(No Model.) 5 Sheets—Sheet 1.

J. BROOKS.

SHEET DELIVERY APPARATUS.

No. 374,930. Patented Dec. 20, 1887.

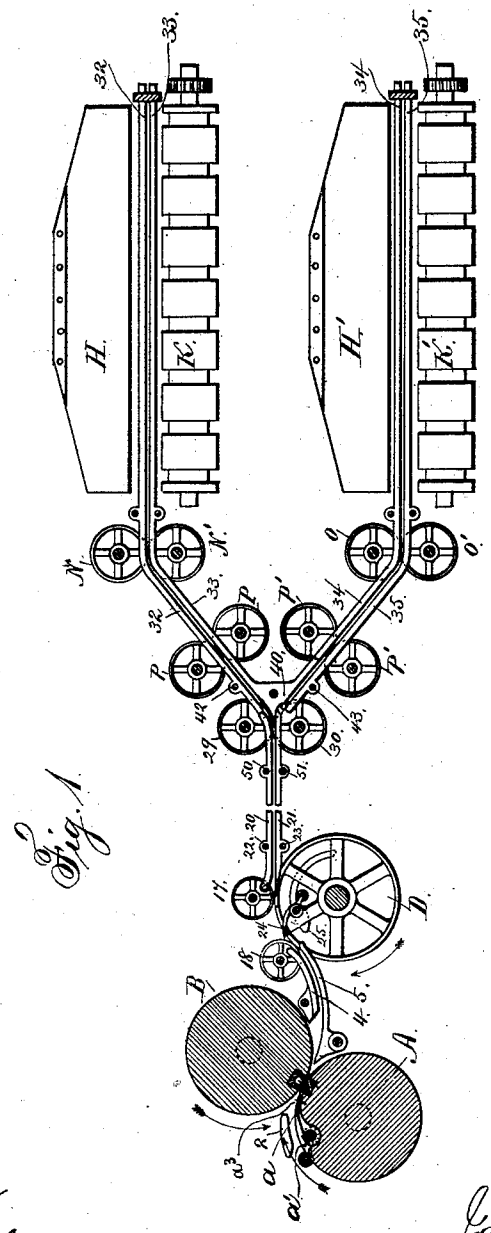


Fig. 1.

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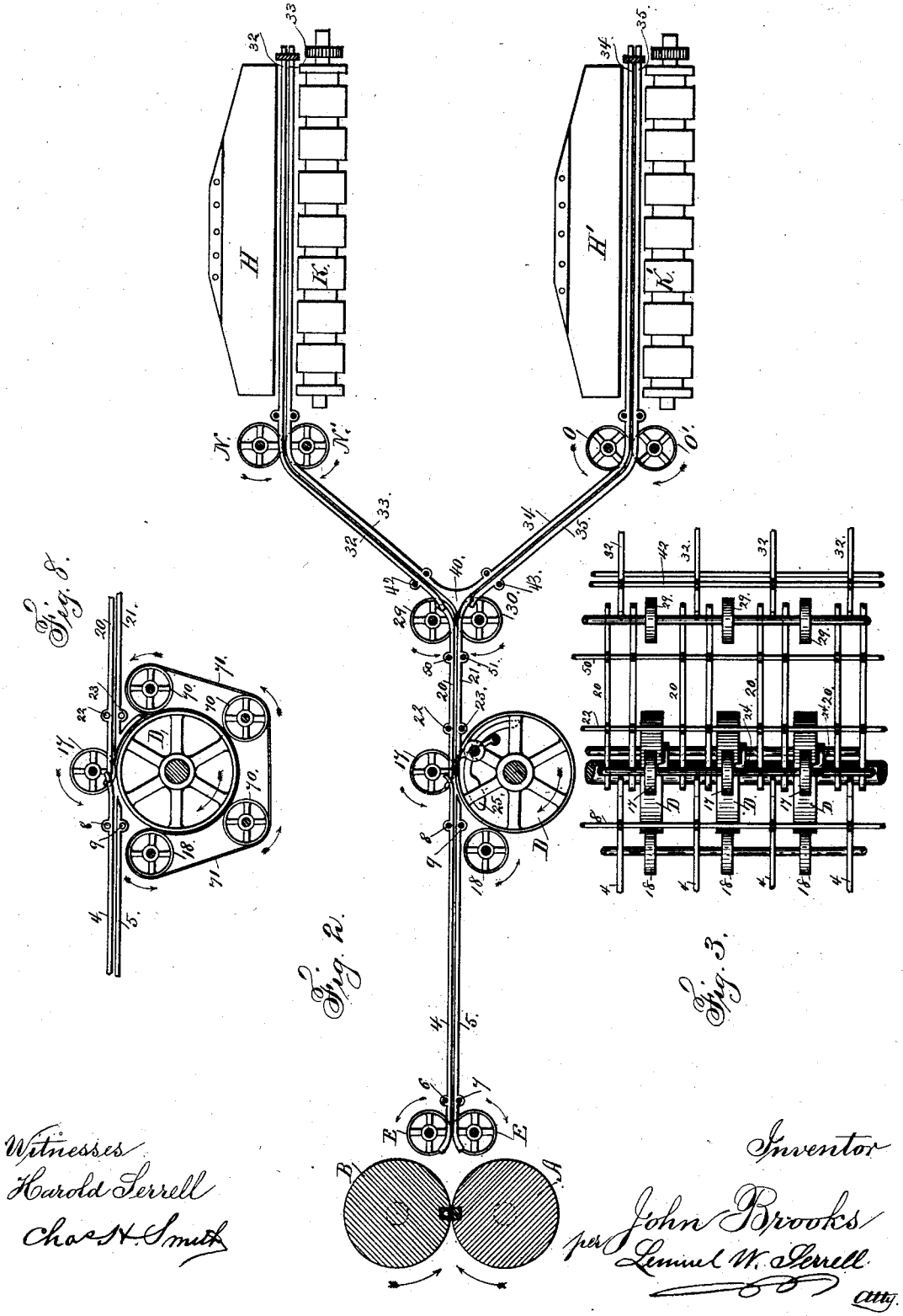
(No Model.)

5 Sheets—Sheet 2.

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No. 374,930. Patented Dec. 20, 1887.



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(No Model.) 5 Sheets—Sheet 3.

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Fig. 5.

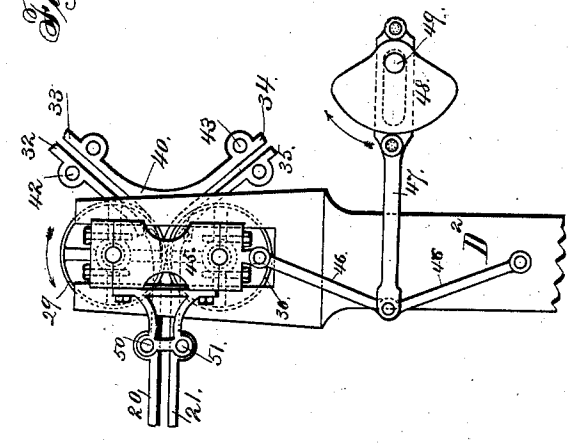
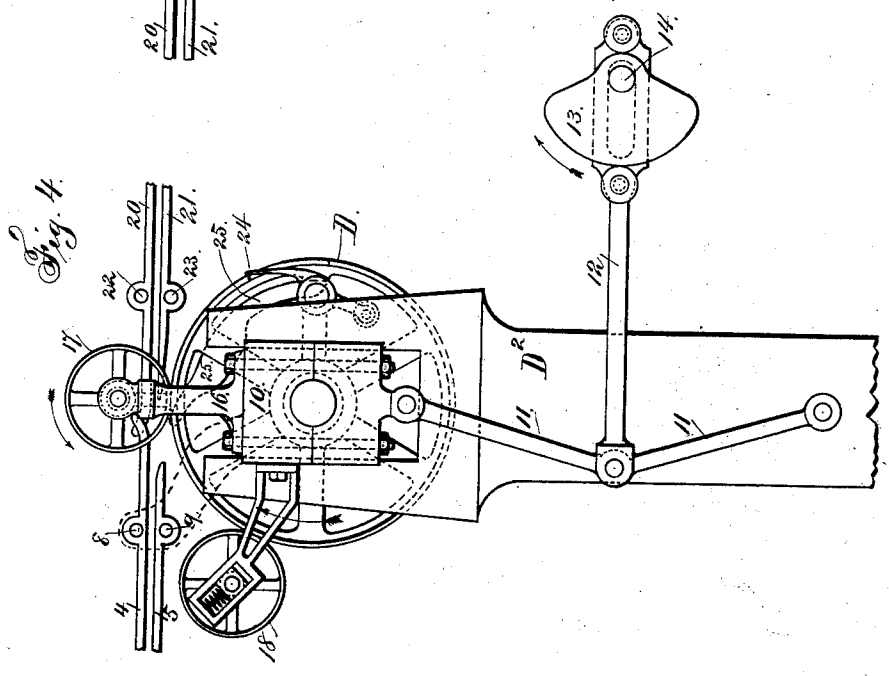


Fig. 4.



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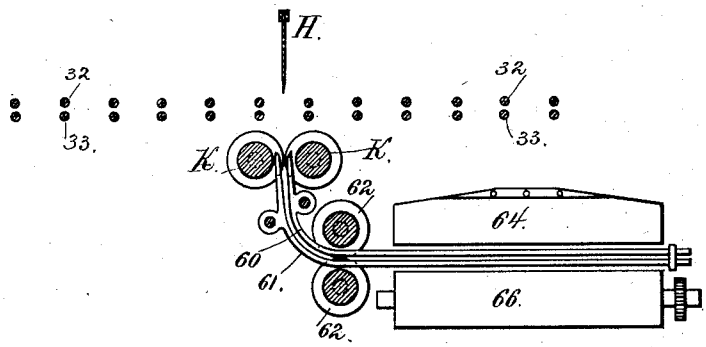
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SHEET DELIVERY APPARATUS.

No. 374,930. Patented Dec. 20, 1887.

Fig. 7.



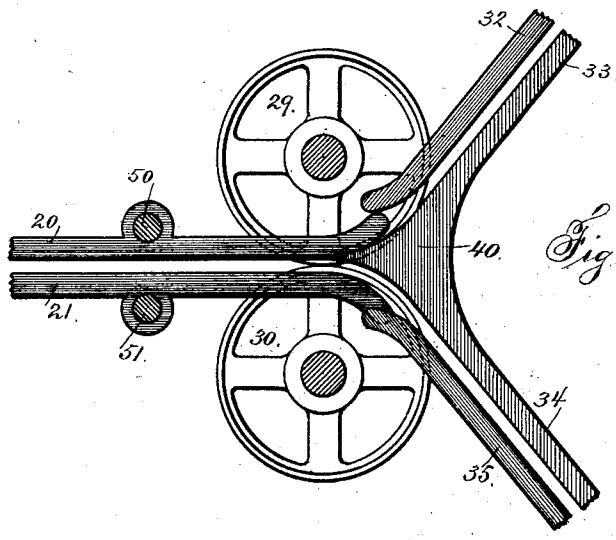


Fig. 6.

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(No Model.) 5 Sheets—Sheet 5.

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SHEET DELIVERY APPARATUS.

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Fig. 11.

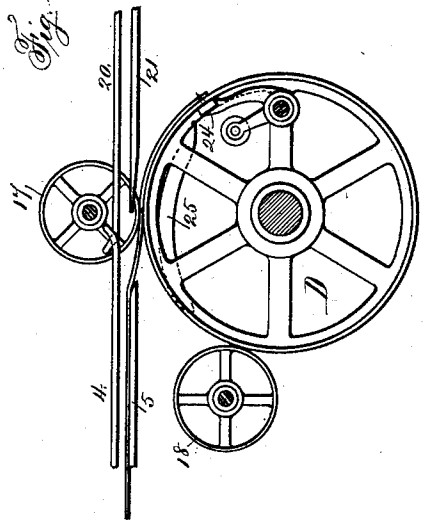


Fig. 12.

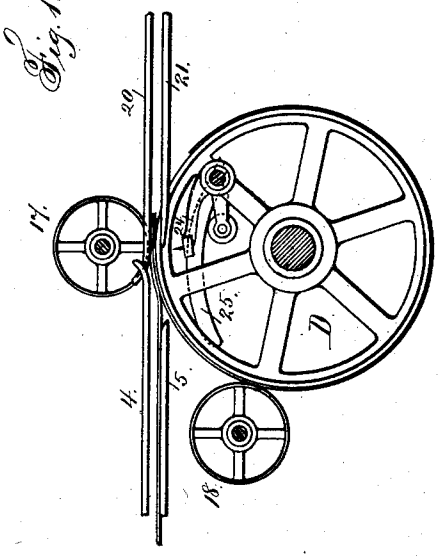


Fig. 9.

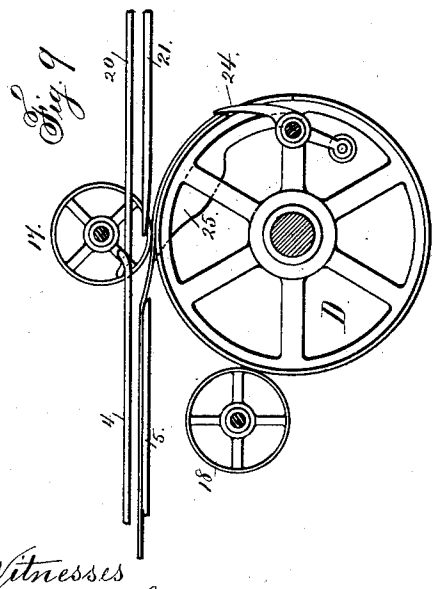
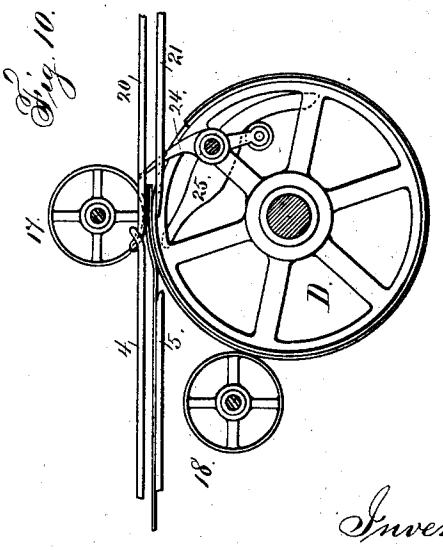


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN BROOKS, OF PLAINFIELD, NEW JERSEY.

SHEET-DELIVERY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 374,930, dated December 20, 1887.

Application filed March 15, 1886. Serial No. 195,241. (No model.)

To all whom it may concern:

Be it known that I, JOHN BROOKS, of Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Sheet-Delivery Apparatus, of which the following is a specification.

The object of this invention is to convey the printed sheets through between cutting-cylinders and between guide-bars to a superimposing-cylinder, around which the first sheet is wrapped and brought to correspond with a second sheet, and the two are delivered jointly to a folding apparatus, and I make use of guide-bars and a switch mechanism for directing the sheets first to one folding-machine and then to a second folding mechanism, so as to give time for the folding devices to operate in succession.

In the drawings, Figure 1 is a diagrammatic view representing the manner in which my improvements are introduced between the cutting-cylinders and the folding mechanism and Fig. 2 is a similar view with the superimposing-cylinder differently located. Fig. 3 is a partial plan view of the pulleys and guide-bars. Fig. 4 is an elevation representing the means for raising and lowering the superimposing-cylinder. Fig. 5 is a similar view of the parts that move the switch-rollers. Fig. 6 is a section showing the switch-bars and switch-rollers in larger size. Fig. 7 is a sectional diagram representing the conveying-bars and portions of the folding mechanism, and Fig. 8 is a section representing a modification in the superimposing-cylinder. Fig. 9 shows the superimposing-cylinder in the depressed position for wrapping the sheet around the same. Fig. 10 is a similar view with the superimposing-cylinder elevated to discharge the imposed sheets. Figs. 11 and 12 are views similar to Figs. 9 and 10, except that pins are shown for holding the advancing ends of the sheet instead of grippers.

In my improvements I make use of metal bars for the sheets to run upon instead of the tapes heretofore usually employed; but tapes may be used in addition, if desired, and I raise and lower the superimposing-cylinder and provide stationary guide-bars, so that when the imposing-cylinder is lowered the sheet can be wrapped around the superimposing-cylinder, and when such cylinder is raised the two sheets will be passed on together, one lying upon the other between the stationary guide-bars; and I use sheet-delivery rollers that are raised and lowered to deliver the sheets or pairs of sheets through one of two channels formed by ranges of guide-bars in pairs, with a stationary switch or director for the sheets.

The cutting-cylinders A B are of ordinary character. When the cutter entirely separates the paper, the advancing end of each sheet is lifted and caused to pass off the cutting-cylinder A by lifting-fingers *a*, that extend out from a rock-shaft, *a'*, and these are moved by a stationary cam, 2, upon the frame of the machine, as seen in Fig. 1; but when the paper is partially separated and the superimposing-cylinder D travels at an increased velocity the sheets are pulled apart, and the distance between the superimposing-cylinder D and the cutting-cylinders A B has to be greater than the length of the sheet to allow of the completion of the separation being effected by the pull upon the advancing sheet. The arrangement of devices for this object is shown in Fig. 2, and in this case it is preferable to employ the rollers E to give motion to the sheet and move it along between the guide-bars 4 and 5; but these rollers E E will not be needed in the arrangement shown in Fig. 1. The guide-bars 4 and 5 are sustained upon stationary cross-bars 6 and 7 to the frame of the machine, and the ends of the guide-bars near the superimposing-cylinder D may be moved up and down with such superimposing-cylinder, preferably, by the bars 8 and 9, that are connected to the boxes 10, that support the axis of the superimposing-cylinder D, (see dotted lines, Fig. 4;) but these bars may remain stationary, as illustrated in Figs. 9 and 11. It is preferable to make the superimposing-cylinder and the rollers E E and other rollers hereinafter set forth of ranges of pulleys, so as to permit the ends of the respective guide-bars to pass in between the pulleys.

The superimposing-cylinder D is raised and lowered by the toggle-bars 11, connecting-rods 12, and cams 13 upon a shaft, 14, that is rotated once for each two revolutions of the superimposing-cylinder, and the toggle-bars

are connected with the respective journal-boxes 10, there being toggles, cams, and connecting-rods at the two sides of the press, and the boxes 10 slide in jaws in the frame D^2 of the machine.

Upon the journal-boxes 10 there are the bearings 16, that support the shaft of the imposing-roller 17, and there is a forwarding-roller, 18, at one side of the superimposing-roller D, for a purpose hereinafter shown. This roller 18 may be in bearings on the frame of the machine; but preferably it is supported by arms extending from the boxes 10, and it should in that case be pressed into contact with the superimposing-cylinder D by springs acting on the bearings. The guide-bars 20 21 are held stationary at the ends next the superimposing-cylinder by the cross bars 22 23, and the imposing and delivery operations are as follows:

The grippers 24 are acted upon by the stationary cam 25, and this cam is shaped so as to open the grippers 24 shortly after they pass the forwarding-roller 18; and when the parts are in the position shown in Figs. 4 and 9 the advancing end of the sheet is pressed down by the imposing-roller 17 upon the surface of the superimposing-cylinder D, and at this moment the grippers 24 are allowed to close and grasp the sheet, the cam 25 being shaped to effect this. The sheet is now carried around with the superimposing-cylinder D by the grippers 24, and while this is being done, and just as the rear end of the sheet passes clear of the roller 17, the cam 13 and toggles lift the superimposing-cylinder D and roller 17, and the forwarding-roller 18, pressing on the sheet, holds the same to the cylinder D and causes it to move with the same, and the advancing end of the first sheet comes up in line with the advancing end of the next sheet and the two are forwarded together, the one laid upon the other by passing through between the superimposing-cylinder D and its roller 17; but at this time the top of the cylinder D has been raised above the bars 21, and the sheets are driven along between the ranges 20 and 21 of bars. The grippers 24 do not act at this time, because the elevated position of the superimposing-roller D has raised the gripper-shaft so that the concentric portion of the cam 25 holds the gripper-crank, so that the grippers are open and cannot close. Therefore they move with the cylinder D, as illustrated in Fig. 10, and are out of the way of the advancing ends of the sheets as they travel on between the ranges 20 and 21 of guide-bars to the pairs of switch-rollers 29 and 30, that seize the sheets and carry them to the folding devices, as hereinafter described.

The action of the parts represented in Fig. 1 is identically the same as that of the parts shown in Figs. 2 and 4, except that the cam 25 is shaped to allow the grippers to close when near the forwarding-roller 18, and this forwarding-roller 18 and the bars 4 and 5 can be raised and lowered with the superimposing-cylinder D, so as to maintain their proper positions in relation thereto.

I have shown folding-blades H and H′ and folding-rollers K K′ as constituting portions of two folding-machines. These parts and the devices for moving the knives at the right time are well known. I, however, convey the imposed sheets to these folders between the ranges of bars 32 33 and 34 35. These ranges of bars are at each side of the folding-blades and parallel thereto and above the folding-rollers, and the bars are parallel to the axis of the folding-rollers; but in approaching the folding devices they diverge from the switch-rollers 29 and 30, as seen in Figs. 1 and 2, and they are at right angles to the axis of these switch-rollers, so that the pair of switch-rollers forward the sheet along between the ranges of bars 32 33 or between the ranges of bars 34 35, according to the elevated or depressed positions of the switch-rollers. The ranges of bars 33 and 34 unite with the guiding-bar 40, and the ranges of bars 32 and 35 are held stationary by the cross-bars 42 43. The shafts of the two switch-rollers 29 and 30 are supported in the bearings 45, (see Fig. 5,) that are slid vertically within jaws on the frame of the machine by toggle-bars 46, rods 47, cams 48, and a shaft, 49. The cross-bars 50 51 are connected to the ranges 20 21 of bars, and they are moved up and down by and with the journal-boxes 45. When the switch-rollers 29 and 30 are raised, the top of the roller 30, coming above the apex of the guiding-bar 40, causes the advancing ends of the sheets to pass up between the ranges of guide-bars 32 33, and thence to the folding-blade H and rollers K; and when the switch-rollers 29 30 are lowered the bottom of the roller 29, coming below the apex of the guiding-bar 40, directs the sheets down between the ranges of guide-bars 34 and 35 to the folding-blade H′ and rollers K′. The ends of the respective bars 20 21 32 35 are bent outwardly, as seen in Fig. 6, to insure the proper delivery and passage of the sheets. The pairs of forwarding-rollers N N′ O O′ P P′ serve to insure a continuance of the movements of the sheets and their ultimate delivery to the folding devices.

In Fig. 7 I have shown the ranges of bars 60 61 as receiving the folded sheets of paper as they pass between the rollers K K, and these bars guide the sheets between the forwarding-rollers 62, that carry the sheets along as they pass between the bars 60 and 61 beneath the folding-knife 64, that carries the middle of the sheet down between the folding-rollers 66.

The imposing-cylinder D (shown in Fig. 8) is raised and lowered and operates the same as the superimposing-cylinders, before described; but, instead of using grippers to carry the alternate sheets around the surperimposing-cylinder, there are pulleys 70, in addition to the roller 18 and endless belt 71, around the

respective pulleys to hold the sheet in contact with the respective pulleys of the imposing-cylinder. The cylinder D and rollers 17 18 70 70 70 all move up and down together, and the cross-bars 8 and 9 and guide-bars 4 and 5 all move together, and the first sheet is directed downwardly and around the superimposing-cylinder D, and then the first and second sheets are imposed and passed off between the ranges 20 and 21 of guide-bars.

In Fig. 2 the acceleration of the sheets by the more rapid movements of rollers D and 17 causes the sheets to be drawn apart and the space left for directing the respective sheets. With the parts arranged as in Fig. 1 the necessary distance between the sheets is obtained by increasing the speed of the switch-rollers 29 30 and the rollers N N′ O O′ P P′. The pins a^3 in Fig. 1 are in the cylinder A, and pass freely through openings in fingers that project from a cross-shaft, a', and the pins carry the advancing end of one sheet around upon the cylinder A, and then the advancing end of the second sheet is taken upon the said pins; but then, as the pins pass beneath the cylinder B, the fingers a are raised by the cam 2 coming into contact with an arm on the shaft a', so that the fingers lift the front ends of the two sheets from the pins and pass them in between the ranges 4 and 5 of bars to be carried to the folding mechanism. When the superimposing-cylinder D and roller 17 are used with the fingers, as in Fig. 1, the cylinder D will receive four or six sheets and then forward them together to the folding devices. This improvement is especially useful, as it allows for the press being used for different kinds of job-work.

In Figs. 11 and 12 I have shown the pins 24 as projecting through the cylinder D, upon which the advancing end of one sheet is held. These pins are withdrawn by the cam 25 at the time the cylinder D is raised to discharge the forward end of the first sheet with the advancing end of the second sheet between the ranges 20 and 21 of bars, and these pins are the equivalents of the grippers shown in Figs. 9 and 10.

The difficulty generally experienced in the use of tapes is that some tapes will be tighter than others, and consequently the sheets will not lie horizontal and smooth or be fed perfectly to the rollers between which they have to pass. In my present invention the metal guide-bars in pairs are accurate and rigidly secured in a horizontal plane and insure the perfect movement of the sheets as they pass to the rollers, and the sheets are kept smooth.

I claim as my invention—

1. The combination, with the cutting-cylinders A B and the ranges 4 5 of guide-bars, of the superimposing-cylinder D, the imposing-roller 17, the forwarding-roller 18, the movable bearings for the journals of the same, and mechanism, substantially as set forth, for moving the bearings and raising and lowering the imposing cylinder and rollers and the ranges of guide-bars 20 21, substantially as set forth.

2. The combination, with the ranges of guide-bars 20 21 and the switch-rollers 29 30, of the movable bearings for the journals of said rollers and means, substantially as specified, for raising and lowering the same, and the guide-bars 20 21 at one end, the stationary guiding-bars 40, and ranges 32 33 34 35 of guide-bars, substantially as set forth.

3. The combination, with the superimposing-cylinder D and imposing-roller 17 and movable bearings for the journals of the same, of the ranges of guide-bars and gripper-fingers upon the superimposing-cylinder and mechanism, substantially as set forth, for raising and lowering the bearings of the superimposing cylinder and roller, substantially as specified.

4. The combination, with the cutting-cylinders and pins for holding the advancing ends of the sheets and means, substantially as specified, for removing the sheets from such pins, of ranges of guide-bars between which the sheets are passed as they are discharged from the cutting-cylinder, a superimposing cylinder around which the sheets are wrapped and caused to accumulate, and ranges of guide-bars between which the imposed sheets are discharged, substantially as set forth.

5. The combination, with the ranges of guide-bars between which the sheets are passed, of a pair of forwarding-rollers and means, substantially as specified, for raising and lowering such forwarding-rollers and guide-bars, and a stationary guiding-bar, 40, and ranges of guide-bars 32, 33, 34, and 35, diverging therefrom for directing the sheets as delivered by the forwarding-rollers between one pair or the other of the ranges of diverging guide-bars, substantially as set forth.

6. The combination, in a sheet-delivery apparatus, of a superimposing cylinder and roller and movable bearings for the journals of the same, and means, substantially as specified, for raising and lowering the said bearings and ranges of stationary guide-bars, substantially as specified, whereby the sheets are imposed when the cylinder is in one position and they are discharged upon the guide-bars when the cylinder is in the other position, as set forth.

7. In a sheet-delivery apparatus, the combination, with the cutting-cylinders, of ranges of metal guide-bars between which the sheets are passed, a superimposing-cylinder upon which the sheets are received and collected from between the guide-bars, and a roller for pressing the sheets upon the superimposing-cylinder, substantially as specified.

8. In a sheet-delivery apparatus, the combination, with the cutting-cylinders, of ranges of metal guide-bars between which the sheets

are passed, a stationary guiding-bar, 40, and inclined ranges of metal guide-bars 32, 33, 34, and 35, diverging from the ends of the first guide-bars, and the switch-rollers 29 30 and movable bearings for the journals of the same, and means, substantially as specified, for raising and lowering the switch-rollers and guide-bars at one end and directing the sheets between one or the other of the ranges of diverging guide-bars, substantially as set forth.

Signed by me this 9th day of March, A. D. 1886.

JOHN BROOKS.

Witnesses:
GEO. T. PINCKNEY,
WALLACE L. SERRELL.