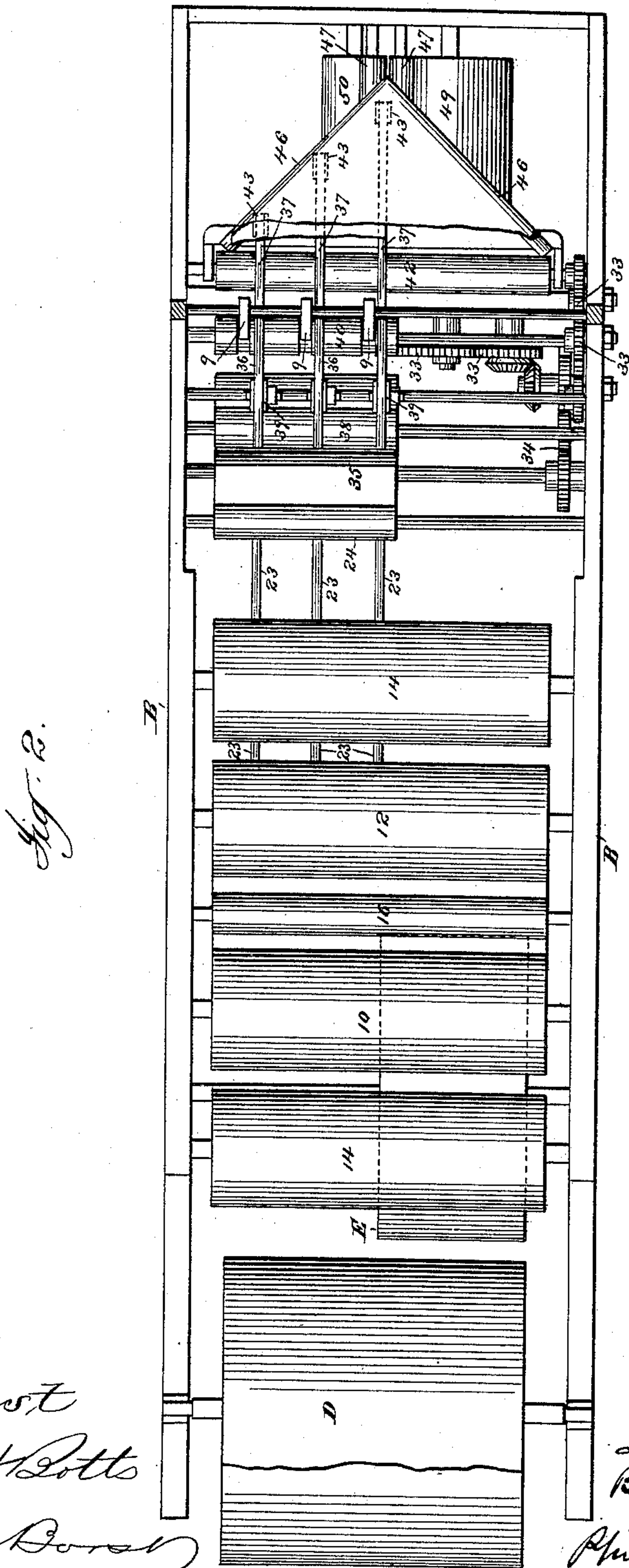
6 Sheets—Sheet 2.

L. C. CROWELL.

WEB PRINTING AND DELIVERING MACHINE.

No. 431,840.

Patented July 8, 1890.



Attest
Geo H. Lott
J. M. Doran

Inventor:
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(No Model.)

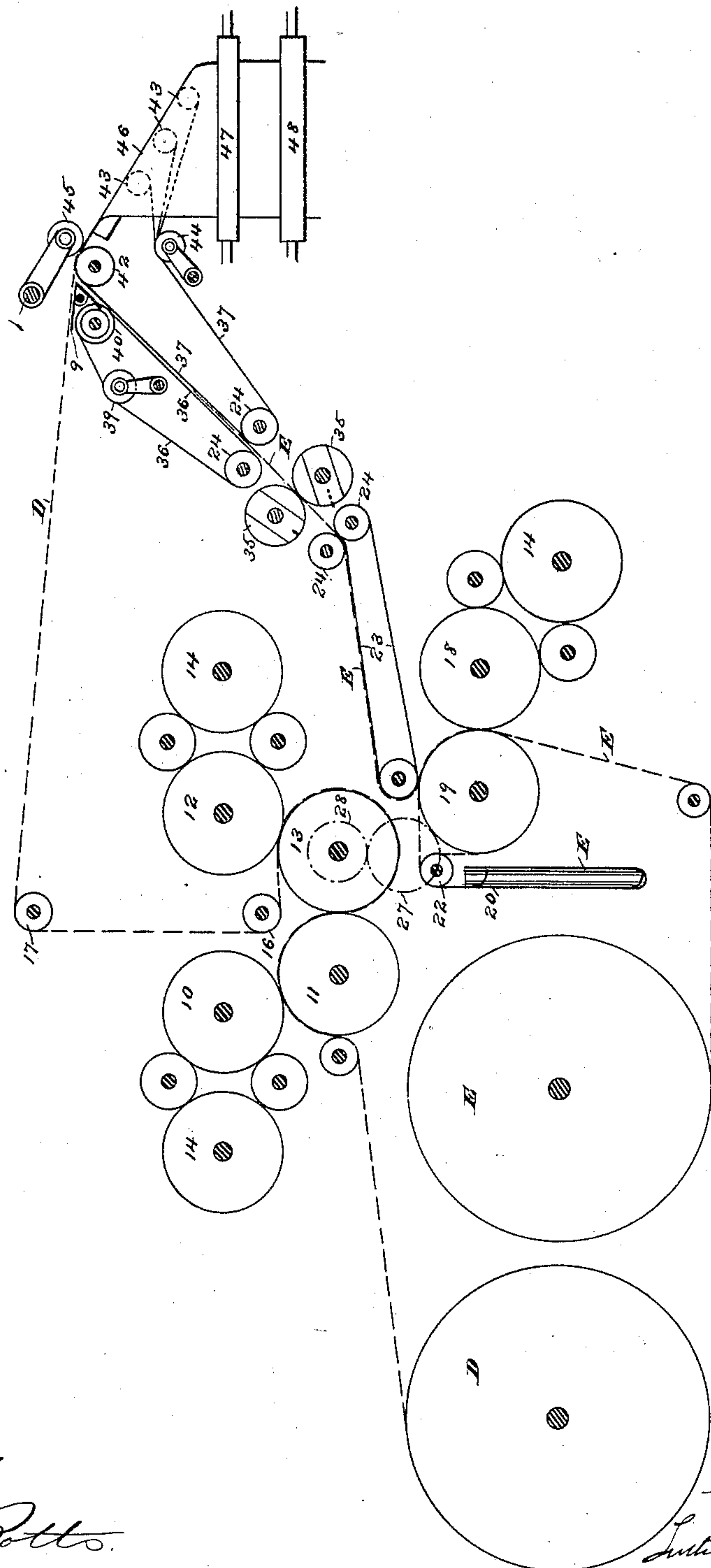
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L. C. CROWELL.
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Fig. 3.



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6 Sheets—Sheet 4.

L. C. CROWELL.

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Fig. 5.

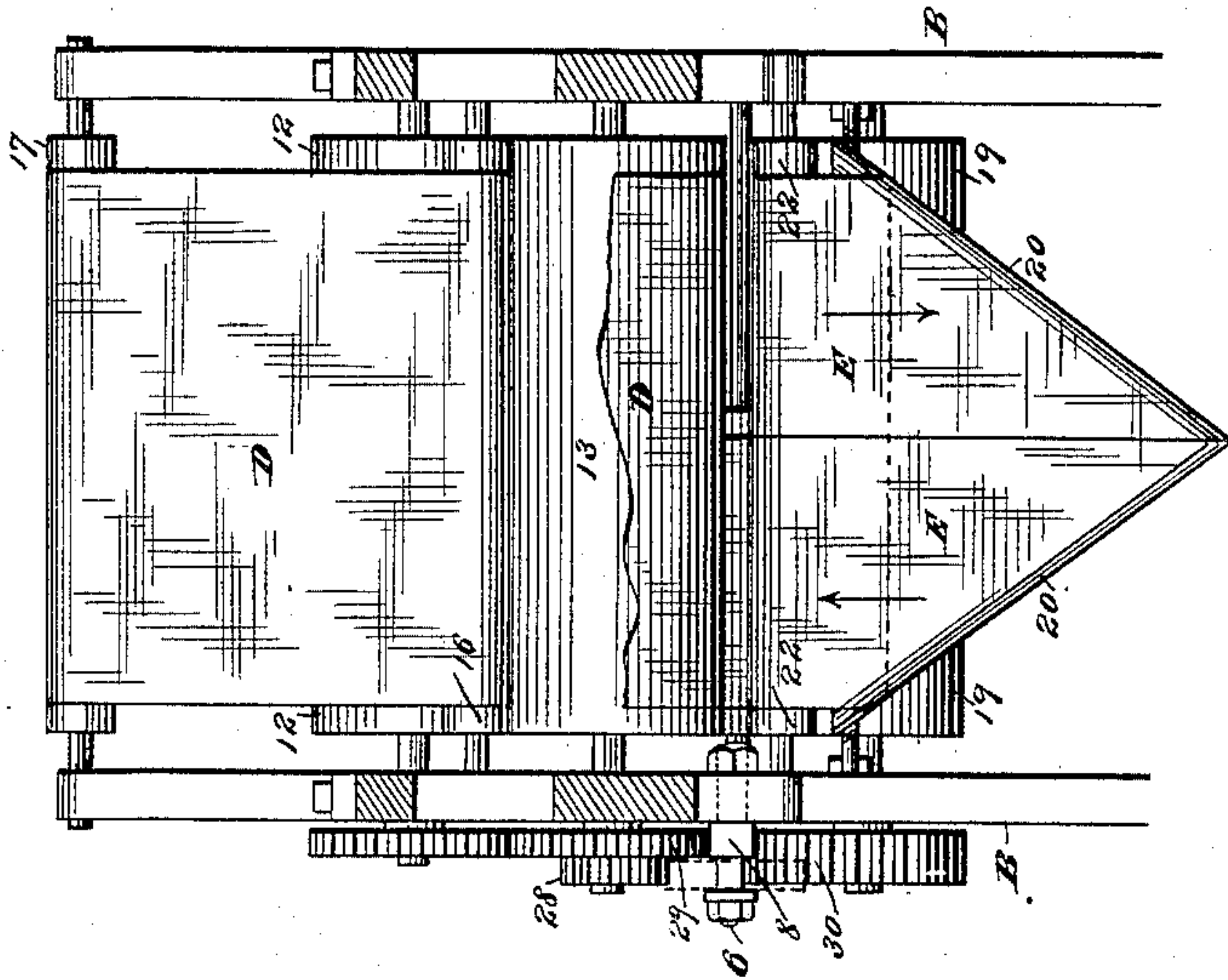
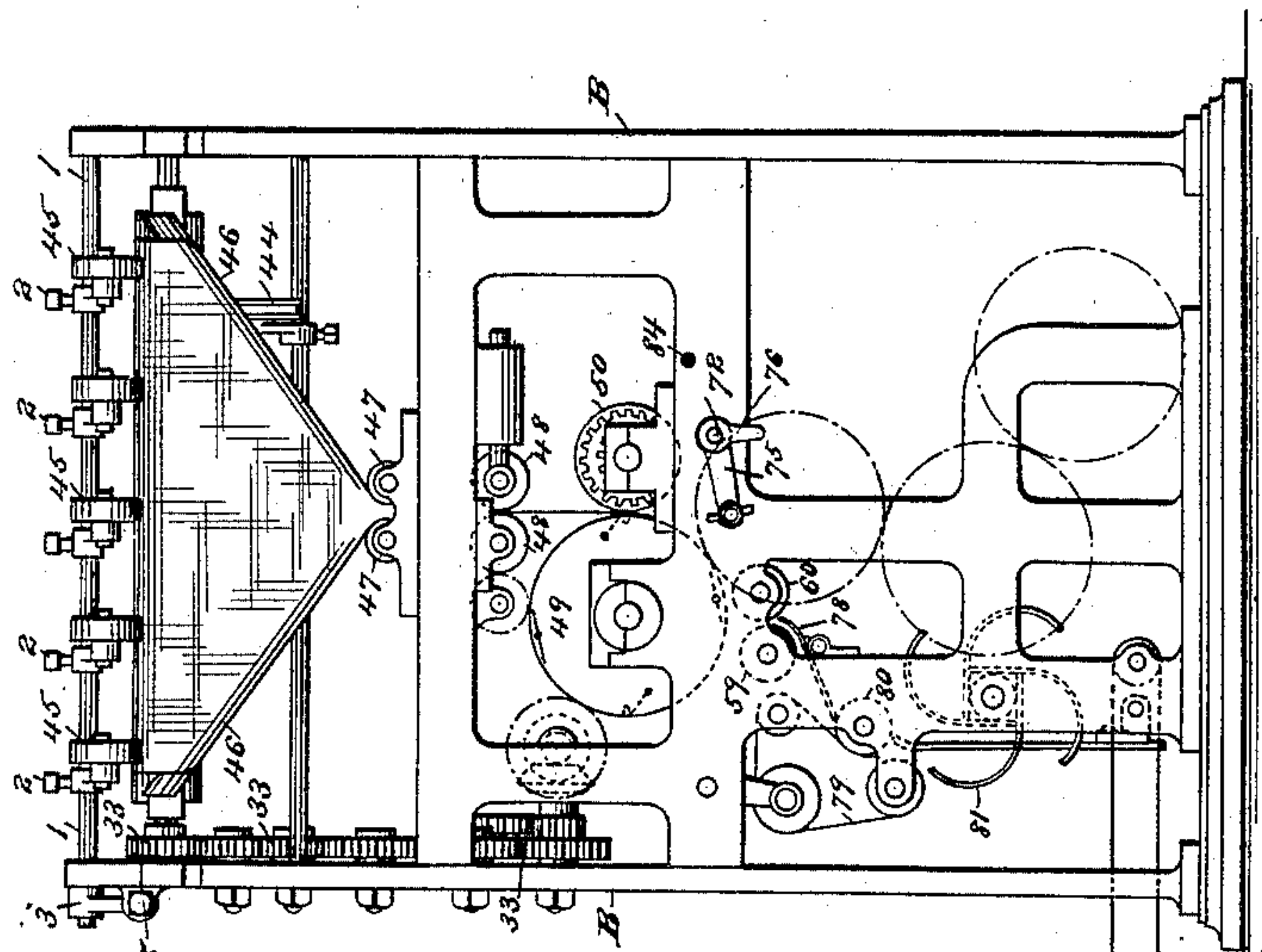


Fig. 4.



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Chas. H. Dotts
Geo. Borer

Inventor

Lester C. Crowell
By Philip Phelps & Son
Attys

(No Model.)

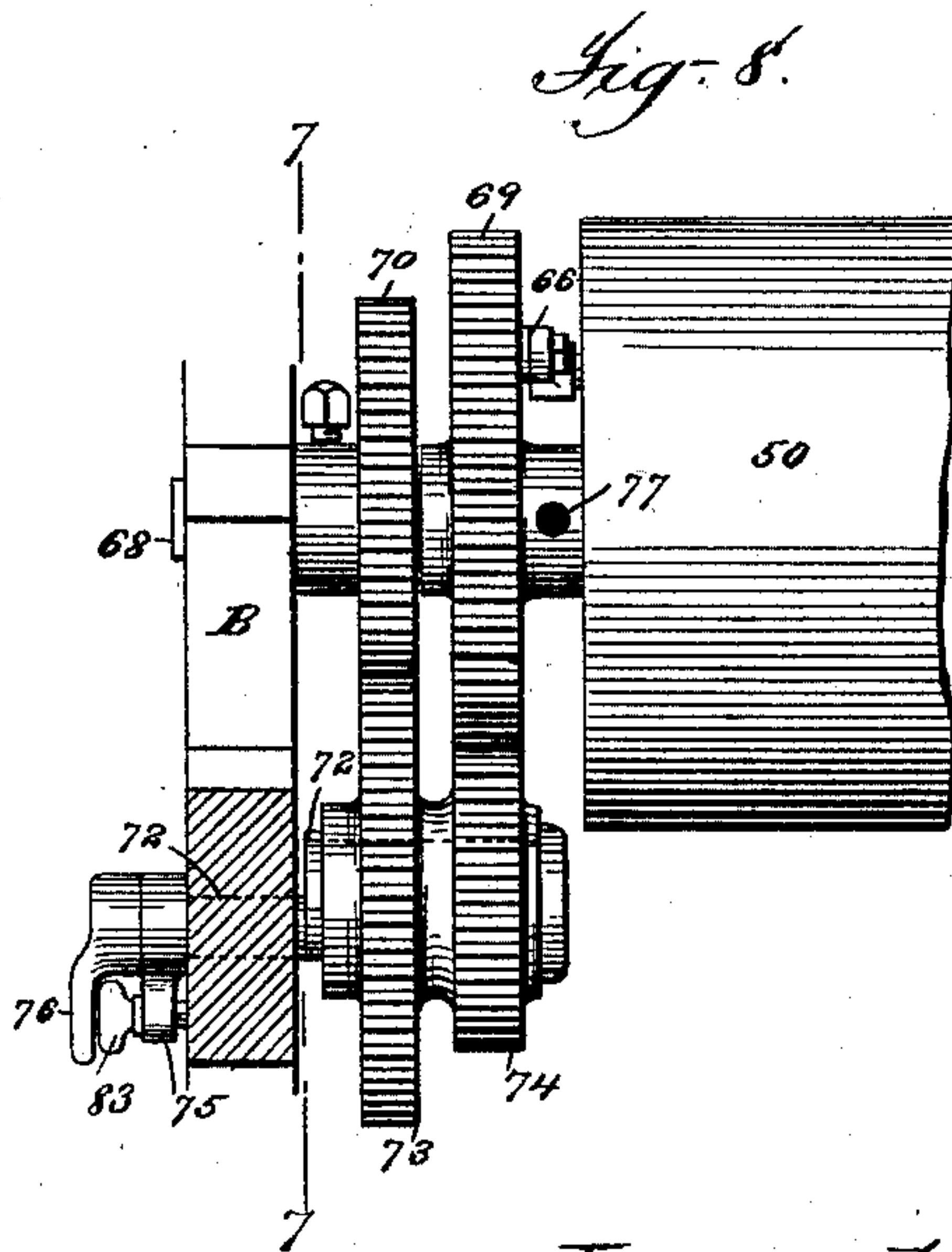
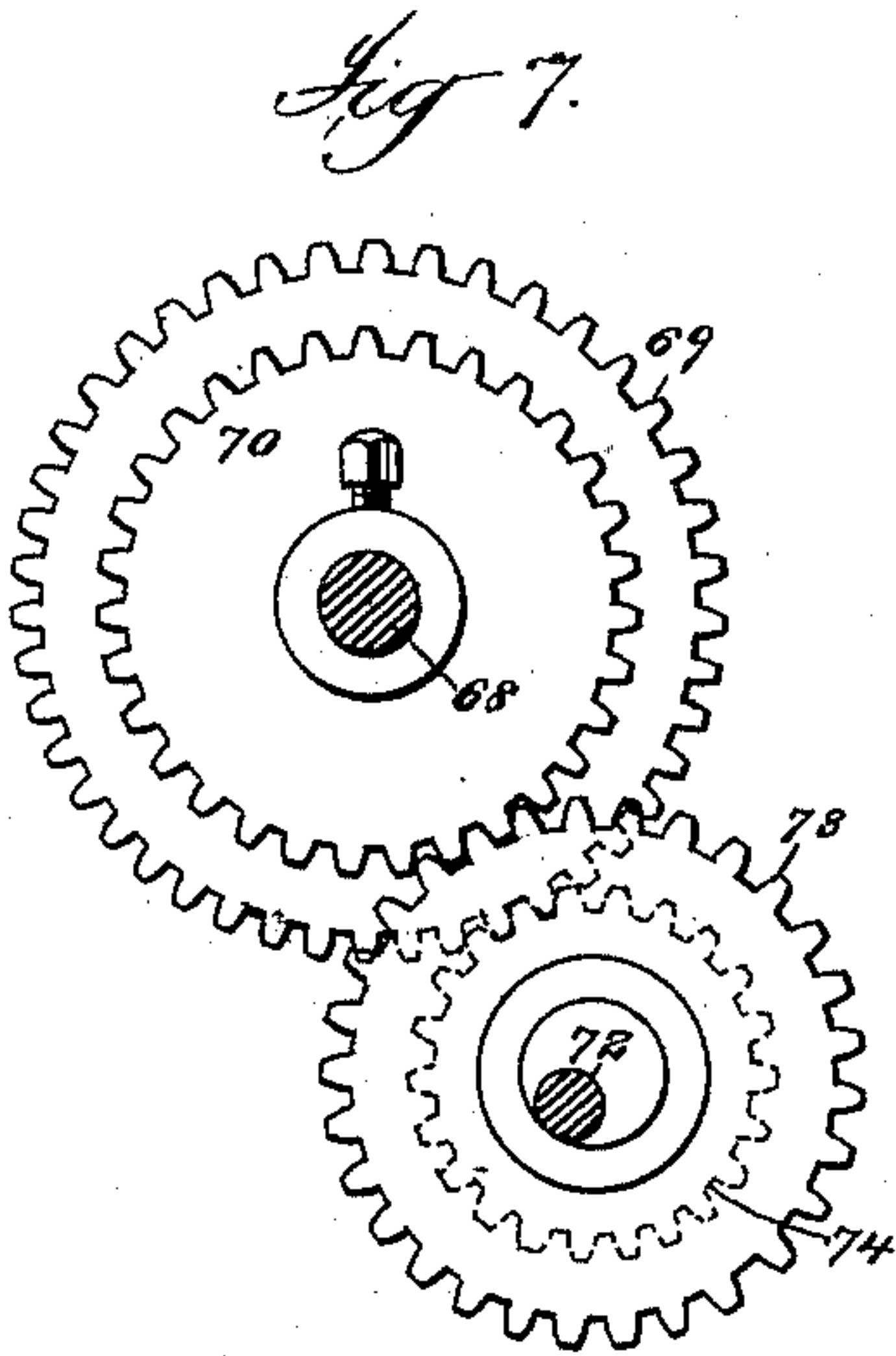
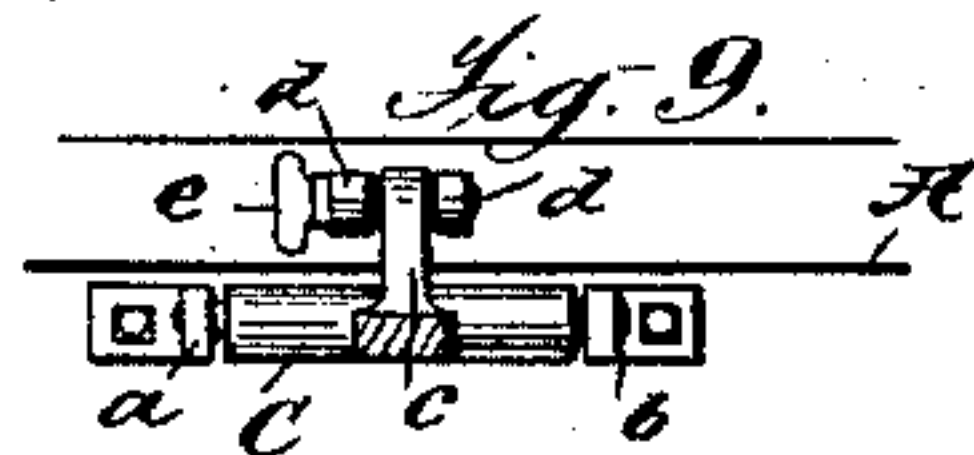
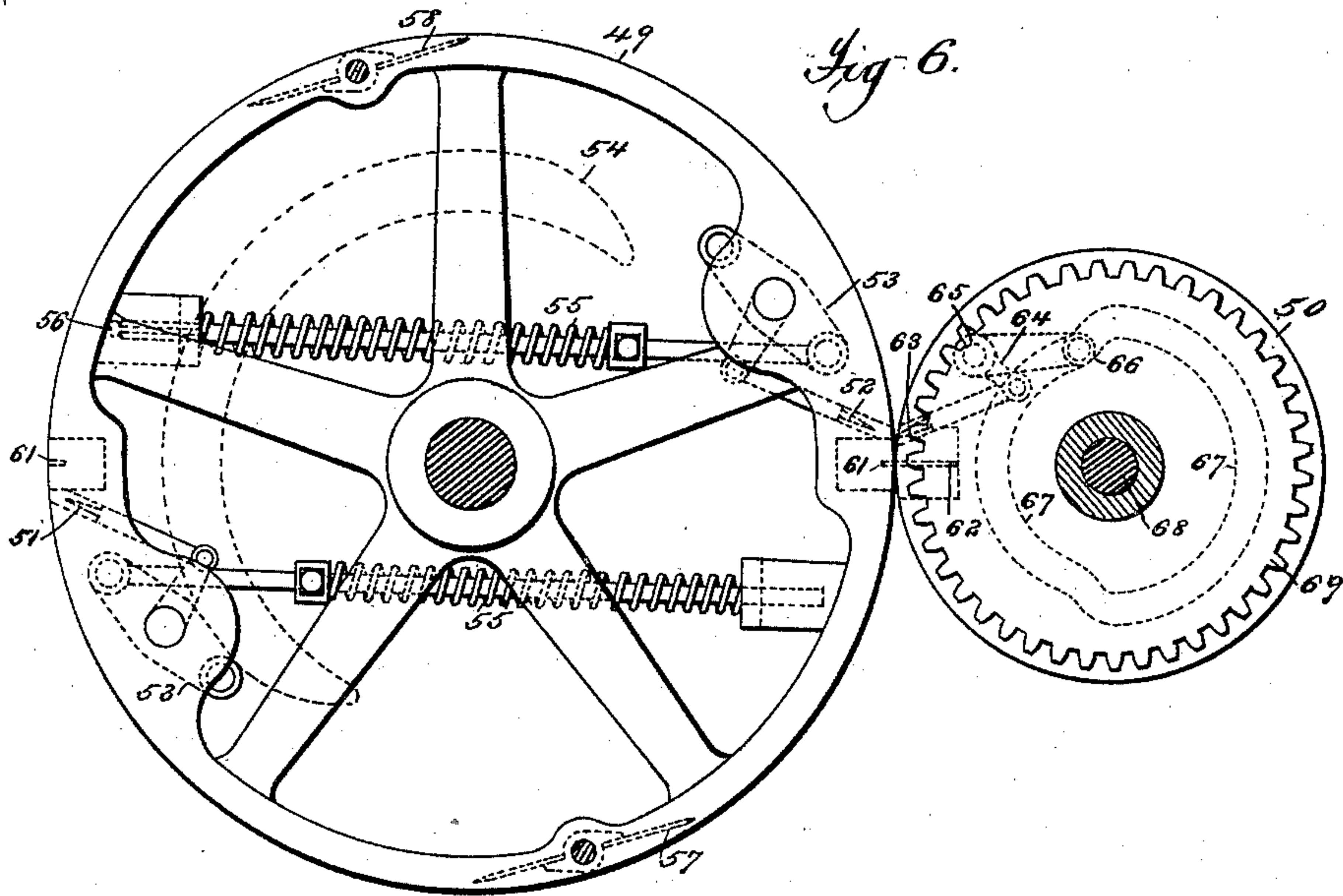
6 Sheets—Sheet 5.

L. C. CROWELL.

WEB PRINTING AND DELIVERING MACHINE.

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(No Model.)

6 Sheets—Sheet 6.

L. C. CROWELL.

WEB PRINTING AND DELIVERING MACHINE.

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Fig. 10.

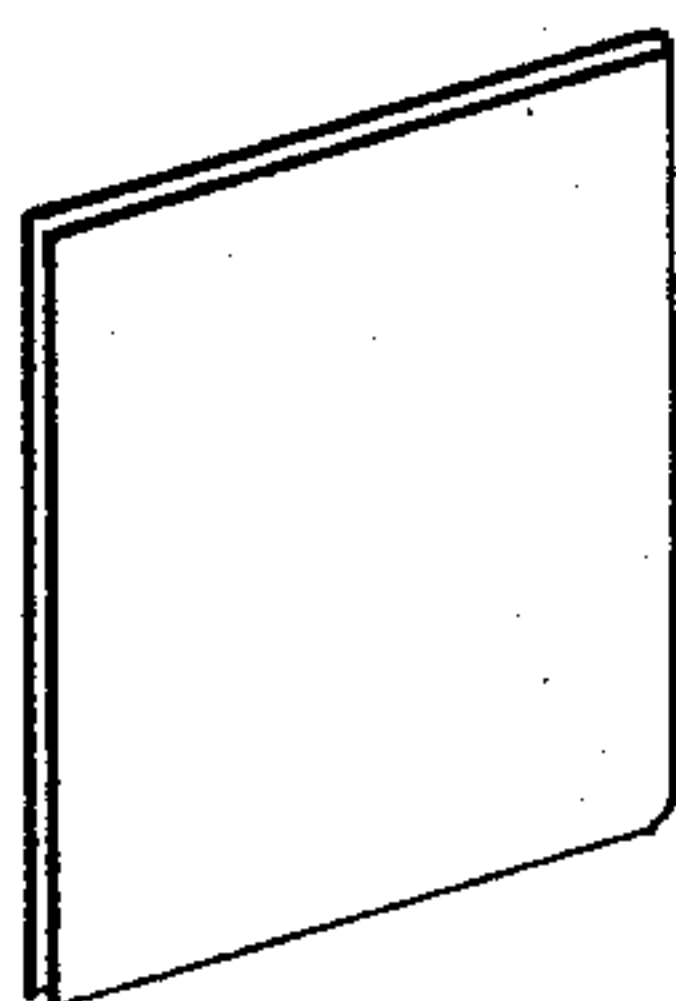


Fig. 11.

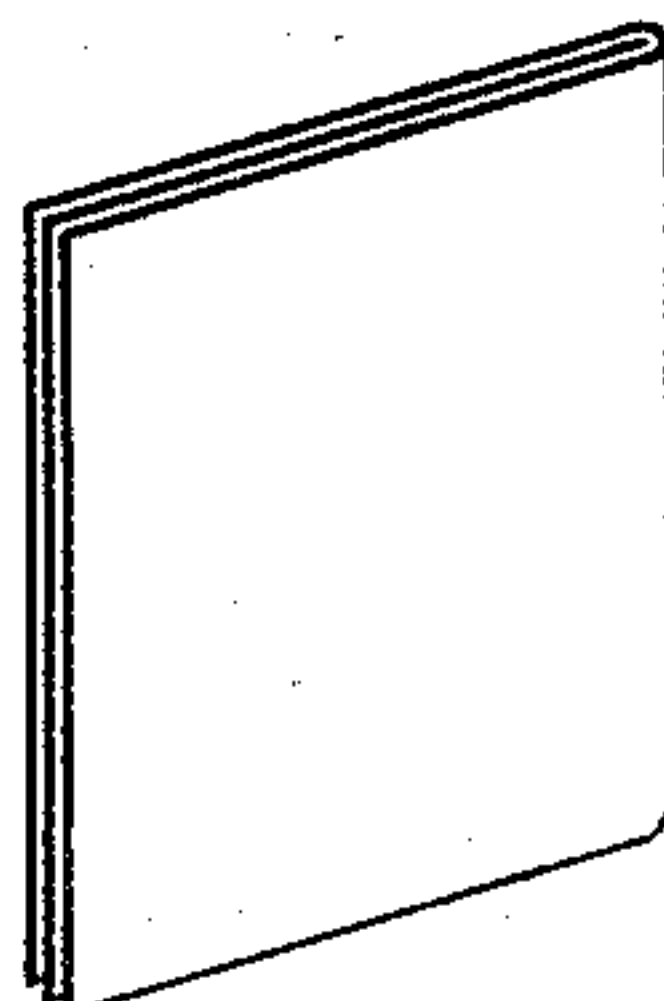


Fig. 12.

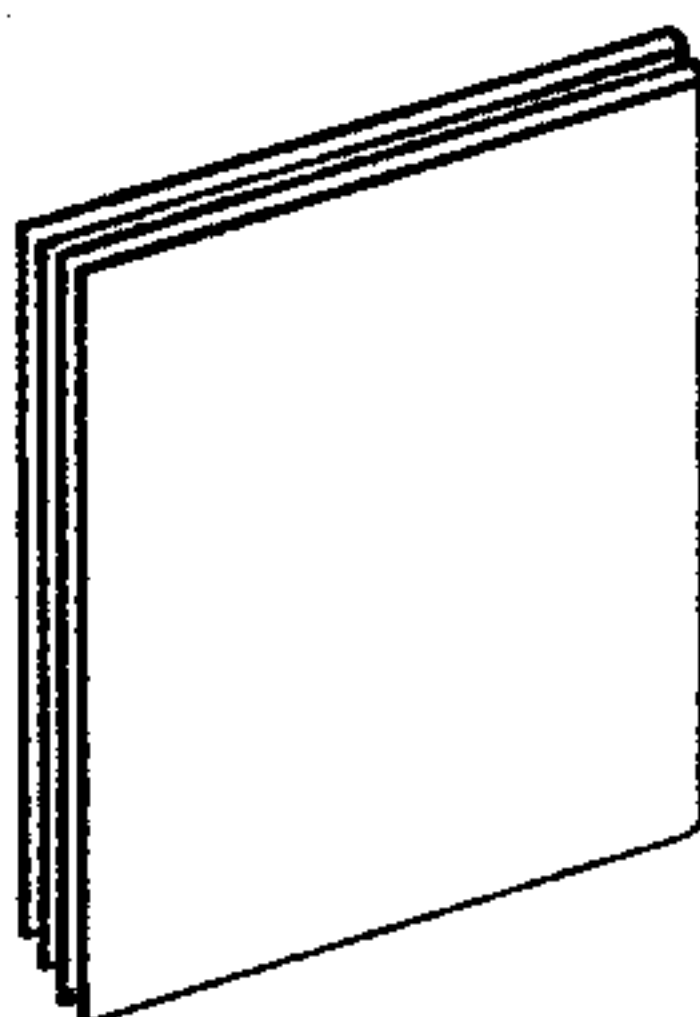


Fig. 13.

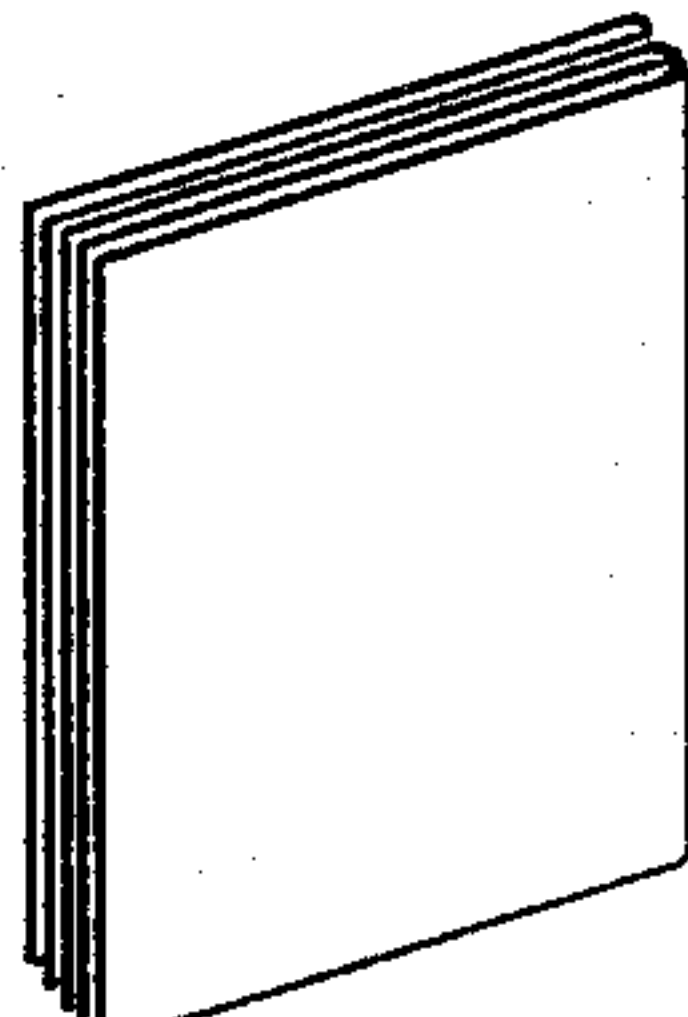


Fig. 14.

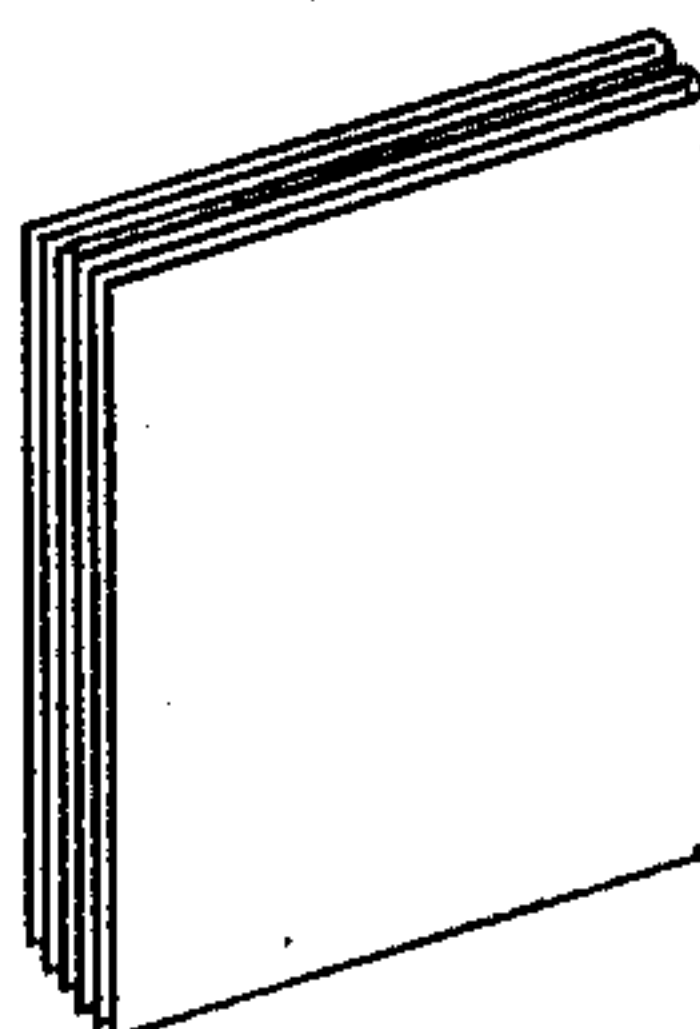


Fig. 15.

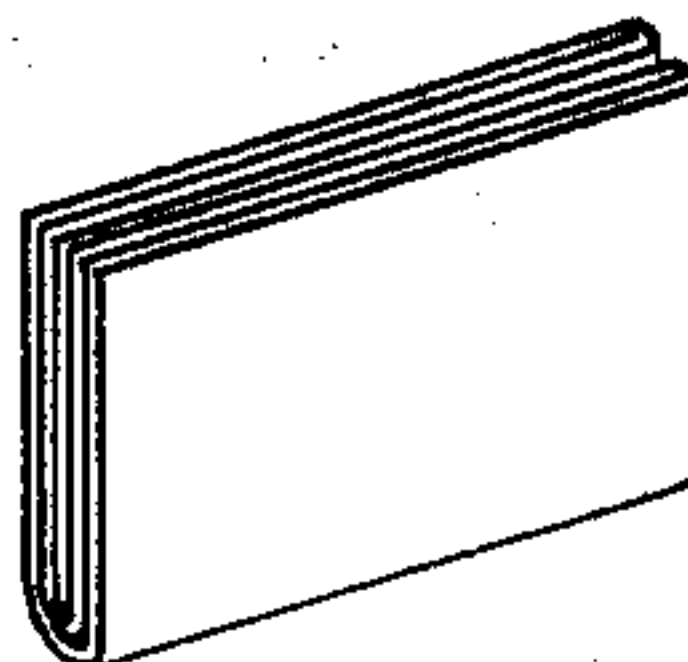
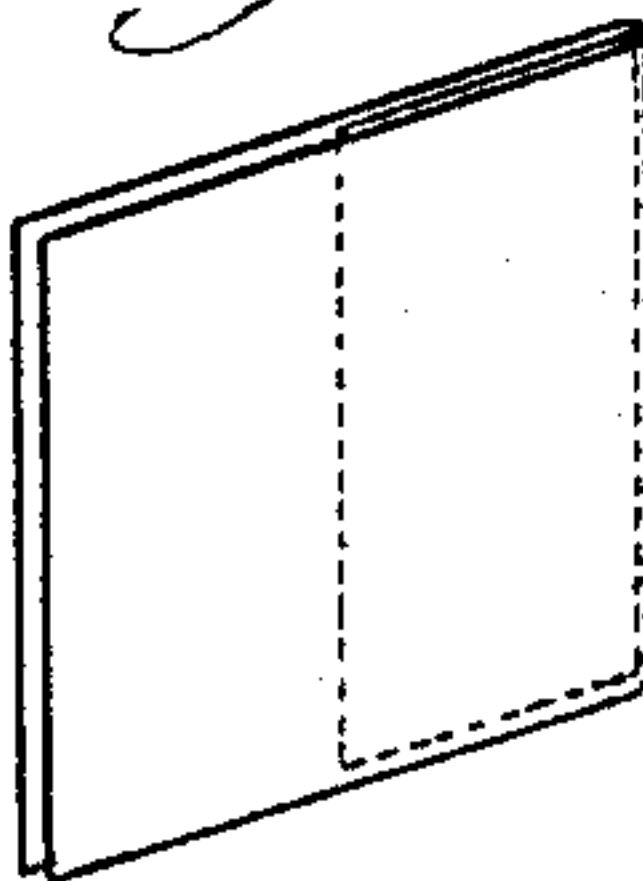


Fig. 16.



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John B. Borer

Inventor:
Lester C. Crowell

By

Philip Phelps & Hoag

Atty's

UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO R. HOE & CO., OF NEW YORK, N. Y.

WEB PRINTING AND DELIVERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 431,840, dated July 8, 1890.

Application filed November 18, 1889. Serial No. 330,754. (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 Web Printing and Delivery Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

In the construction of web-printing machines it has been found desirable to provide a machine adapted to print at will multiple products—such as four, six, eight, ten, and twelve page papers—and which shall be compact in form and sufficiently simple in construction to permit of a high rate of speed being maintained during the printing of an edition. This object is attained in the present case by a machine using but twelve forms and provided with a simple and convenient means of adjustment, by which the press may be readily changed so as to produce at will the various products; and the invention consists, generally, in the compact combination, with suitable delivery mechanism, of two printing mechanisms so arranged that one may be thrown out of operation, if desired, or the two mechanisms may be run together, either at the same or at different rates of speed, the delivery mechanism being so constructed as to either associate the two webs, fold and sever them, or sever a sheet from one web and associate the sheet with the other web, or fold and sever the single web when one printing mechanism is not in use, the collecting mechanism being operated or thrown out of operation in either case, as desired.

In addition to the general construction of the machine, my invention consists in various constructions and combinations of parts, which will be more particularly described in the specification, and pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation. Fig. 2 is a plan view. Fig. 3 is a longitudinal sectional diagram taken inside the frame. Fig. 4 is a delivery end elevation.

Fig. 5 is a vertical cross-section taken substantially on the line 5 5 of Fig. 1. Figs. 6, 7, and 8 are detail views of the collecting mechanism, Fig. 7 being a section on line 7 7 of Fig. 8. Fig. 9 is a detail view of the means for holding the movable web-support, and Figs. 10 to 16 show the various products of the machine, Figs. 10 to 14, respectively, showing the four, six, eight, ten, and twelve page products previous to the final fold, Fig. 15 a product after the cross-fold has been made, and Fig. 16 a six-page product with a half-width page.

It will be understood that in some of the drawings parts of the frame-work, gears, and other similar parts, the construction of which is well understood in the art, have been omitted, in order that the combination of the essential parts may be more clearly shown.

Referring now to the drawings, A is the frame of the machine, provided at one end with supports B C for main and supplement web rolls D E. As shown in Fig. 1, one of the supports C for the supplement-web is hinged to the base, so as to fold outwardly and permit the supplement-web E to be readily placed in position without removing the main web D. This hinged support C may be held in its upright position by a bolt or any suitable means. I prefer, however, to use the construction shown, (see Fig. 9,) in which the support C is pivoted in lugs *a b* on the base of the frame, and is provided with a short arm *c*, extending at right angles to the support. When the web is in place, the arm rests upon the base-frame between two lugs *d d*, and the arm and lugs are provided with holes to receive the thumb-screw *e*, by which the arm is locked and the support is held in a vertical position.

In the upper part of the frame A, next the main and supplement rolls, is the main-web-printing mechanism, consisting of the two sets of type and impression cylinders 10 11 and 12 13, one of which sets forms the printing and the other the perfecting impression cylinders, as is usual in this form of mechanism. Type-cylinders 10 12 are provided with ink-ing mechanism 14, which is of the usual con-

struction, and need not be particularly described here. The type-cylinders 10 and 12 carry each two pages of matter longitudinally and two circumferentially of the cylinder, the result of one revolution of the cylinders being the printing and perfecting of eight pages of matter—four for each of two products.

The operation of this main printing and perfecting mechanism is not different from that of similar mechanisms well known in the art, and need not be described further than to say that the web D passes from the web-roll under the conducting-roll 15 over the impression-cylinder 11, where it receives an impression from the type-cylinder 10 below the impression-cylinder 13, and upward over the same cylinder, where it is perfected by type-cylinder 12, whence the web passes under a conducting-roll 16 upward and over the conducting-roll 17 to the other end of the machine, where is placed the associating and delivering mechanism for the main and supplement webs, which will be described hereinafter.

The supplement-web-printing mechanism is preferably substantially of the form shown and described in my prior Letters Patent No. 212,444, for perfecting a web of less width than the main web, and is preferably placed below and in close proximity to the main printing mechanism. This supplement-printing mechanism consists of the type-cylinder 18 and impression-cylinder 19, the type-cylinder 18 being provided with an inking mechanism 14 of the ordinary form. These printing-cylinders are arranged parallel with the main printing-cylinders and are preferably of equal length, but in combination with the turner 20 are adapted to print and perfect a web of less width than the main web.

The operation of the supplement-printing mechanism is the same as in my patent above referred to, and need not be described further than that the supplement-web E passes from the web-supports C, under the conducting-roll 21, up to and between one end of the type and impression cylinders 18 19, where it is printed upon one side, over the conducting-roll 22 and downward over one side of the turner 20, returning over the other side of the turner 20, as shown by the arrows in Fig. 5, over the other end of the conducting-roll 22, the two ends of the roll 22 being made for this purpose to revolve in different directions under and between the impression-cylinder 19 and the type-cylinder 18, where it is perfected, and whence it is carried by the tapes 23 between the conducting-rolls 24 to the severing and associating mechanism, which will be described hereinafter.

The main and supplement web printing mechanisms are operated by the main operating-shaft 25, through the series of intermediates 26, gearing with the impression-cylinder 11, which is geared with the other parts of the main printing mechanism, the supplement impression-cylinder 19, with which the

other parts of the supplement mechanism are geared, being driven from the main impression-cylinder 13 through a removable intermediate 27. The impression-cylinder 13 is provided with two gears 28 29, one of which 28 is half the size of the other, and the supplement impression-cylinder 19 is provided with a broad-faced gear 30.

To enable the intermediate gear 27 to be shifted to engage with either of the gears on impression-cylinder 13 for the purpose of changing the relative speed of the two printing mechanisms, the frame is provided with two studs 6 7, on either of which the gear 27 may be placed, the stud 6 being provided with a shoulder 8, against which the gear 27 is held for engagement with the outside reduced gear 28 on cylinder 13. It will thus be seen that by removing the gear 27 the supplement-printing mechanism may be thrown out of operation, and that the supplement-printing mechanism will be run at the same or at half the speed of the main printing mechanism as gear 27 engages with the larger or smaller gear upon the impression-cylinder 13 thus by the simple removal or shifting of a gear enabling one mechanism to be thrown out of operation, or the relative speed of the two mechanisms to be changed for the different products.

Geared to the main operating-shaft 25 is a longitudinal shaft 32, extending to the other end of the frame, with which is geared, through a series of intermediates 33, the associating, collecting, and delivering mechanism, which will now be described. Removably supported upon a stud in the frame is the gear 34, operated from one of the intermediates 33 through bevel-gears so arranged that the gear 34 is driven at the same speed as the supplement-printing mechanism, and geared to 34 are the perforators 35, likewise moving at the same speed as the supplement mechanism when run at half-speed, and adapted to be thrown out of operation by the removal of gear 34 when the supplement mechanism is run at full speed. These perforators are of a common form, the cylinders carrying the perforators being cut away at opposite sides, so as to form bars, the edges of which rotate in contact and carry, respectively, the perfecting blade and groove, the shafts being provided at one end with intermeshing gears, one of which meshes with gear 34. With this construction it is evident that when the shafts are rotated so as to carry the perforator-bars into positions in which they are parallel with each other widthwise, as shown in Figs. 1 and 3, by removing the gear 34 the web will pass freely between the perforators. Geared to run at the same speed as the main-web-printing mechanism and receiving the supplement-web E after it has passed between the perforators 35 are upper and lower conducting-tapes 36 37. The tapes 36, as seen in Figs. 1 and 3, pass from the conducting-roll 38 over tighteners 39 and roll 40 back to conducting-roll 38. The lower series of tapes 37 pass from the lower con-

ducting-roll 41, parallel with the tapes 36 and forming a bite as they pass roll 40 under the guide 9 to and over a conducting-roll 42 to their respective pulleys 43 in the folding mechanism, returning over the tightener 44 to the roll 41. As usual in this form of mechanism, the rolls 38 41 are placed a short distance apart, so that the tapes 36 37 shall feed the web after it has been perforated without severing the same, the severance not being made until the web enters the bite formed by roll 40 and the tapes, when the web is severed at the perforations by the excess of speed of this mechanism. The perforators and carrying-tapes, with roll 40, thus form a web-severer for the supplement-web. As stated above, the perforators 35 may be thrown out of operation, when the two printing mechanisms will be run at the same speed and the web E pass directly to the tapes 36 37 and under the guide 9. The two webs will then be associated, the supplement-web being uncut. The main web D passes from the conducting-roll 17 over the guide 9 to and between the roll 42 and the pulleys 45, where the supplement web or sheet will be associated with the main web and pass with it over the longitudinal folder, consisting of the internal folders 46 and the external folders 47 between the conducting-rolls 48, by which the fold is completed, and thence to the cutting, collecting, and delivering mechanism.

For the purpose of securing accurate registry between the main web and the supplement web or sheet, the arms carrying the pulleys 45 are individually adjustable circumferentially of the shaft 1 by means of the set-nuts 2, and the shaft 1 is adjustable in its bearings, so as to increase or decrease the pressure of the whole series of pulleys 45 upon the webs, this latter adjustment being made by means of a depending arm 3, connected to the shaft, and two set-screws 4 5, mounted in lugs in the frame and pressing upon either side of the arm 3. The roll 42 and pulleys 45 thus form a pair of adjustable conducting-rolls. The pulleys 45 are preferably covered with an elastic material, and by the two means of adjustment just described the pressure of the pulleys upon either side of the web, or that of the whole series of pulleys, may be readily graduated, so as to feed the two webs or web and sheet with absolute registry. By feeding the supplement-sheet under the main web and between it and the folding-tapes 43 the upper series of tapes common in this type of folding mechanism for sheets is rendered unnecessary, and only the lower series of tapes are used.

The construction thus far described forms an essential and independent part of my invention, and it is to be understood that this combination of printing mechanisms, with or without the web-severer, may be used with any form of delivery mechanism. The machine will preferably be constructed, however, with special mechanism for varying the

products of the machine, as before stated, and this cutting, collecting, and delivering mechanism will now be described.

While any sheet-collecting mechanism that is capable of being thrown out of operation may be used as a part of the delivery mechanism of this machine, I prefer to use that shown, which, however, forms no part of the present invention, but is described and claimed in another application, Serial No. 307,497, filed April 16, 1889.

Referring now particularly to Figs. 6, 7, and 8 it will be seen that the cutting, collecting, and folding mechanism consists, generally, of the two cylinders 49 50, one of which 49 has a circumference of twice the length of a sheet of the product, and the other 50 a circumference equal to the single length of a sheet. Cylinder 49 is provided with two series of sheet-holding pins 51 52, carried by the levers 53 and operated in one direction by means of the stationary cam 54 and in the other direction by the springs 55. The series of pins 52 are adapted to be retracted and retained in inoperative position by a latch 56, as fully shown and described in my Letters Patent No. 383,800, or in any other suitable manner. The cylinder 49 is provided also with two series of transverse folding-blades 57 58, operated by a stationary cam 85 in the manner usual in this class of mechanism, and adapted to form, in combination with the conducting and folding rolls 59 60, (see Fig. 4,) a transverse fold. The cylinder 49 is also provided, just in advance of the sheet-holding pins 51 52, with grooves 61 for the cutting-blade on cylinder 50. The cylinder 50 is provided with a cutting-blade 62, and just behind this with a series of sheet-holding pins 63, connected pivotally to the arm 64 on the rock-shaft 65, from which an arm extends carrying a bowl 66, adapted to be operated by cam 67. For the purpose of advancing these sheet-holding pins only at each alternate revolution of the cylinder 50, the cam 67, which is loose upon the shaft 68 of cylinder 50, is provided with a gear 69, and fixed upon the shaft 68 is a second gear 70. Loosely mounted upon a shaft 71, eccentrically supported in the frame by stud 72, are two rigidly-connected gears 73 74, engaging, respectively, with gears 70 and 69, the gear 73 being of equal size with gear 70, and the gear 74 of half the size of gear 69. Thus the speed of the cam 67, as received from the shaft 68 through gears 70, 73, 74, and 69, is reduced one-half.

For the purpose of throwing the collecting mechanism of shaft 50 out of operation, the eccentric stud 72 is provided upon the outside of the frame with an arm 75, by which the stud may be thrown into a position in which the gears 73 and 74 are out of engagement with the gears 70 and 69. The arm 75 is provided with a thumb-screw 83, which is adapted to enter either of two holes 84 in the frame to hold the arm in either position, and for the purpose of locking the stud more firmly,

especially in the position of engagement of the gears, a jam-nut 76 is provided. To secure the cam 67 to the cylinder in such a position as to retract the pins 62 and hold them in retracted position when the collecting mechanism is to be thrown out of operation, the hub of the cam is provided with a hole 77, registering with a hole in the shaft 68, in which a pin or screw may be inserted to hold the parts in position. Any other suitable means for securing the cam may be used.

The operation of this collecting mechanism is as follows: When the collecting mechanism is to be used, the gears 73 74 will be thrown into engagement with the gears upon the shaft 68 and the cam 67 released from the shaft. The series of pins 52 of the cylinder 49 will be retracted and held in position by the latch 56. As the web passes from the conducting-rolls 48 to and between the cylinders 49 50, these cylinders being in the position shown in Fig. 6, the leading end of the web will be taken by the pins 63 and carried around the cylinder 50 until the latter cylinder has completed a revolution, when the web will be severed by the blade 62, and at or about the same time the pins 63 will be retracted, releasing the end of the sheet. The series of pins 51 will then have reached the side opposite the cutting-blade and will catch and hold the severed sheet and the leading end of the web, which will then be carried around upon cylinder 49 until the cylinder has completed a half-revolution, when the second sheet will be severed by blade 62. The two sheets thus collected will then be folded by the folding-blade 57 between the rolls 59 and 60. When the collecting mechanism is not to be used, the gears 73 74 will be thrown out of operation and the cam 77 locked in position to retract the pins 63, as above stated, and the second series of sheet-holding pins 52 of cylinder 49 will be released. Each sheet, in this case, as severed by the cutting-blade 62, acting in one of the grooves 61 of cylinder 49, will be carried forward by sheet-holding pins 51 or 52 and be folded, as before. From the conducting and folding rolls 59 60 the product passes over the guide 78 and between tapes 79 and the conducting-roll 80 to the fly 81, by which it is deposited upon the carrier 82, or any other form of delivery mechanism may be used, as shown in numerous of my prior Letters Patent.

The operation of the machine will now be readily understood from the following general description: If a twelve-page product be desired, the printing mechanisms will be run at the same rate of speed, gear 27 being on stud 7, the gear 34 will be removed, throwing the perforators 35 out of operation, and the collecting mechanism of cylinders 49 and 50 will be thrown into operation, all as above described. The two webs will then pass together between conducting-roll 42 and pulleys 45 to the longitudinal folder, where the supplement-web will be folded on one side of and inside the main web, the two webs

passing thence to the cutting and sheet collecting mechanism, where two sections, each of six pages, will be collected, folded between conducting and folding rolls 59 60, and carried thence to the delivery mechanism, thus producing a product consisting of two six-page sections, as shown in Fig. 14 prior to cross-folding. When a ten-page paper is desired, the gear 27 will be shifted from stud 7 to stud 6, thus engaging with the half-size gear 28 of cylinder 13 and reducing the speed of the supplement-printing mechanism to one-half that of the main mechanism, and the perforators 35 will be thrown into operation through gear 34. The collecting mechanism will operate as in the case of a twelve-page product. As the web passes from the supplement-printing mechanism, it is perforated by perforators 35, and then is taken up by the tapes 36 37 and carried onward until, as it passes into the bite between the tapes and roll 40, it is severed on account of the double speed of this mechanism, and passing under guide 9 is associated with main web D between cylinder 42 and pulleys 45, whence, folded as before, it passes to the collecting mechanism, the first section thus consisting of six pages. On account of the half-speed of the supplement-printing mechanism, however, the next section of the main web will not have associated therewith a supplement-section, but will consist of only four pages. The product, therefore, will consist of a six-page section and a four-page section, forming a ten-page product, as shown in Fig. 13. For an eight-page product the gear 27 will be removed, throwing the supplement-printing mechanism out of operation, and two four-page sections of the main web will be collected by the collecting mechanism, forming an eight-page product, as shown in Fig. 12. For a six-page product the adjustment and operation will be the same as for a twelve-page product, except that the collecting mechanism of the cylinders 49 and 50 will be thrown out of operation and the product will consist of a single six-page section, as shown in Fig. 11. For a four-page product the supplement-printing mechanism and collecting mechanism will be thrown out of operation and the product will consist of a single four-page section of the main web, as shown in Fig. 10.

It has been customary with newspaper publishers whenever extra news or other causes rendered a supplement-sheet necessary to issue nothing less than a sheet of the dimensions of a page of their regular paper, which often exceeds the actual demands. I obviate this difficulty and economize greatly in the use of paper by providing, as will be seen, a machine in which the supplement-sheet may be of any desired width, as one-half or one-fourth of a page, or less by any number of columns, whereby, in case the regular sheet contains eight columns to the page, a supplement-sheet of seven, six, five, four, or any desired number of columns may be inserted by

simply using a supplement-web of corresponding width. A product in which the supplement-page is one-half width is shown in Fig. 16.

5 It is evident that many ordinary forms of mechanism used in web-printing machines may be added to this machine—such, for instance, as pasting devices to lay a line of paste on either the main or supplement web, and
10 also on the fold-line of the associated sections. Other folding and delivering mechanism may be used with or without a sheet-counter, if desired. Such additional mechanism, and others of similar nature, is well known in the
15 art, and it will readily be seen may be applied to this machine. It is not shown, in order that the essential features of the invention may more clearly be presented.

What I claim is—

20 1. The combination, with a main-web-printing mechanism, of a supplement-web-printing mechanism geared to run at a speed below that of the main web, a sheet-severer for the supplement-web, and sheet feeding and asso-
25 ciating mechanism for associating the printed supplement-sheet with the main web, all substantially as described.

30 2. The combination, with a main-web-printing mechanism, of a supplement-printing mechanism, means whereby the relative speed of the printing mechanisms may be varied, a sheet-severer for the supplement-web arranged to be thrown in or out of operation, and mechanism for associating the printed
35 supplement sheet or web with the main web, all substantially as described.

40 3. The combination, with a main-web-printing mechanism and a folder therefor, of a supplement-printing mechanism, a sheet-severer for the supplement-web, and sheet feeding and associating mechanism for associating the printed supplement-sheet with the main web prior to the folding of the latter and on the side next the folder, whereby the supplement-
45 sheet is folded inside the main web, all substantially as described.

50 4. The combination, with a main-web-printing mechanism, a folder and sheet-collecting mechanism therefor, the collecting mechanism constructed to be thrown in and out of operation, of a supplement-printing mechanism, means whereby the relative speed of the printing mechanisms may be varied, a sheet-severer for the supplement-web arranged to

be thrown in and out of operation, and mechanism for associating the printed supplement sheet or web with the main web prior to the folding of the latter, all substantially as described.

5. The combination, with a main-web-printing mechanism, a folder provided with a single series of tapes, and a delivering mechanism, of a supplement-web-printing mechanism, a sheet-severer for the supplement-web, and mechanism for associating the printed supplement-sheet with the main web prior to the folding of the latter and on the side next the tapes, whereby the main sheet and single series of tapes carry the supplement-sheet into the folder, all substantially as described.

6. The combination, with a main-web-printing mechanism, a longitudinal folder provided with a single series of tapes, and a delivering mechanism, of a supplement-web-printing mechanism, a sheet-severer for the supplement-web, and mechanism for associating the printed supplement-sheet with the main web prior to the folding of the latter and on the side next the tapes, whereby the main sheet and single series of tapes carry the supplement-sheet into the folder, all substantially as described.

7. The combination, with a main-web-printing mechanism, a folder, and adjustable conducting-rolls between the printing mechanism and the folder, of a supplement-web-printing mechanism, a sheet-severer for the supplement-web, and means for carrying the printed supplement-sheet to the conducting-rolls, all substantially as described.

8. The combination, with a main-web-printing mechanism, a supplement-web-printing mechanism geared to run at a lower speed than the main web, a sheet-severer for the supplement-web, consisting of a perforator and carrier geared, respectively, to run at the speed of the supplement and main webs, and sheet feeding and associating mechanism for associating the printed supplement-sheet with the main web, all substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

GEO. H. BOTTS,
J. J. KENNEDY.