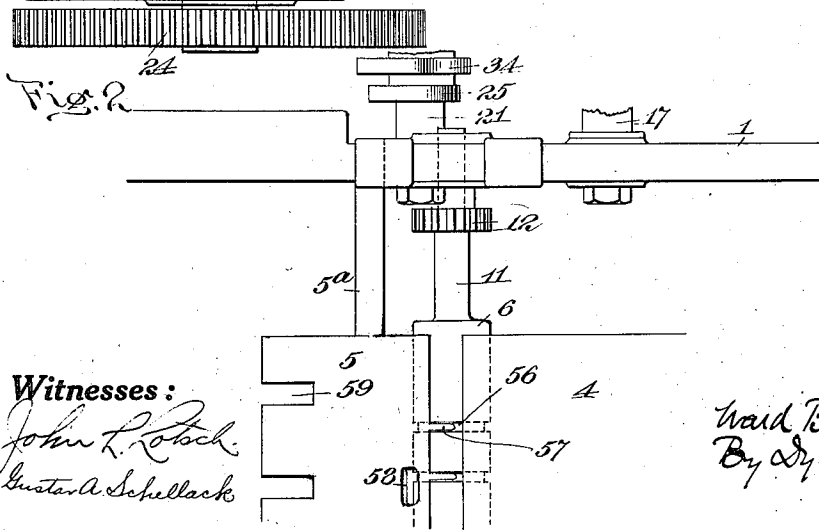
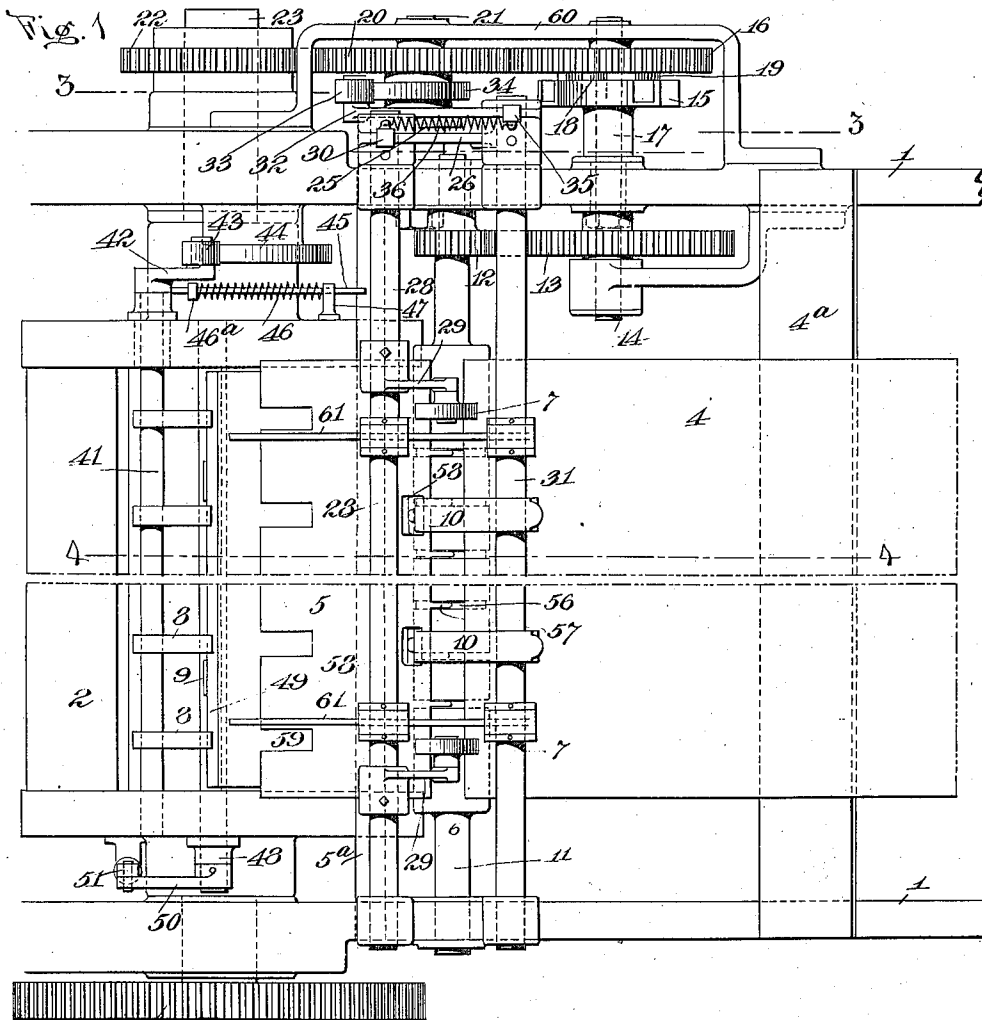


W. B. STORY,  
 REGISTERING DEVICE.  
 APPLICATION FILED APR. 22, 1912.

1,237,225.

Patented Aug. 14, 1917.

2 SHEETS—SHEET 1.



Witnesses:

*John K. Lotzsch*  
*Luister A. Schellack*

Inventor  
 W. B. Story  
 By *Dyer & Taylor*

Attorneys.

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2 SHEETS—SHEET 2.

Fig. 3

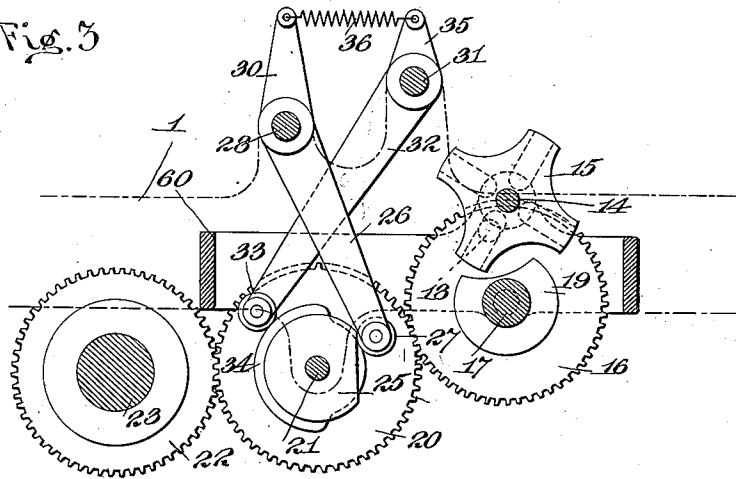


Fig. 4

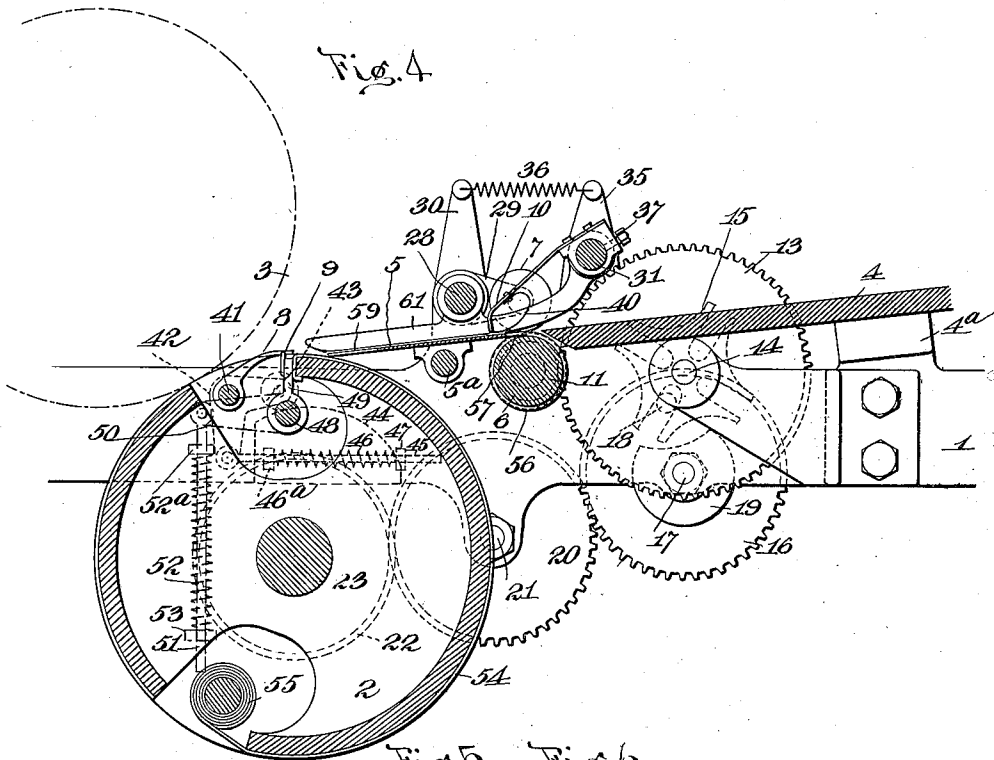
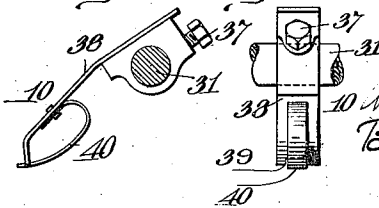


Fig. 5 Fig. 6



Witnesses:

*John L. Rotch*  
*Lucretia A. Schellack*

Inventor

*Ward B. Story*  
By *Edw. J. Taylor*

Attorneys.

# UNITED STATES PATENT OFFICE.

WARD B. STORY, OF BROOKLYN, NEW YORK, ASSIGNOR TO WARD B. STORY COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## REGISTERING DEVICE.

1,237,225.

Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed April 22, 1912. Serial No. 692,393.

*To all whom it may concern:*

Be it known that I, WARD B. STORY, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented a certain new and useful Registering Device, of which the following is a specification.

The invention relates to improvements in devices for feeding and gaging the front edges of sheets. It is particularly applicable for use in printing presses, although it is not limited to such use.

The objects of the invention are to produce a device in which the sheet may be presented to the grippers on the taking cylinder in a positive and easy manner. A further object is to produce a device which will insure positive action; to produce a device in which the gripper will have a minimum amount of movement, and to produce a device in which the sheets will be properly gaged before they are fed by the forwarding roller.

These and further objects will appear from the following specification and accompanying drawings, considered together or separately:

In the drawings, Figure 1 is a plan view, with the center broken away, of an apparatus embodying my invention.

Fig. 2 is a detail of the same, with the drop rollers and the gages and supporting shafts removed in order to show the details of the front and rear tables.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view on the line 4—4 of Fig. 1; and

Figs. 5 and 6 are detail views of the gage.

The device illustrated comprises a frame 1, 1. The taking cylinder 2, and the type cylinder 3 are of the usual construction, except as to certain details of the taking cylinder relating to the gripper and stop. The front table 4 is carried upon a support 4<sup>a</sup>, connected to the frame. The rear table 5 is carried upon a support 5<sup>a</sup> also connected to the frame. These tables are for the purpose of supporting the sheet when it is being fed to the grippers. The forwarding roller 6 lies between the front and rear tables, and below the same. The drop roller 7 is above the forwarding roller. In the embodiment chosen for illustration, the forwarding roller is a continuous roller, best shown in Fig. 1.

The drop roller is formed of a number of rollers or wheels, best shown in Fig. 1. It will be understood that as many of these drop rollers are employed as is necessary to properly hold the sheet against the forwarding roller and feed the same forward.

The gripper 8 is carried by the taking cylinder 2. This gripper is in the form of a plurality of arms, best shown in Figs. 1 and 4, so that the front edge of the sheet will be gripped. The stop 9, shown in the embodiment of the invention illustrated, is in a plurality of pieces, and is adapted to be engaged by the front edge of the sheet. The stop is best shown in Figs. 1 and 4. The gage 10 is adapted to be lowered to the plane of the rear table 5, or to a slightly lower plane when in operative position, so that the sheet will be fed to it, and then, after the sheet is in engagement with the gage, the gage will be raised and the sheet will be free to be fed forward.

The sheet is adapted to be fed upon the table 4, either by hand or by any suitable well known devices (not shown.) Its front edge is adapted to be fed to the space between the drop and forwarding rollers, the former being lifted, by mechanism which will be described, at this moment, so that there is a clear space between the two rollers. The free end of the gage 10 is adapted to rest upon the rear table at this time, or to be slightly below the same, as will be described, so that the sheet may be advanced by hand, or by feeding devices, to a position with its front edge in contact with the gage. The sheet, after being gaged, is fed to the taking cylinder and grippers by means of the drop and forwarding rollers, the former being brought into contact with the sheet and pressing it against the latter so that it is fed by frictional engagement therewith. At this moment, the gage is raised so as to allow the sheet to be fed to the taking cylinder.

I provide mechanism for starting the sheet from rest to normal speed, or to the peripheral speed of the taking cylinder, or slightly faster than the peripheral speed of the same. This mechanism is adapted to gradually accelerate the speed from nothing up to the maximum. This mechanism is as follows: The forwarding roller is supported upon, and is turned by, a shaft 11. This shaft carries a pinion 12 (see Fig. 1.) A

gear 13 meshes with the pinion 12, and rotates the latter. This gear 13 is supported upon a shaft 14, the shaft being carried in suitable bearings in the frame 1. The shaft 14 carries a slot-wheel 15. The details of this slot-wheel are shown in Figs. 1, 3 and 4. In the embodiment chosen for illustration, the slot-wheel has four radial slots extending from the periphery close to the center of the wheel. A gear 16, mounted upon a shaft 17, is located to one side of the slot-wheel 15. This gear 16 carries a pin 18. The pin is adapted to engage in one or another of the slots. The pin successively engages with the slots as the gear 16 is rotated. The gear 16 also carries a segmental wheel 19. This wheel has a segment cut out, as best shown in Fig. 3, so that the slot-wheel may be turned when the pin engages with one of the slots. When the pin passes out of engagement with a slot, then the unmutated portion of the segmental wheel will engage with the notched periphery of the slot-wheel. This mechanism produces a form of Geneva stop gear, the principles of which are well understood. A gear 20 meshes with the gear 16. This gear is carried upon a shaft 21. The shaft 21 extends across the machine, from one side member of the frame to the other. A gear 22 meshes with the gear 20. The gear 22 is supported upon a shaft 23, which also supports the taking cylinder 2. The shaft 23 is rotated by means of a gear 24.

From the foregoing description, it is apparent that upon the gear 24 being rotated, in the embodiment chosen for illustration, in the counter-clockwise direction, the gear 22 will rotate the gear 20, and the gear 20 will rotate the gear 16. The pin 18 will, during every revolution of the gear 16, engage one of the slots of the slot-wheel, and rotate the latter a quarter revolution. During the period of time in which the pin is not in engagement with the slot, the segmental wheel will engage with the notched periphery of the slot-wheel, and lock the same against movement. The rotation of the slot-wheel will rotate the gear 13, and this gear 13 will rotate the gear 12. The gear 13 is shown as very much larger than the gear 12, so that a quarter revolution of the former will rotate the gear 12 a number of times. The proportions are such that the gear 12 will be rotated, and the forwarding roller will be rotated a sufficient number of times so as to feed the sheet positively to the gripper. It should be understood that the proportions of the parts may be varied in accordance with the particular situation. The device just described locks the forwarding roller against movement at certain times, and then it rotates it, with a gradually accelerating speed up to maxi-

mum which is in excess of the peripheral speed of the cylinder. The speed of the sheet now begins to be retarded but before its speed is lowered to that of the normal or peripheral speed of the cylinder the leading edge of the sheet will be crowded against the stops on the cylinder and be seized by the gripper. If desired the parts may be so proportioned that the leading edge of the sheet will be delivered to the stops on the cylinder before the sheet reaches its maximum speed but the speed of the sheet must always be at least as great as that of the periphery of the cylinder when the sheet is engaged by the grippers.

For the purpose of lifting the drop roller from contact with the forwarding roller so that a sheet may be fed against the gage, and also for the purpose of lifting the drop roller after the sheet has been fed into contact with the stop, so that it will then be fed by engagement with the gripper, I provide the following mechanism: The shaft 21 carries a cam 25, best shown in Fig. 3. This cam is of circular shape, with one side eccentric. A lever 26 carries a roller 27, which engages with the cam 25. A shaft 28 supports the lever 26, and is rotated thereby. The shaft 28 carries arms 29, the free ends of which support the rollers 7 (see Figs. 1 and 4). An arm 30, at one end of the shaft 28, extends upward, and is for the purpose of attachment of a spring, to be described, for depressing the roller 27, when permitted by the position of the cam 25. The proportion of the gears 20, 16, 13 and 12 is such that the shaft 21 will make one complete revolution for each sheet that is being fed, so that at the proper time the roller 27 will engage with the eccentric part of the cam 25, and will depress the drop roller by the mechanism described. Also at the proper time, the roller 27 will engage with the raised part of the cam 25, and will lift the drop roller 7.

For the purpose of lifting the gage 10 at the proper time to permit a sheet, which has been fed against it and is gripped by the forwarding and drop rollers, to be fed forward, I provide the following mechanism: A shaft 31 extends across the frame, and carries one or more grippers, 10, upon it. This shaft has at one end an arm 32 (see Fig. 3). The free end of the arm 32 carries a roller 33. This roller 33 engages against a cam 34, said cam being carried upon the shaft 21. This cam, as shown, has a high part and a low part. Another arm 35, carried by the shaft 31, extends upward, substantially to the same height as the arm 30. A spring 36 connects the two arms. The gages are preferably supported upon the shaft 31, and are adjusted in position by means of set screws 37, so that their angle to the shaft and their position along the shaft

may be adjusted to suit the work. From the preceding description it is apparent that, as the shaft 21 rotates, the roller 33 will successively engage the high and low parts of the cam 34. When it engages with the high part, the shaft 31 will be rotated, and the gage will be lifted above the sheet. When the roller engages the low part of the cam, the shaft will be rotated in the opposite direction, and the gage will be pressed down upon the table. The spring 36 exerts stress to depress the gage 10 and the drop roller 7.

The details of the preferred form of gage are shown in Figs. 5 and 6. Each gage comprises a spring arm 38. This arm has a notch 39 in its free extremity. A spring 40 is secured to the arm 38, and lies within the notch. This spring is preferably a weak spring, and its purpose is to prevent the sheet from sticking to the gage as the latter is raised. When in normal position, and out of contact with the sheet, the spring 40 extends slightly below the free end of the gage.

The details of the gripper are as follows: The gripper arms 8 are carried upon a shaft 41. This shaft is mounted in suitable bearings in the taking cylinder 2. Upon one end of the taking cylinder the shaft is connected to a bell-crank 42. One arm of the bell-crank carries a roller 43. This roller is adapted to engage a cam 44. This cam is fixed, and is supported upon the frame 1. The other arm of the bell-crank is connected to a rod 45. A spring 46 surrounds the rod. One extremity of the spring engages with a stop 46<sup>a</sup> on the rod, and the other extremity engages with a bearing or guide 47, carried by the taking cylinder. The expansion of the spring tends to draw the roller 43 toward the center of the taking cylinder and to depress the grippers 8. The depression of the grippers will draw them into contact with the taking cylinder, and will hold the front edge of the sheet in position. The location and shape of the cam 44 is such that the taking cylinder turning in the counter-clockwise direction will, at a slight angular distance in advance of the place where the gripper reaches the rear edge of the rear table 5, cause the roller 43 to engage with the cam. The cam is eccentric, on an increasing radius. Consequently, the roller 43 engaging with the cam will be moved away from the center of the taking cylinder. This will turn the shaft 41, and will raise the grippers. The sheet at this moment will have been fed by the drop and forwarding rollers, and will be moving at the same speed as the peripheral speed of the taking cylinder. The sheet will be fed against the stop 9, and when it is in contact with the same, or is crowded against it, the roller 43 will engage with a portion of the cam 44 of decreasing radius. Consequently, the shaft

41 will be turned in the opposite direction, and the gripper will be lowered, through the agency of the spring 46, into contact with the front edge of the sheet, and will hold the latter, and will feed the same forward by 70 such contact.

The details of the stop 9 are as follows: A shaft 48, mounted in bearings in the taking cylinder, carries the blanket clamp 49. This shaft extends through one end of the cylinder, and has an arm 50 on the extremity. This arm engages with a rod 51. A spring 52 surrounds the rod, the extremities of the spring engaging a stop 52<sup>a</sup> on the rod and a fixed bearing or guide 53, so that the expansion of the spring will tend to turn the shaft 48 and engage the blanket clamp with the taking cylinder. The blanket 54 has one edge engaged by the clamp, and the other end is wound around the blanket roller 55 in the usual manner.

In order to insure that the sheet will always be fed above the rear table 5, I provide the following devices: The forwarding roller 6 is provided with a number of peripheral grooves 56. The front edge of the rear table is provided with flexible fingers 57, which enter these grooves and are curved downward sufficiently so that the sheet, when fed along the surface of the front table, will ride up over these fingers and will properly be brought against the gage. In order to insure that the gage will be lowered so that there will be no possibility of the sheet slipping between it and the table, I provide apertures 58 in the rear table (see Fig. 2). These apertures are of such a size that the free edge of each gage can be lowered a short distance through the aperture. To allow the rear table to extend sufficiently over the taking cylinder to support the sheet, and at the same time to allow the taking cylinder to turn with the grippers elevated, I provide slots 59 (see Fig. 2) in the rear edge of the rear table to allow these grippers to pass through.

For the purpose of supporting the shafts 21 and 17, a bracket 60 is provided, having suitable bearings thereon. For the purpose of holding the sheet down upon the rear table, and also down upon the forwarding roller, when the drop roller is not in contact with it, I provide suitable guides 61 (see Figs. 1 and 4). These guides are supported upon the shafts 28 and 31 by suitable bearings.

From the foregoing description, it is apparent that the sheets may be registered against the gage 10 to accurate front register, at the proper moment, in relation to the position of the grippers; the drop rollers will descend in contact with the forwarding rollers, and grip the sheet at the same moment, or slightly after this. The gages will be elevated, allowing the sheet to be fed un-

der them. The sheet will be started from rest gradually until it reaches a speed equal to the peripheral speed of the taking cylinder. It will then be brought gently against the stops. If the speed of the feed rollers be slightly greater, the front end of the sheet will be crowded against the stop, so that there will be a perfect front registry. As the sheet is under perfect control when it is brought against the stop, and is held down upon the rear table by means of the guides 61, it is apparent that the grippers need not be elevated to any great extent, it being sufficient that the space between the grippers and the stops and the taking cylinder be just enough to allow the sheet to be fed into this space. It is apparent that as the grippers pass the paper line at the head of the sheet, the speed of the sheet is this moment being accelerated, and is faster than the peripheral speed of the taking cylinder.

It is apparent that no time need be lost between sheets for registering, as they may be fed to the gage, owing to the fact that the period of time in which the drop roller is out of contact with the forwarding roller is very great in comparison with the period of time in which they are in contact, which is the period of time during which the sheet is being fed.

If desired, the speed of the forwarding roller may be so proportioned that the advance of the sheet is in excess of the normal travel during the same period of time, so that the duration of time during which the sheets can be fed to the gage is amplified.

In accordance with the provisions of the patent statutes, I have described the principle of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is merely illustrative and that the invention can be carried out in other ways.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A registering device adapted to be used in connection with a taking cylinder, said device having a movable gage, means for forwarding the sheet from the gage to the gripper on the cylinder, said means being at rest and in engagement with the sheet which is also at rest, said means starting the sheet from the state of rest and gradually accelerating it to a speed at least as great as the speed of the gripper, and delivering it to the grippers at a speed at least as great as the speed of the grippers, and means for moving the gage out of contact with the sheet.

2. A registering device, adapted to be used in connection with a cylinder having a taking gripper thereon, a movable gage, means for forwarding the sheet from the

gage to the gripper, said means starting from a state of rest in engagement with the sheet and starting the sheet from a state of rest and gradually accelerating it to a speed at least as great as the speed of the gripper and delivering it to the gripper at a speed at least as great as that of the peripheral speed of the cylinder, and means for moving the gage out of contact with the sheet.

3. A registering device adapted to be used in connection with a taking cylinder having a gripper, and means for actuating the gripper, said device having a forwarding roller, a movable gage, means for intermittently rotating the forwarding roller from rest gradually to a peripheral speed at least as great as the peripheral speed of the cylinder, said forwarding roller starting from a state of rest in engagement with the sheet and delivering the sheet to the cylinder at a speed at least as great as the peripheral speed of the cylinder, and means for moving the gage out of contact with the sheet.

4. A registering device adapted to be used in connection with a taking cylinder having a gripper thereon and means for actuating the gripper, said device having a forwarding roller, a drop roller, a movable gage, means for intermittently rotating the forwarding roller from rest gradually to a peripheral speed at least as great as the peripheral speed of the taking cylinder, said forwarding roller starting from a state of rest in engagement with the sheet and delivering the sheet to the grippers at a speed at least as great as the peripheral speed of the cylinder, means for lifting the drop roller out of contact with the forwarding roller, and means for moving the gage out of contact with the sheet.

5. A registering device adapted to be used in connection with a taking cylinder having a gripper thereon and means for actuating the gripper, said device having a forwarding roller, a drop roller, a movable gage in cooperative relation to the forwarding roller to rotate the same from a state of rest gradually to a peripheral speed at least as great as the peripheral speed of the taking cylinder, said forwarding roller starting from a state of rest in engagement with the sheet and delivering the sheet to the grippers at a speed at least as great as the peripheral speed of the cylinder, means for lifting the drop roller out of contact with the forwarding roller, a second means for lifting the gage out of contact with the sheet, the two last means being so coordinated as to hold the gage in contact with the leading edge of the sheet while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

6. A registering device adapted to be used

in connection with a taking cylinder having a gripper thereon, and means for actuating the gripper; said device having a forwarding roller; a drop roller; a movable gage; means in cooperative relation to the forwarding roller, to rotate the same from a state of rest gradually to a peripheral speed at least equal to the peripheral speed of the taking cylinder, and delivering the sheet to the cylinder at a speed greater than the peripheral speed of the cylinder; a cam; connections with the cam, for lifting the drop roller out of contact with the forwarding roller; a second cam for lifting the gage out of contact with the sheet, the two last cams being so coordinated as to hold the gage in contact with the leading edge of the sheet, while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

7. A registering device adapted to be used in connection with a taking cylinder having a gripper thereon, and means for actuating the gripper, said device having a forwarding roller; a drop roller; a movable gage; a pin and slot gear in cooperative relation to the forwarding roller, to rotate the same from a state of rest to a peripheral speed at least equal to the peripheral speed of the taking cylinder; means for lifting the drop roller out of contact with the forwarding roller; a second means for lifting the gage out of contact with the sheet, the last two means being so coordinated as to hold the gage in contact with the leading edge of the sheet, while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

8. A registering device adapted to be used in connection with a taking cylinder, having a gripper thereon, and a fixed cam for actuating the gripper; said device having a forwarding roller; a drop roller; a movable gage; means in cooperative relation to the forwarding roller, to rotate the same from a state of rest gradually to a peripheral speed at least equal to the peripheral speed of the taking cylinder, said forwarding roller starting from a state of rest in engagement with the sheet and delivering the sheet to the cylinder at a speed at least as great as the peripheral speed of the cylinder; means for lifting the drop roller out of contact with the forwarding roller; a second means, for lifting the gage out of contact with the sheet, the two last named means being so coordinated as to hold the gage in contact with the leading edge of the sheet, while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

9. A registering device adapted to be used in connection with a taking cylinder, having a gripper thereon and means for actuating the gripper; said device having a forwarding roller; a drop roller; a movable gage; a pin and slot gear, in cooperative relation to the forwarding roller, to rotate the same from a state of rest to a peripheral speed at least equal to the peripheral speed of the taking cylinder; a cam; connections with the cam, for lifting the drop roller out of contact with the forwarding roller; a second cam, for lifting the gage out of contact with the sheet, the two cams being so coordinated as to hold the gage in contact with the leading edge of the sheet, while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

10. A registering device adapted for use in connection with a taking cylinder, having a gripper thereon and a fixed cam for actuating the gripper; said device having a forwarding roller; a drop roller; a movable gage; means in cooperative relation to the forwarding roller, to rotate the same from a state of rest gradually to a peripheral speed at least equal to the peripheral speed of the taking cylinder and delivering the sheet to the cylinder at a speed greater than the peripheral speed of the cylinder; a cam; connections with the cam, for lifting the drop roller out of contact with the forwarding roller; a second cam, for lifting the gage out of contact with the sheet, the two last named cams being so coordinated as to hold the gage in contact with the leading edge of the sheet, while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

11. A registering device adapted to be used in connection with a taking cylinder having a gripper thereon, and a fixed cam for actuating the gripper; said device having a forwarding roller; a drop roller; a movable gage; a pin and slot gear, in cooperative relation to the forwarding roller, to rotate the same from a state of rest to a peripheral speed at least equal to the peripheral speed of the taking cylinder; means for lifting the drop roller out of contact with the forwarding roller; a second means for lifting the gage out of contact with the sheet, the two means being so coordinated as to hold the gage in contact with the leading edge of the sheet, while the drop roller is out of contact with the forwarding roller, and move the gage out of contact with the sheet after the drop roller has been lowered upon the sheet.

12. A registering device adapted to be used in connection with a taking cylinder

5 having a gripper thereon, and a fixed cam  
 for actuating the gripper; said device hav-  
 ing a forwarding roller; a drop roller; a  
 10 movable gage; a pin and slot gear, in co-  
 operative relation to the forwarding roller,  
 to rotate the same from a state of rest to a  
 peripheral speed at least equal to the pe-  
 ripheral speed of the taking cylinder; a  
 15 cam; connections with the cam, for lifting  
 the drop roller out of contact with the for-  
 warding roller; a second cam for lifting the  
 gage out of contact with the sheet; the two  
 last named cams being so coördinated as to  
 20 hold the gage in contact with the leading  
 edge of the sheet, while the drop roller is out  
 of contact with the forwarding roller, and  
 25 move the gage out of contact with the sheet  
 after the drop roller has been lowered upon  
 the sheet.  
 30 13. A registering device for sheet feeders  
 adapted for use in connection with a taking  
 cylinder having a gripper thereon, said de-  
 vice having a movable gage, an intermit-  
 tently rotating forwarding roller, a drop  
 35 roller, means for raising the gage from the  
 path of the sheet, means for moving the  
 drop roller into engagement with the sheet  
 to feed the latter to the gripper, and means  
 for moving the drop roller from engage-  
 40 ment with the sheet.

14. A registering device for sheet feed-  
 ers adapted for use in connection with a  
 taking cylinder having a gripper thereon,  
 said device having a movable gage, an in-  
 45 termittently rotating forwarding roller, a  
 drop roller, a cam for raising the gage from  
 the path of the sheet, means for moving the  
 drop roller into engagement with the sheet  
 to feed the latter to the gripper, and a cam  
 for moving the drop roller from engage-  
 50 ment with the sheet.

15. A registering device for sheet feeders  
 adapted for use in connection with a taking  
 cylinder having a gripper thereon, a mov-  
 45 able gage, an intermittently rotating for-  
 warding roller, a drop roller, means for  
 raising the gage from the path of the sheet,  
 means for moving the drop roller into en-  
 gagement with the sheet to feed the latter  
 to the gripper, means for moving the drop  
 50 roller from engagement with the sheet after  
 the latter is grasped by the gripper, and  
 means for arresting the movement of the  
 forwarding roller.

This specification signed and witnessed 55  
 this 19th day of April, 1912.

WARD B. STORY.

Witnesses:

J. F. COLEMAN,  
JOHN L. LOTSCH.