No. 717,487. Patented Dec. 30, 1902.

H. A. W. WOOD.

DELIVERY MECHANISM.

(Application filed Apr. 16, 1894. Renewed May 9, 1902.)

(No Model.) 5 Sheets—Sheet 1.

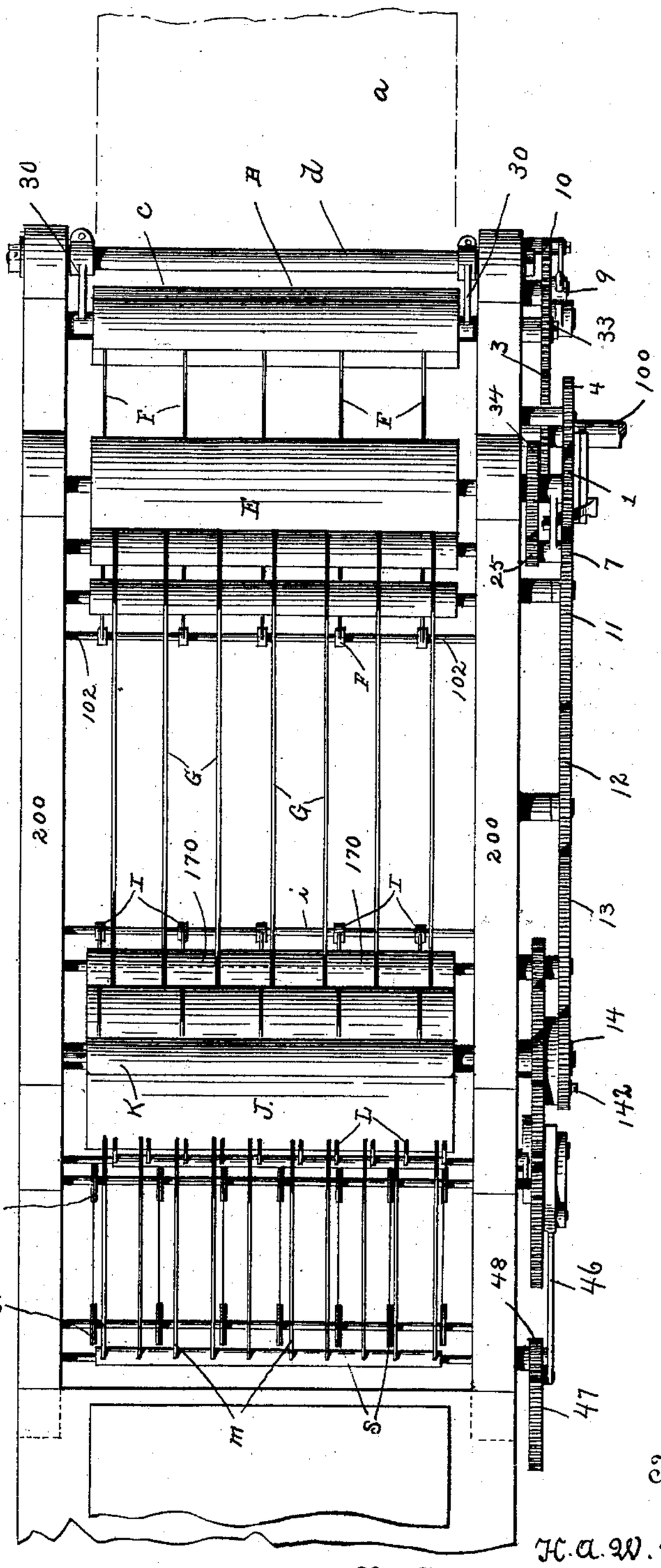

Fig. 1.

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No. 717,487. Patented Dec. 30, 1902.

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DELIVERY MECHANISM.

(Application filed Apr. 16, 1894. Renewed May 9, 1902.)

(No Model.) 5 Sheets—Sheet 2.

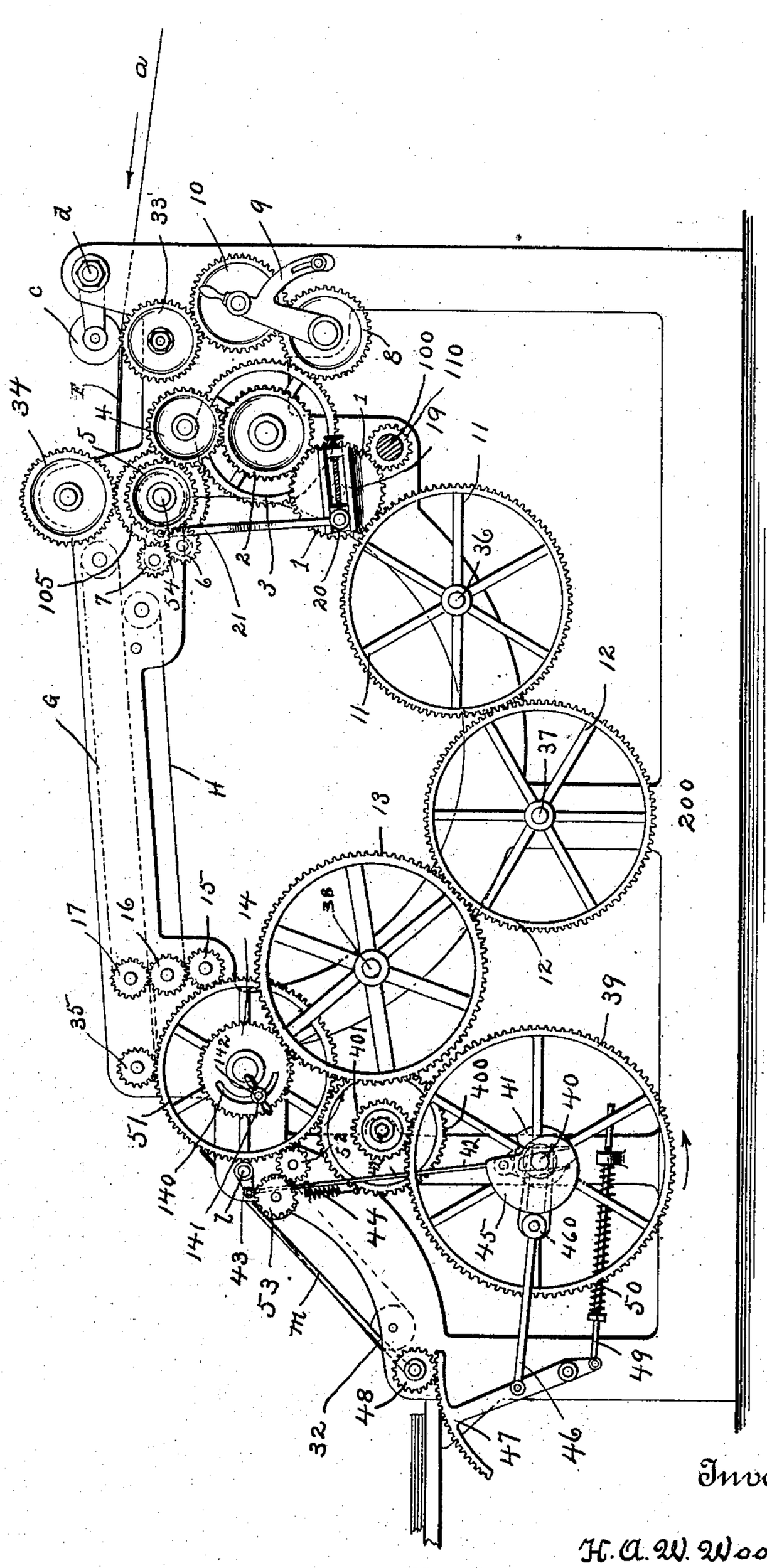

Fig. 2.

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(Application filed Apr. 16, 1894. Renewed May 9, 1902.)

(No Model.) 5 Sheets—Sheet 3.

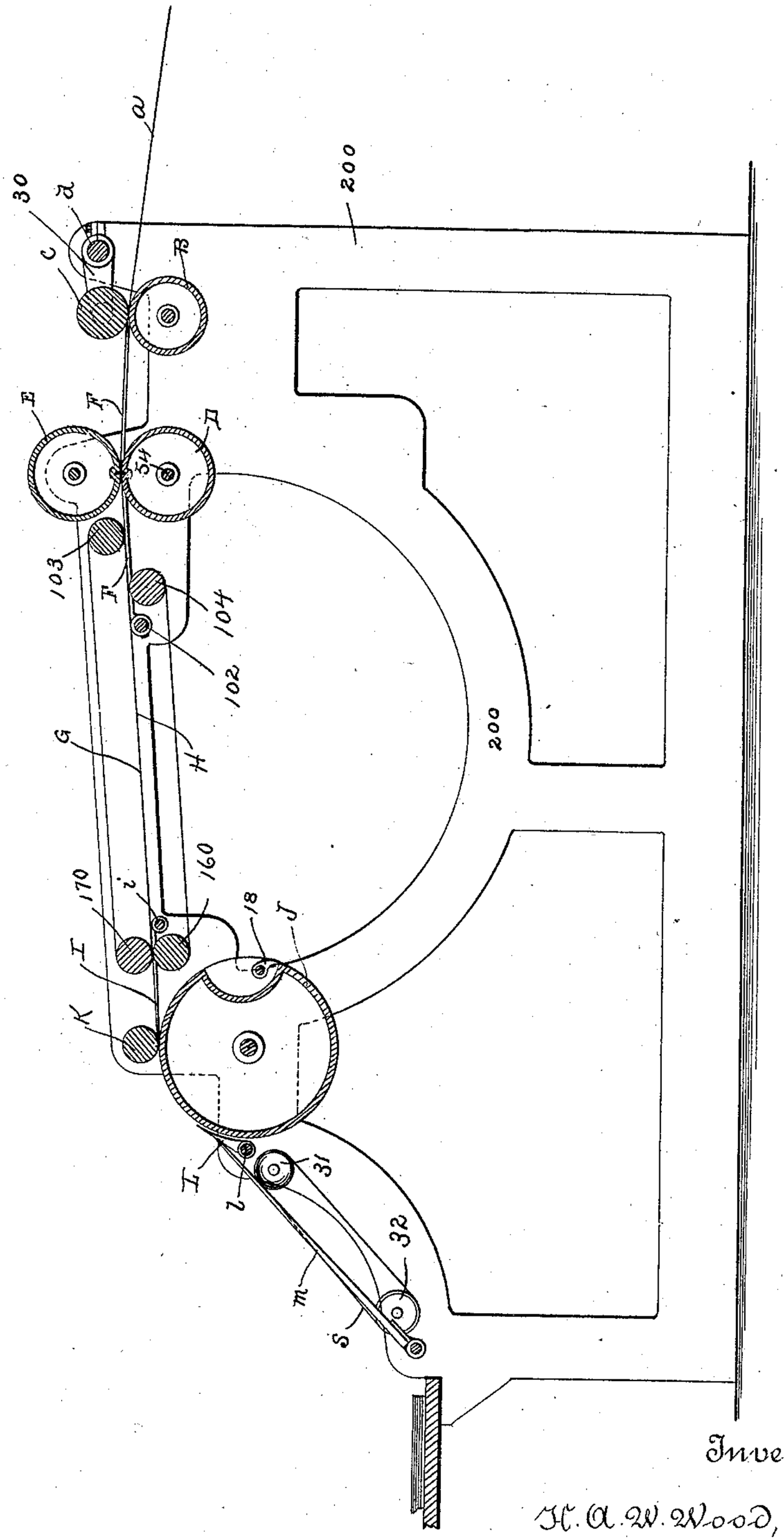

Fig. 3.

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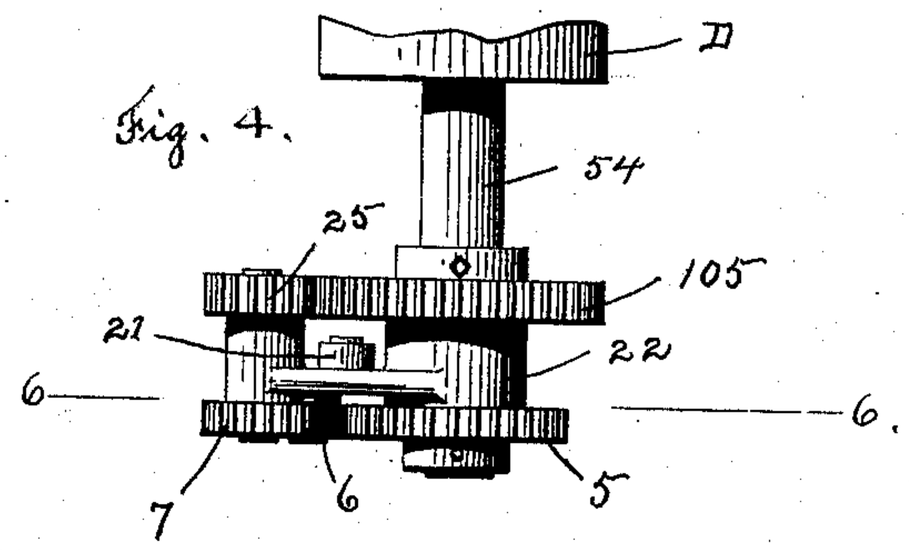
(Application filed Apr. 16, 1894. Renewed May 9, 1902.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 4.



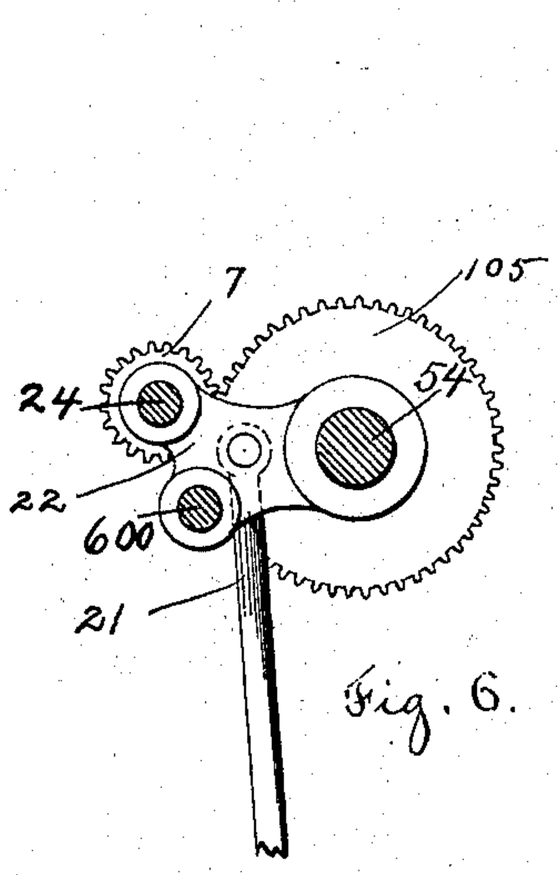


Fig. 6.

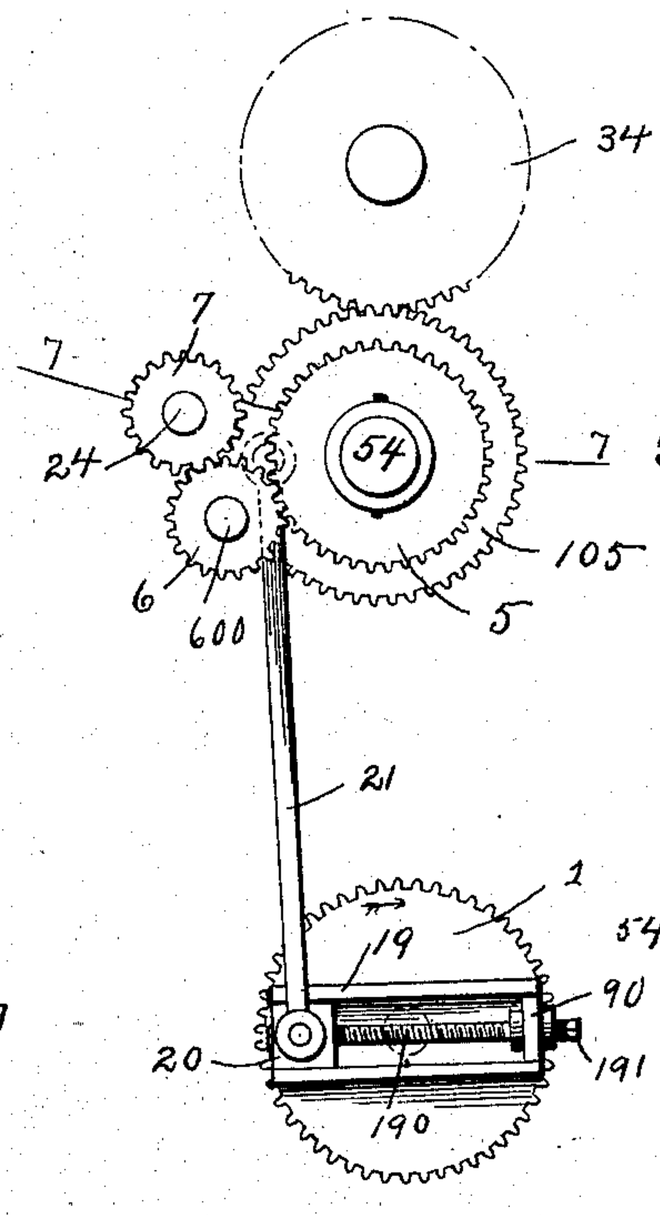


Fig. 5.

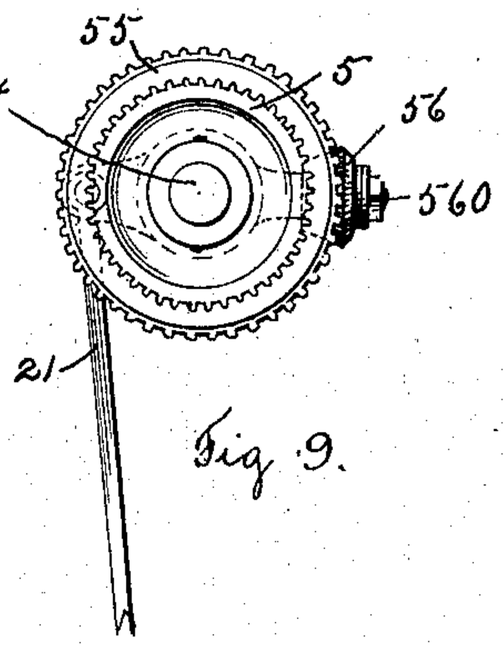


Fig. 9.

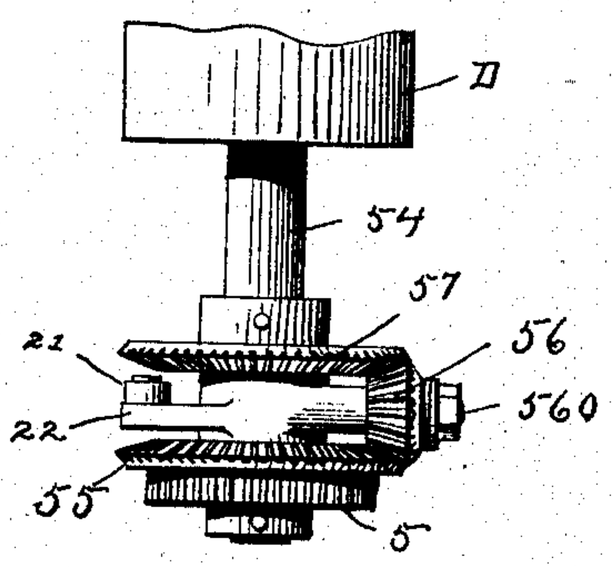


Fig. 8.

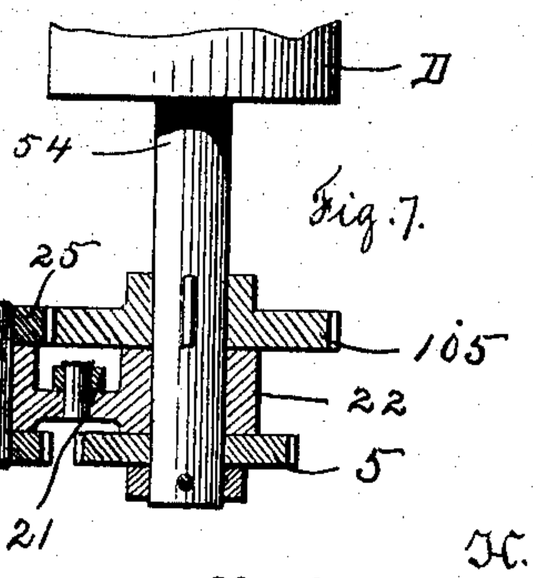


Fig. 7.

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DELIVERY MECHANISM.

(Application filed Apr. 16, 1894. Renewed May 9, 1902.)

(No Model.) 5 Sheets—Sheet 5.

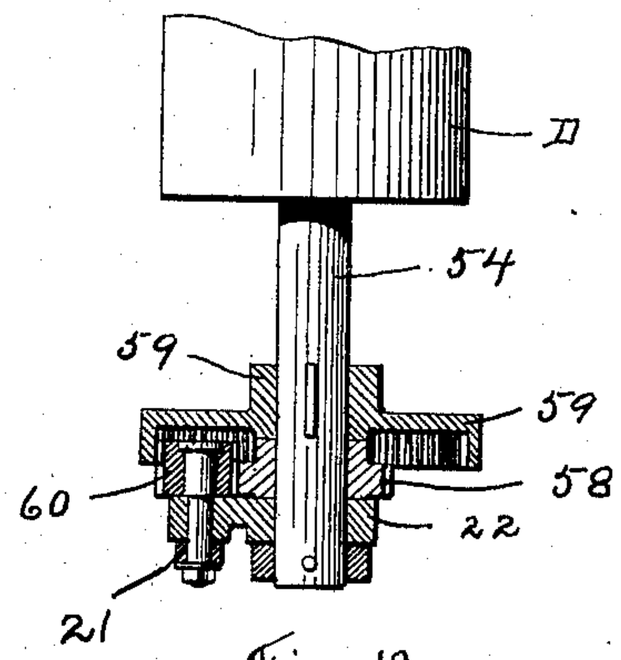

Fig. 10.

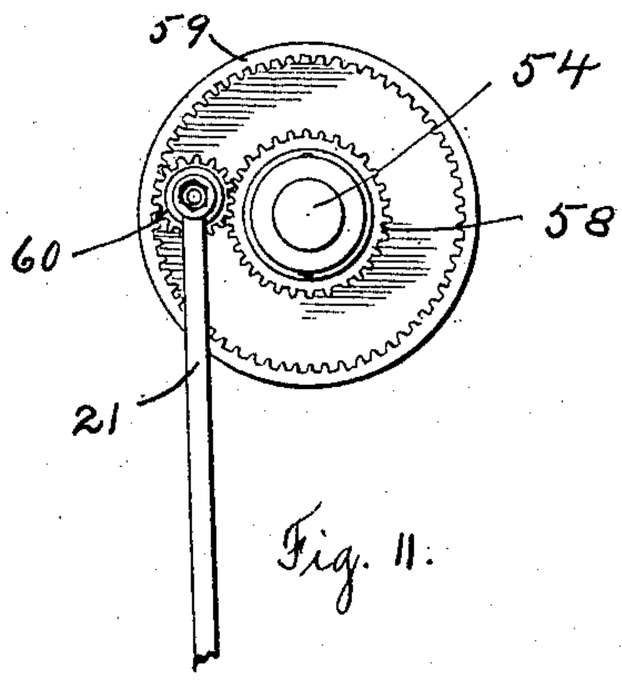

Fig. 11.

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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO CAMPBELL PRINTING PRESS AND MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DELIVERY MECHANISM.

SPECIFICATION forming part of Letters Patent No. 717,487, dated December 30, 1902.

Application filed April 16, 1894. Renewed May 9, 1902. Serial No. 106,509. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Delivery Mechanism, of which the following is a specification.

The aim of this invention is to provide a sheet-delivering mechanism whereby different lengths of sheets may be severed from a web and delivered.

To this end the invention consists of the devices and arrangements described and claimed in this specification and illustrated in the accompanying five sheets of drawings, in which—

Figure 1 is a plan view of a device constructed after my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section of the same. Figs. 4, 5, 6, and 7 are detail views, on an enlarged scale, of the gearing used to impart a variable motion to the cutting-cylinders; and Figs. 8, 9, 10, and 11 are views of two modified forms of gearing for this purpose.

The especial object of my invention is to provide a mechanism for severing variable-lengthed sheets from a web and for delivering the same and to provide a device of this character which shall have very few and simple adjustments.

Referring to the drawings and in detail, 200 200 represent two side frames, which may be used to carry the parts hereinafter described.

The web *a* is led to my delivery mechanism from any suitable source of supply, as from a printing-press or from a web-roll, and is drawn into the machine by means of the drum-cylinder B, coacting with which is a pressure-roll C, which is mounted in arms 30, clamped on a shaft *d*. From the leading-in drum B the web passes over suitable guide-fingers F, between the two cutting-cylinders D and E, which have the usual cutting blade or knife and socket, and from this point the end of the web or sheet is further led or guided by said fingers F between the two sets of tapes G and H. From the tapes the end of the sheet is guided by suitable fingers I onto a collecting-cylinder J, where a number of sheets are collected and afterward delivered by the fly-frame *m* onto a suitable delivery or receiving table.

The aim of my invention is to provide a device in which the web or sheets run constantly and which may be easily adjusted for various lengths, and to accomplish these desirable results I have provided the following gearing: 1 represents a gear which I call a "time-gear" and which makes one turn for each sheet manipulated. This time-gear may be driven from a suitable shaft 100 by means of a pinion 110, which meshes with and drives the gear 1. The gear 1 meshes with and drives a double gear 2 3, which is mounted on a suitable stud secured in the side frame. The large gear 3 of this double gear meshes with and drives a gear 8, also mounted on a stud secured in the frame 200. Arranged on this stud is a sweep 9, which carries an intermediate 10, which intermediate meshes with and engages a change-gear 33, secured on the shaft of the leading-in drum B. By changing this gear 33 the speed at which the web is pulled into the apparatus can be varied as desired. Power is transmitted from the time-gear 1 to the collecting-cylinder J by means of intermediates 11, 12, and 13, which are mounted on suitable studs 36, 37, and 38. Loosely mounted on the end of the shaft of the collecting-cylinder J is a gear 14, into which the intermediate 13 meshes.

Secured on the end of the shaft of the collecting-cylinder J is a gear 51, and projecting from this gear 51 is a screw 141, which extends through a concentric slot 140 in the gear 14, and arranged on the end of the same is a nut 142, by which means the collecting-cylinder can be adjusted relatively to the gear 14.

The tapes H, before referred to, are arranged on two tape-rolls 160 and 104, and the tapes G are arranged on two tape-rolls 170 and 103, as shown, and these tapes may be driven from the gear 51 by means of the intermediate pinion 15 and the intermeshing pinions 16 and 17, mounted on the ends of the rollers 160 and 170.

The collecting-cylinder J carries a set of

grippers 18, which are arranged in the periphery of the same in the usual manner and which may be operated by any of the usual means, as tumbling studs, not necessary here to describe at length.

If desired, a breaking drum or cylinder K may be arranged to operate with the collecting-cylinder J and may be geared thereto by means of the pinion 35.

Arranged on a shaft *l* are a set of stripping-fingers L. These stripping-fingers are actuated by means of a suitable arm 43, secured on the end of the shaft *l*, and connected to which is a suitable yoke 42, which carries a roller engaging a cam 41, mounted upon a shaft 40, which shaft 40 is driven by means of a gear 39, mounted on the same. This gear 39 meshes with the gear 401 of a compound intermediate 401 400, the latter gear of which meshes with the gear 51, and which compound intermediate is arranged on a stud projecting from the side frame. By this means it will be seen that as the collecting-cylinder J is adjusted relatively to its driving-gear 14, the gear 51, turning with the collecting-cylinder in its adjustment, will also adjust the shaft 40 and the various tapes and devices so that the stripping-fingers and fly-frame will always be in a fixed position relatively to the grippers 18 of the collecting-cylinder. This is an important arrangement in that the relation between the collecting-cylinder and its various appurtenances never has to be adjusted, the only adjustment being simply between the collecting-cylinder and its driving-pinion 14. By this arrangement I am able to save many adjustments over the ordinary construction. The proportion shown in the gearing between the gear 51 and the gear 39 is one to three, so that the collecting-cylinder J will collect three sheets for each movement of the fly-frame, and of course the number of sheets that will be collected on the collecting-cylinder may be varied as desired.

The stripper-fingers L are moved away from contact with the collecting-cylinder J by means of a spring 44, arranged to coöperate with the yoke 42, as shown. From the strippers L the collected sheets are led down over the fly-frame *m* by means of suitable tapes S, which are arranged on tape-pulleys 31 and 32, as shown, the tape-pulleys 31 being driven from the gear 51 by means of the intermediate 52 and the gear 53, arranged as shown.

On the end of the shaft which supports the fly-frame is arranged a pinion 48. Meshing with this pinion 48 is a sector 47, which is actuated from a cam 45, arranged on the shaft 40, by means of a suitable yoke 46 and roll 460. A suitable link 49 connects with the lower end of the sector, and a spring 50 is arranged upon this link in the usual manner, so as to throw the fly-frame down by spring-pressure in any of the usual ways. By this means it will be seen that three sheets will be collected on the collecting-cylinder J and thereafter delivered by the fly-frame onto the receiving-table.

The gear 14 and the time-gear 1 are made of the same size, so that the collecting-cylinder J will make one turn for each sheet manipulated.

The guide-fingers I may be arranged on a suitable shaft *i*, as shown, and the guide-fingers F may be arranged on a shaft 102 and may extend through grooves in the lower cutting-cylinder to the feeding-in drum, if desired, although I may use separate guide-fingers on each side of the cutting-cylinders, if so desired.

In a device of this character if it is desired to manipulate various lengths of sheets the cutting-cylinders must be driven at a variable speed, or, in other words, as the speed of the web through the cutting-cylinders is varied for different lengths of sheets the peripheral speed of the cutting mechanism of the cutting-cylinders must be timed or so arranged that while the same act to perforate or sever the web the peripheral speed will be the same as that of the web. To accomplish this, I have invented the following form of gearing: From the gear 2 of the double gear 2 3, before described, power is transmitted through the intermediate 4 to a gear 5, which is loosely journaled on the shaft 54 of the lower cutting-cylinder D. The two cutting-cylinders D and E are geared together by means of the gears 105 and 34, keyed on their respective shafts, and the gearing for driving the cutting-cylinders is so timed that the cutting-cylinders will always make one revolution for each sheet manipulated, the variable length of sheets being obtained by the peculiar movement given to the cutting-cylinders, as hereinafter described. Journaled on the shaft 54 of the lower cutting-cylinder D, between the gears 105 and 5, is a bracket 22, in the end of which is journaled a shaft 24, on the ends of which is secured a pinion 25, which engages the gear 105, and a pinion 7, which meshes with and engages an intermediate 6, which is mounted on a stud 600, also carried by the bracket 22, which intermediate 6 also meshes with the gear 5. By this means it will be seen that power will be transmitted from the gear 5 to the gear 105. If now the normal peripheral speed of the cutting-cylinders is suitable for one length of sheet, the gearing before described would suffice; but as variable lengths of sheets are to be manipulated different speeds must be imparted to the cutting-cylinders. I therefore give a variable speed to the cutting-cylinders by suitable gearing, as hereinafter described.

On the time-gear 1 I arrange suitable ways or guides 19, and in these guides is arranged a suitable crank-block 20, which may be adjusted toward and from the center of the time-gear 1 by means of a suitable screw 190, which has an operating-handle or nut 191. The screw 190 is tapped into the crank-block 20 and is held in position by suitable collars ar-

ranged on each side of the piece 90, secured between the ways 19. This crank-block 20 connects by link 21 to the bracket 22, and by this means it will be seen that the bracket 22 will be vibrated or oscillated about the shaft 54 as a center, and, further, that one complete forward-and-backward vibration of the bracket will be made for each revolution of the cutting-cylinders as the time-gear 1 and the cutting-cylinders make turn for turn. If the bracket 22 be held stationary, it will be seen that a continuous motion will be imparted to the cutting-cylinders; but if an intermittent motion be given to the bracket 22 from the crank-block 20 it will be seen that the pinions moving around the shaft 54 as a center become planet-gears and impart an additional motion to the gear 105 by means of their movement. By this means the continuous motion of the gear 5 will be transformed into a varying motion in the gear 105. In other words, the peripheral speed of the cutting-cylinders may be varied. It will be seen that the crank-block 20 can be adjusted to either side of the time-gear 1, and by this means the speed of the cutting-cylinders at the cutting instant can be either accelerated or diminished over what would be their action derived from direct gearing, and by this means the action of the cutting mechanism at the time of operation can be adjusted to move at the speed at which the web is moving through the machine. It will be seen that the block 20 may be adjusted to either side of the center of the time-gear. The cutting-cylinders are preferably so arranged that the knives thereof will be in coöperation when the time-gear is about in the position shown in Fig. 2. If now the crank-block is adjusted to the position shown in said Fig. 2, it will be noted that the planet-gears will be moved downwardly, or in the same direction as the revolution of the lower cutting-cylinder. This will cause an increase in the speed of the cutting-cylinders at this particular instant. If the crank-block 20 is adjusted to the other side of the center, the planet-gears will be moved in the opposite direction, and hence there will be a diminution of speed in the cutting-cylinders in this particular position. Thus by this means by adjusting the crank-block either side the knives of the cutting-cylinders can be made to act either at a faster or slower speed than the normal speed of the parts, and hence sheets longer or shorter than the length of the cutting-cylinders may be produced. By this means various lengths of sheets can be manipulated.

The cutting-cylinders may act either to entirely sever the sheet from the web or to simply perforate the web, the sheet being then broken from the web while in the tapes G and H by means of the breaking-roll K, the distance between the collecting-cylinder J and the cutting-cylinders preferably with this construction being such that two lengths of sheet will never be between the same.

The speed of the tapes G and H and the peripheral speed of the collecting-cylinder J is preferably made greater than the peripheral speed of the drawing-in drum B, so that the sheet will be accelerated or pulled forward between the tapes in order that it may be properly grasped by the collector J. By this mechanism various lengths of sheets can be manipulated.

When it is desired to change the device for a different length of sheet, the gear 33 is first changed, so that the speed of the drawing-in mechanism will be varied as desired. The block 20 is then adjusted on the time-gear 1 so that the speed of the cutting devices of the cutting-cylinders E and D at the moment when they act on the web will be in proper relation to the speed of the web. Then by loosening the nut 142 the collecting-cylinder J and its delivery mechanism are properly set so that the grippers will coact with the head of each sheet as the same moves from the tapes to the collecting-cylinder. Thus by means of these simple devices my delivery device can be varied to sever and deliver various lengths of sheets, which is a very desirable result when the device is used in connection with a printing-press, as by this means the printing device can be made to print various lengths of sheets, which will be properly handled by the delivery mechism. Another important point is that I do not have to have different cutting-cylinders for different lengths of sheets within the limits of the machine. This gearing for giving the peculiar motion to the cutting-cylinders can be varied and modified, and two modifications are shown in the drawings. In the first modification (shown in Figs. 8 and 9) I use a bevel-gear 55, loose on the shaft 54, but arranged to turn with the gear 5, and in place of the gear 105 I use a bevel-gear 57, which is secured to the shaft 54, and on the bracket 22 I arrange a short shaft or stud 560, on which is placed a bevel-pinion 56, which is arranged between the two gears 55 and 57. By the intermittent motion imparted to the bracket 22 it will be seen that by this gearing a variable speed will be imparted to the cutting-cylinders. In Figs. 10 and 11 I have shown another modification. In this modification I use a small pinion 58, which is driven by gearing substantially as gear 5 of the previous device. The pinion 58 is loosely arranged on the shaft 54, and rigidly secured upon said shaft I arrange an internal gear 59, and on the bracket 22 I arrange a planet-gear 60 between the loose pinion 58 and the internal gear 59, and by this means it will be also seen that an intermittent or variable speed will be imparted to the cutting-cylinders.

In both of the modifications the lower cutting-cylinder D is geared to turn the upper cutting-cylinder E by means of any suitable form of gearing, such as two spur-gears.

In all these devices it will be seen that by adjusting the block 20 to one side or the other

of the center 190 a greater range to this variance of speed of the cutting-cylinders is obtained than if the adjustment was on one side of the center only.

I am aware that the details and gearing may be greatly changed and modified by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of cutting-cylinders, adjustable mechanism for imparting a variable movement thereto, so that different lengths of sheets may be cut, a collecting-cylinder, means for leading the sheets from the cutting-cylinder to the collecting-cylinder, and means for setting the collecting-cylinder so that the heads of the various lengths of sheet may be properly taken thereby, substantially as described.

2. The combination of cutting-cylinders, adjustable mechanism for imparting a variable movement thereto so that different lengths of sheets may be cut, a collecting-cylinder, means for leading the sheets from the cutting-cylinders to the collecting-cylinder, a device for delivering the collected sheets from the collecting-cylinder driven from the collecting-cylinder, and means for adjusting the collecting-cylinder so that the heads of the various lengths of sheets may be properly taken thereby, and also whereby the device for delivering the sheets will be properly set by the same adjustment, substantially as described.

3. The combination of cutting-cylinders, adjustable mechanism for imparting a variable movement thereto so that different lengths of sheets may be cut, a collecting-cylinder, a gear loosely mounted on the shaft of the collecting-cylinder, adjustable means whereby said gear may be secured to turn said cylinder, and means for leading the sheets from the cutting-cylinders to the collecting-cylinder, substantially as described.

4. The combination of cutting-cylinders, adjustable mechanism for imparting a variable movement thereto, a collecting-cylinder driven at a constant speed, means for leading sheets from the cutting-cylinders to the collecting-cylinder, means whereby the collecting-cylinder may be set to properly engage the heads of the various lengths of sheets, leading-in devices for leading a web to the cutting-cylinders, and means for adjusting the speed of the leading-in devices, substantially as described.

5. The combination in a delivery mechanism of cutting-cylinders, a collecting-cylinder, means for delivering the sheets from the collecting-cylinder, gearing whereby the cutting-cylinders and collecting-cylinder will make turn for turn, but so that the cutting-cylinders may have a variable peripheral speed, and means whereby the collecting-cylinder can be set to receive and manipulate various lengths of sheets, substantially as described.

6. The combination with cutting-cylinders of gearing for driving the same comprising a tight and loose gear arranged on the shaft of one of the cutting-cylinders, a bracket loosely journaled on said shaft, said bracket carrying an intermediate gear 6 engaging the loose gear, a shaft 24 carrying a pinion 7 engaging the intermediate 6, and a pinion 25 engaging the tight gear, a time-gear, a crank-block carried thereby, means for adjusting the crank-block to either side of the center of the time-gear, and a connection from the crank-block to the said bracket, substantially as described.

7. The combination of a collecting-cylinder carrying grippers, stripper-fingers acting to guide the sheets from the collecting-cylinder, a fly for delivering the sheets, gearing from the collecting-cylinder to actuate the stripper-fingers and the fly, a driving-gear loosely arranged on the shaft of the collecting-cylinder, and means whereby the driving-gear can be adjustably secured to the collecting-cylinder whereby the collecting-cylinder can be adjusted to receive and manipulate various lengths of sheets, without disturbing the relation between the collecting-cylinder and the mechanism that delivers the sheet, substantially as described.

8. The combination of a collecting-cylinder, stripping-fingers and a fly, the latter being actuated from a common shaft, gearing from the collecting-cylinder for driving this shaft, a loose gear as 14 mounted on the shaft of the collecting-cylinder, gearing for imparting power to this gear 14, and means for securing the gear 14 to the collecting-cylinder in any adjusted position, substantially as described.

9. The combination in a delivery mechanism of means for drawing a web into the mechanism, cutting-cylinders, and a collecting-cylinder, devices for delivering the sheets from the collecting-cylinder, adjustable gearing for driving the drawing-in mechanism at different speeds, adjustable gearing whereby a varying peripheral speed can be imparted to the cutting-cylinders, and means whereby the collecting-cylinder can be adjusted to receive and manipulate variable lengths of sheets, the whole being so arranged that various lengths of sheets can be severed from the web, and delivered, substantially as described.

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

H. A. WISE WOOD.

Witnesses:
JOHN J. MURRAY,
ALEXANDER HANNEMAN.