6 Sheets—Sheet 1.

S. D. TUCKER.

Sheet-Delivering Apparatus for Printing-Machines.

No. 214,068. **Patented April 8, 1879.**

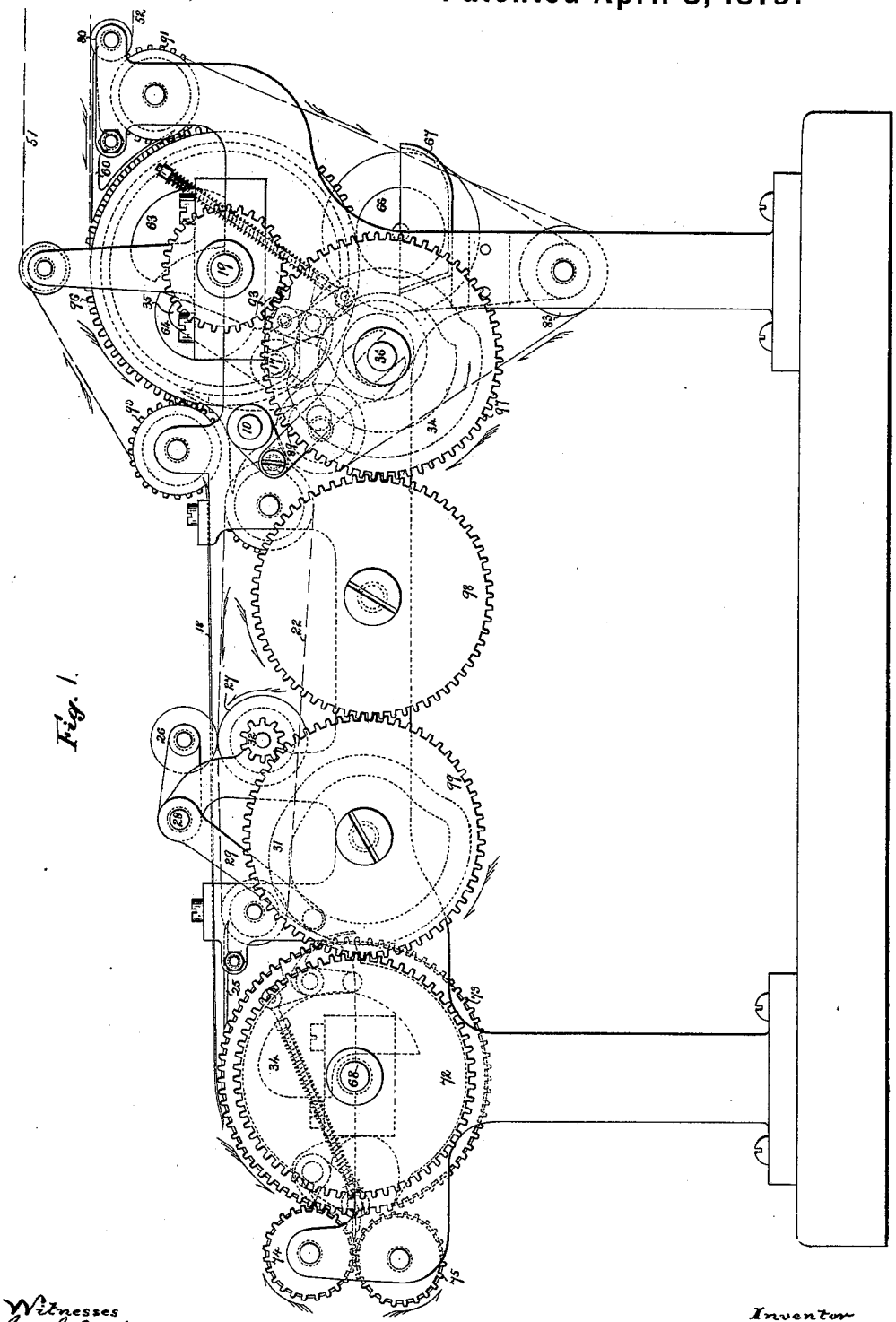

Fig. 1.

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6 Sheets—Sheet 2.

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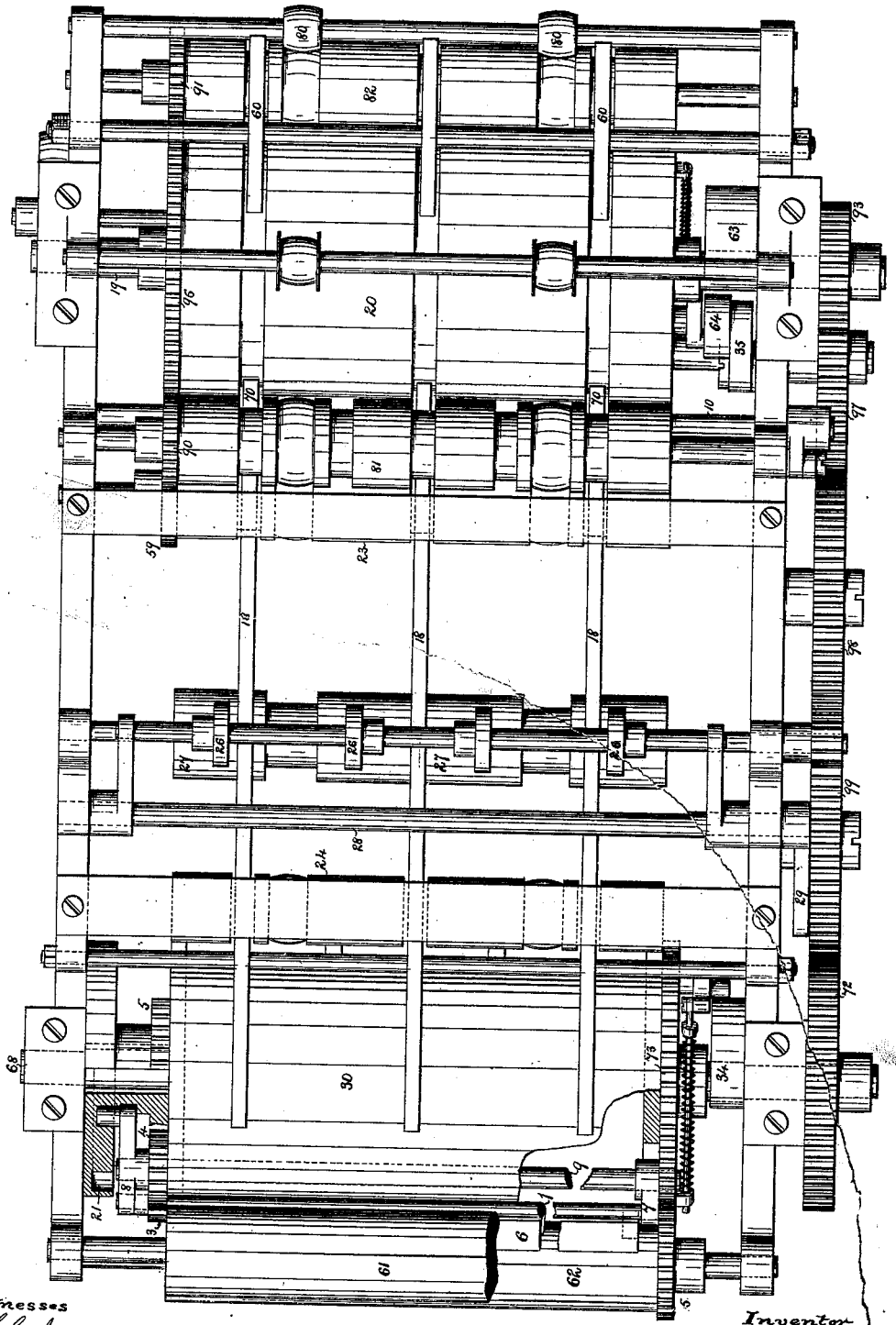
Fig. 2.



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6 Sheets—Sheet 3.

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Sheet-Delivering Apparatus for Printing-Machines.

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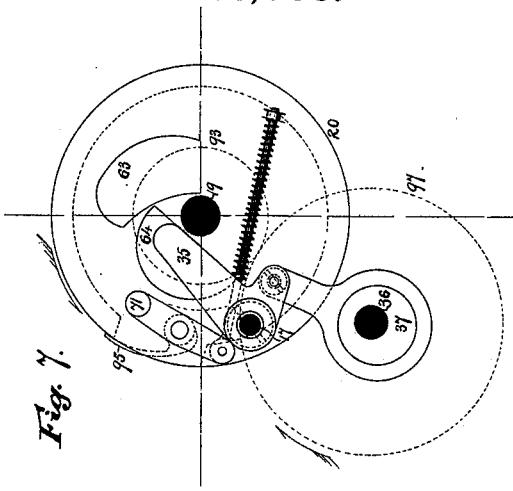

Fig. 7.

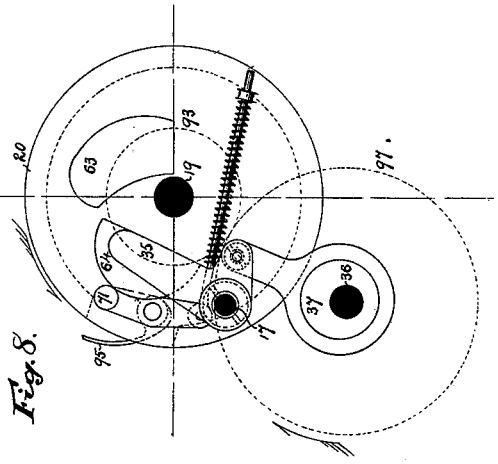

Fig. 8.

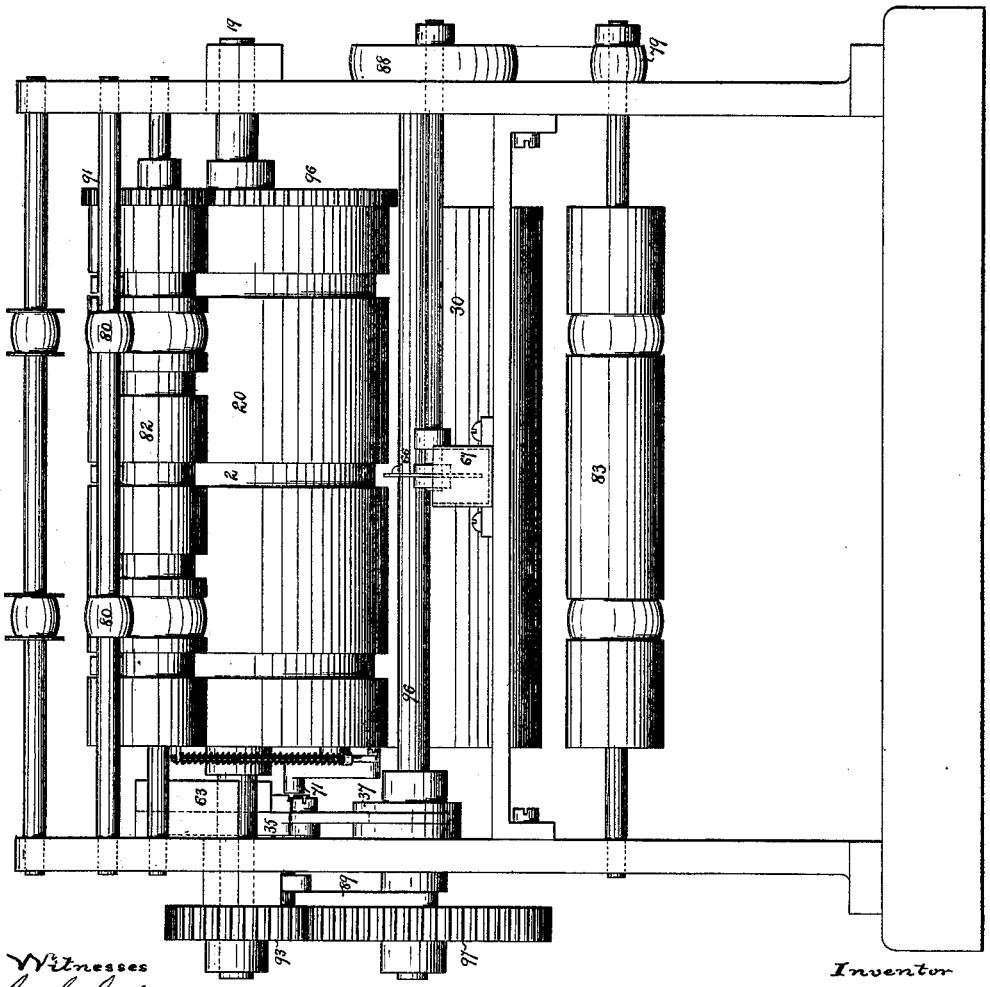

Fig. 3.

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6 Sheets—Sheet 4.

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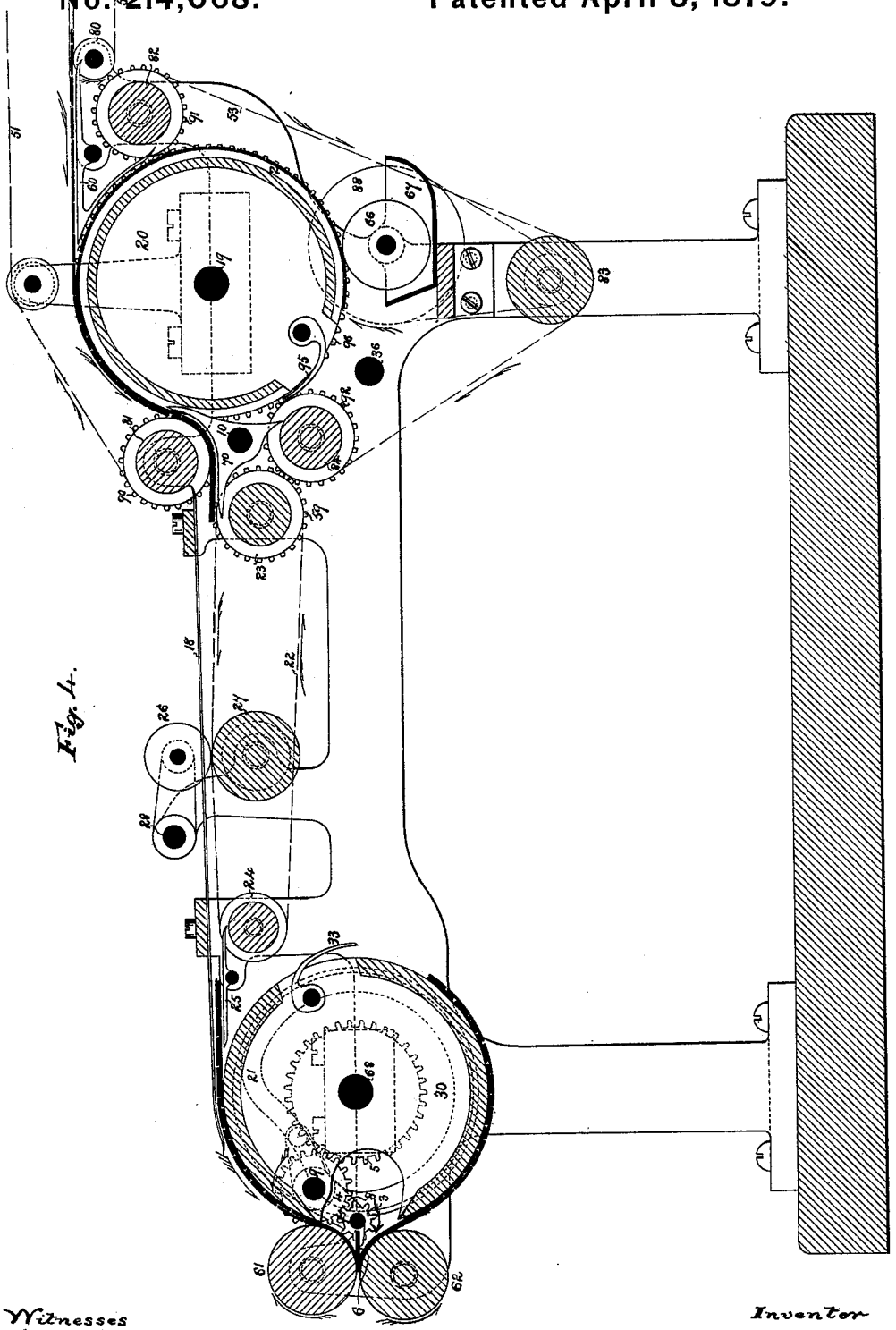

Fig. 4.

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6 Sheets—Sheet 5.

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Sheet-Delivering Apparatus for Printing-Machines.

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Fig. 5.

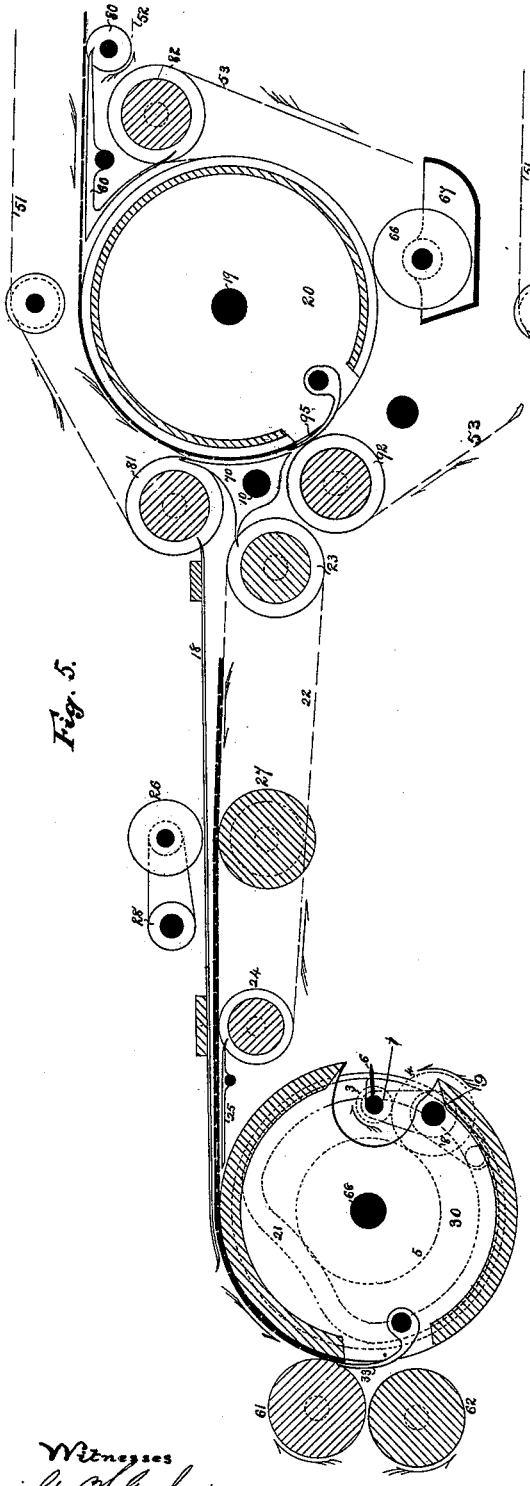
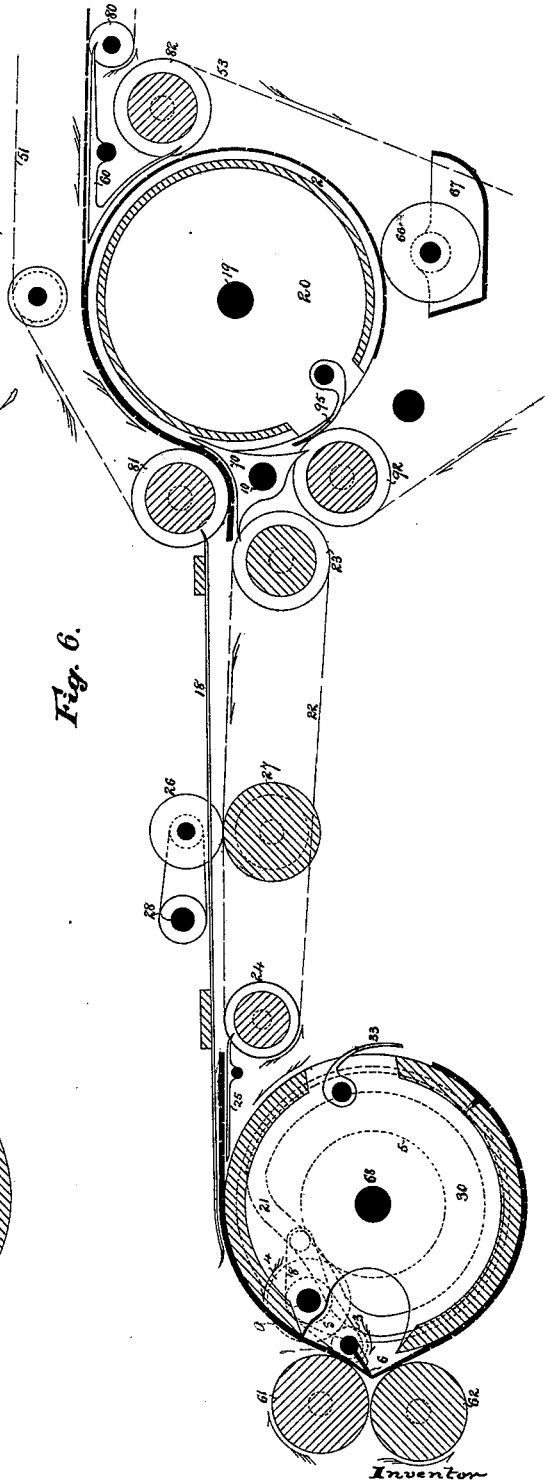


Fig. 6.



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6 Sheets—Sheet 6.

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Sheet-Delivering Apparatus for Printing-Machines.

No. 214,068. Patented April 8, 1879.

Fig. 12.

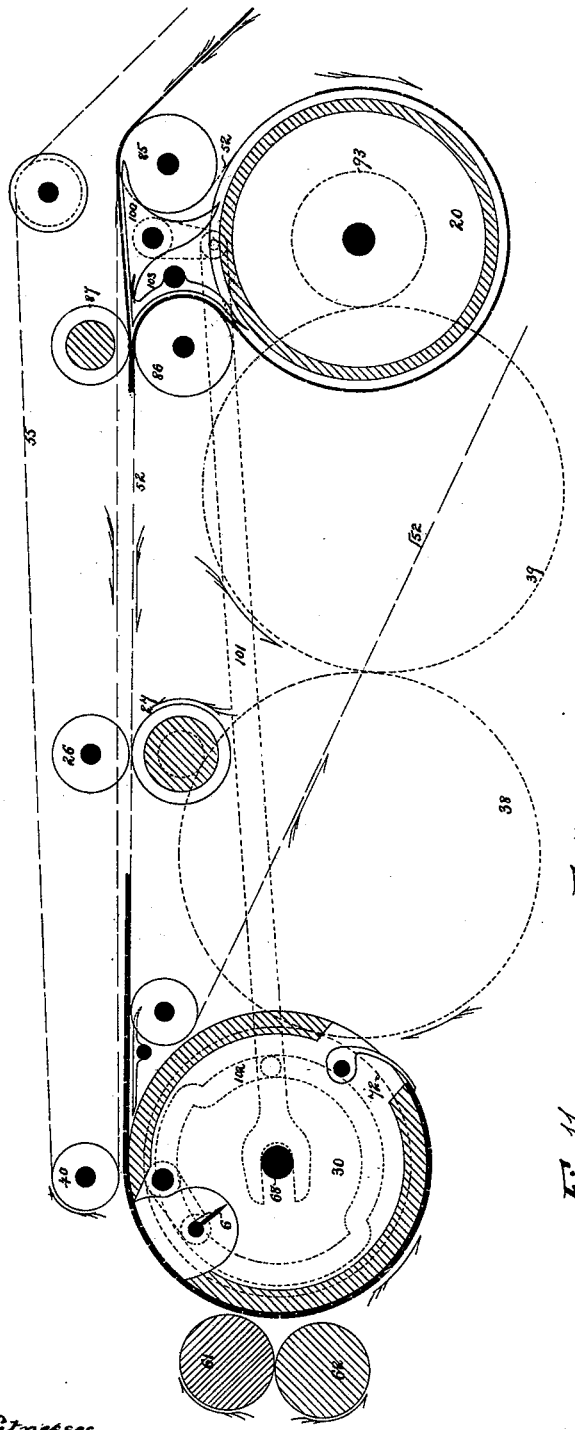


Fig. 9.

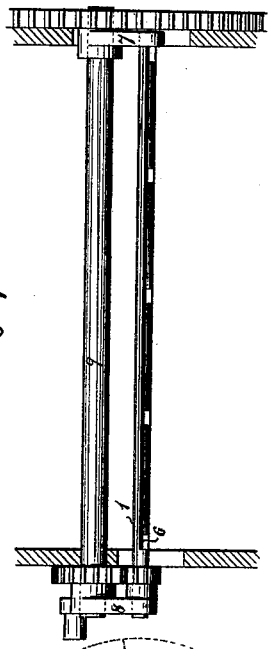


Fig. 10.

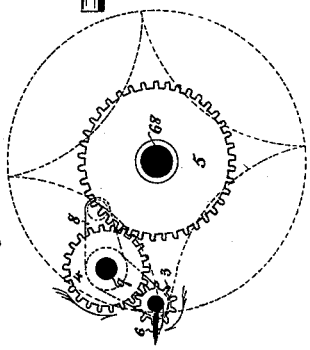
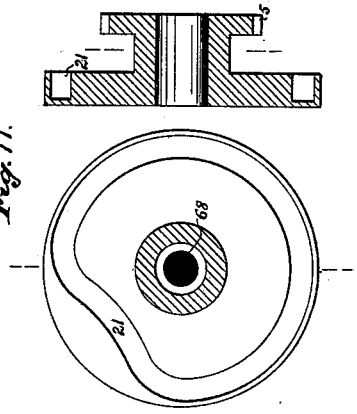


Fig. 11.



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UNITED STATES PATENT OFFICE.

STEPHEN D. TUCKER, OF NEW YORK, N. Y.

IMPROVEMENT IN SHEET-DELIVERING APPARATUS FOR PRINTING-MACHINES.

Specification forming part of Letters Patent No. **214,068**, dated April 8, 1879; application filed June 1, 1878.

To all whom it may concern:

Be it known that I, STEPHEN D. TUCKER, of the city, county, and State of New York, have invented an Improvement in Delivering Apparatus for Printing-Machines; and I declare the following specification to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, Fig. 2 a plan view, Fig. 3 an end elevation, and Fig. 4 a longitudinal sectional elevation, of an apparatus embodying my improvements, whereof Figs. 5 and 6 are longitudinal sectional elevations, showing the mechanisms in two positions and their operation. Figs. 7 and 8 are diagrams showing the operation of the gripercams. Figs. 9, 10, and 11 illustrate details of the folding mechanism. Fig. 12 is a longitudinal sectional elevation, and illustrates a modified form of the primary sheet-manipulating mechanisms. In Figs. 2 and 3 the tapes are omitted in order not to obscure more important parts underlying them.

In consequence of the great speed at which sheets are produced by web-printing machines, it is essential that the sheet-delivering apparatus shall be capable of manipulating said sheets as rapidly as they are supplied to it, in order that the greatest capacity of the printing-machine may be availed of. To this end various mechanisms have been devised, which are adapted to properly deliver the sheets at a high rate of speed which approximates to that of the printing-machine. Those known as "rotating delivering mechanisms" are the most nearly adapted by their mode of operation to equal or approximate the capacity of the printing-machine. These mechanisms are of two classes, viz: first, such as have a revolving carrier, upon the surface of which many sheets may be collected or accumulated one upon another, and be discharged therefrom in a single mass or body, as in the United States Patents Nos. 191,494, 192,510, 192,954, 193,056, 196,502, 197,694, and 197,700; second, such as have a revolving carrier supporting a folding-blade which co-operates with a nipping device, whereby sheets supported on the carrier are doubled by its blade into the nipping device, and are thereby folded as in the United States Patents Nos. 171,196, 191,494. 191,819, 192,034, 195,115, 197,693, 197,694, and 197,700.

In operating such mechanisms they necessarily run at the same high speed as does the printing-machine; and when the sheets delivered by them are to be further manipulated by a secondary apparatus, it is desirable and highly advantageous to reduce the speed of the latter. To this end the sheets from the primary have been directed alternately through two separate channels, each leading to a secondary sheet-manipulating apparatus, running at a considerably reduced rate of speed, for the reason that they each operate upon but one-half of the product of the primary apparatus. Examples of this are shown in the said Patents Nos. 191,819 and 191,494.

In the operation of this device it has been found by experience that the sheets while running at the high speeds of the primary are liable to clog in the channels leading therefrom, particularly in the upper one, which defective operation is avoided by the first part of the present invention, which includes a sheet-delivering apparatus, consisting essentially of a primary rotating sheet-manipulating mechanism, whereby two or more sheets are collected together, so as to occupy a longitudinal space equal, or nearly so, in length to that of one sheet, and a secondary rotating sheet-manipulating mechanism, which runs at a speed considerably reduced, or less than that of the primary, and the folding-blade of which operates at each second revolution of the primary mechanism, the said mechanisms being separated a distance apart equal, or nearly so, to the length of the sheet, and having a single sheet-conducting mechanism interposed between them, by which construction sheets manipulated by the primary may be delivered to the slowly-running secondary at the high rate of speed of the primary mechanism without danger of interfering with each other, buckling up, or otherwise becoming disrupted.

This primary sheet-manipulating mechanism consists of a revolving carrier provided with means whereby sheets of a length nearly equal to its circumference are collected together and discharged therefrom in a single body.

The secondary sheet-manipulating mechanism consists of a revolving carrier provided

with means for imparting a fold to the sheets, which carrier is caused to run at or about one-half the surface, speed of the primary carrier.

Another feature of the invention consists in combining, with a revolving carrier provided with mechanisms for collecting many sheets upon its surface, and discharging them in a single mass or body therefrom, a pasting apparatus, the pasting-disk of which is mounted in stationary bearings, and thus constantly runs in operative relation to said carrier, thus acting circumferentially, and applying lines of paste longitudinally to said sheets.

The invention further consists in combining, with a sheet-collecting mechanism revolving at high speed, and a folding mechanism revolving at low speed, interposed intermittingly-acting sheet-forwarding rollers, running at a like speed therewith, whereby large sheets of a poor, thin, limp quality of paper may be aided in their movement of delivery; and the invention further embraces mechanisms effecting a new mode of operating a rotating folding-blade in a revolving carrier, all of which will be hereinafter more fully explained.

In order to a clear understanding of the present improvements, the construction and operation of the apparatus shown in Figs. 1 to 11 will first be described, and then the modifications of the same explained.

The primary sheet-manipulating mechanism therein shown is a revolving carrier, 20, upon the surface of which many sheets may be collected one upon another, and stripped or discharged therefrom in a single mass or body. Said carrier 20 consists of a cylinder mounted upon a shaft, 19, which is rotated by gearing connecting it with a moving shaft of a web-printing machine, to which this delivering apparatus is adapted to be attached.

The tapes 51 52 form conductors leading from the cutting-cylinders of the printing-machine, and operate to deliver the sheets formed thereby onto the carrier 20 in like manner as is shown in the said Patent No. 191,494. The tapes 51 return over the roller 81, which is driven by the pinion 90 from the toothed wheel 96 on the carrier-shaft, and the tapes 52, driven in concert with the tapes 51, return over the pulleys 80 toward the cutting-cylinders, while guards 60 bridge the space between the periphery of the carrier 20 and said pulleys 80, thus forming, with the tapes 51, a continuous conductor up to the surface of said carrier, which latter, having a greater surface-speed than the cutting-cylinders, accelerates the movement of the sheets, and separates them a distance apart, to facilitate their manipulation and provide a space for gripers, if used, as is well understood, and fully described in said Patent No. 191,494.

This carrier is provided with a second set of tapes, 53, which are stretched from a roller, 84, driven by pinion 92 from the wheel 96, extend partially around the carrier over roller 82, driven by pinion 91 from the wheel 96, and return under a roller, 83. The circumferential portion of the carrier 20, which is unoccupied by the tapes 51 and 53, is spanned by the depending arms of the guards 60, which, with the tapes 51, form the entrance-channel for the sheets, while the switches 70, with the roller 81, form the discharging-channel for the same. These switches 70 also operate to close this latter channel and guide the sheets around with the carrier. Said switches are fast upon a shaft, 10, which is rocked by means of a rock-arm and a connecting-rod, 89, whose stud or friction-roller runs in the cam-groove 34 of the cam-wheel 97, which latter has a toothed periphery, which gears with a pinion, 93, on the carrier-shaft 19. As this pinion 93 makes equal turns with the carrier 20, and is but one-half the diameter of the cam-wheel 97, it follows that the switches 70 will be vibrated in opposite directions at each revolution of the carrier 20, standing in the position shown in Fig. 5 at one revolution of the same, and in the position shown in Fig. 4 at the next revolution thereof.

The mechanisms described operate as follows: Each sheet delivered onto the carrier 20 from the tapes 51 52 is nipped upon its surface by the tapes 51 and driven around with said carrier, the switches 70 then standing as in Fig. 5, and acting to guide the sheet into the nip of the tapes 53, and with the guard 60 aiding its onward movement, so that it is carried around to the entrance-channel, where it receives a second sheet upon it. These two sheets now travel together, and since the switches have meanwhile been rocked into the position shown in Fig. 4, said sheets will be guided off from the carrier 20 at its discharging-channel.

It is obvious, however, that the switches 70 may be so timed or operated as to deliver the sheets from the carrier 20 in packs of three or any other number by properly proportioning the teeth of the cam-wheel 97 to those of the pinion 93, as is well understood.

Heretofore it has been found advantageous to supply such a collecting mechanism with sheet-controlling gripers, as is set forth in the Patent No. 191,494; but in the machine therein illustrated and described said gripers are opened to release the sheet at every revolution of the carrier immediately after passing the discharging-channel.

In the present improvement the gripers 95, though hung on a spring-seated shaft rocked by a cam, as is common, have their sheet-discharging cam 64 fixed on one arm of a vibrating bell-crank, 35, which is pivoted on a stud, 17, and rocked by an eccentric, 37, on the shaft 36 of the toothed wheel 97, whereby said gripers, through their rock-arm 71, are opened to release the sheets at the discharging-channel at such times only as said channel is opened and the sheets are to be discharged; but said gripers are opened at the receiving-channel at each revolution of the carrier 20 by a fixed

griper-cam, 63, with which their rock-arm 71 engages. These gripers 95 thus open to receive and close to seize the sheet at each revolution of the carrier 20, remain closed while passing the discharging-channel when the switch stands as in Fig. 5, and are opened to release the sheets, as in Fig. 6, when said sheets are to be discharged by the switch, as therein shown.

It has been common, in applying a longitudinal line of paste to one or more sheets which are to be united as one product, to employ a disk alternately moved into and out of the plane in which the sheets travel, an example of which moving pasting devices is shown in the United States Patent No. 195,115, or to depress the proper sheets or a portion of the web into contact with a paste-disk situated in a plane below that in which the sheets travel, as in the said Patent No. 191,494.

In the present improvements the carrier is supplied with a pasting mechanism, the pasting-disk 66 of which runs in a paste-vat, 67, and is constantly supported by means of the fixed bearings of its shaft and vat in one operative position with respect to the surface of said carrier. This disk 66 is constantly driven by a pulley, 88, on its shaft, which receives motion from another pulley, as 79, fixed on any one of the moving shafts of the machine. (See Fig. 3.) This pasting-disk and its trough are so attached to the frame-work that they may be readily removed, which removal is effected when it is desired that the carrier shall collect sheets without applying paste thereto, and also to preserve the condition of the pasting mechanism when not in use.

The carrier is grooved circumferentially at the point 2, coinciding with the position of this paste-disk 67, so that when it is not in contact with a sheet it will be non-operative, and will not smear the carrier.

By means of this arrangement of the pasting mechanism a longitudinal line of paste may be applied to alternate sheets, or to all but the last of any other number carried singly onto a collecting-carrier, and thus have their contact-surfaces united to form them into a single mass or body, for the reason that while the first sheet receives the lines of paste, and thus adheres to the second, (if two is the number to be collected,) which two thus united are discharged by the switches, as in Fig. 4, the second sheet does not reach the pasting-disk, which thus rotates ineffectively, as just described; but if the carrier 20 collects three or more sheets, (as it may by causing the cam-wheel 97 to make an appropriate number of revolutions to each one of the carrier,) then the first sheet will be pasted, as will the second, third, and every sheet passing about its surface, except the last, which is discharged before reaching the pasting-disk, as before described, with the preceding ones underlying it.

The secondary sheet-manipulating apparatus may be constructed as are the rotary folding mechanisms described and shown in the hereinbefore-enumerated patents, especially when the sheets are not supported upon the carrier, but are directed between its creasing or folding blade and the co-operating nipping device. It is, however, herein shown as provided with a rotating folding-blade supported in a revolving carrier, upon which the sheets rest while undergoing manipulation, in which arrangement it is necessary that the folding-blade shall not protrude beyond the peripheral line of the carrier, except at the point where the doubling or folding is to be effected, or at such times when the blade is not covered by the sheet, for the reason that such protrusion will disrupt the sheet and prevent its perfect manipulating.

While this operation may be effected by the mechanism shown in Figs. 1 to 8 of the aforesaid Patent No. 171,196, it is requisite, when the folding-blade continuously rotates, as in the mechanism shown in Figs. 12 to 18 of said patent, that means shall be provided whereby said blade, while being turned outward many times at each revolution of its carrier, shall so turn inside its periphery, and protrude beyond the same at the proper point to enter the sheet into the folding-rollers. One part of the present invention is directed to this end, the construction and operation of the part being such that the folding-blade may continuously rotate within a revolving carrier adapted to support or carry sheets upon its surface, and be projected beyond the periphery thereof at one or more points of its path, as may be desired, to co-operate with folding-rollers, as 61 62, in doubling or folding said sheets. As here shown, this carrier 30 is of the same size as and is revolved at one-half the surface-speed of the carrier 20 by means of a toothed wheel, 72, fast on the shaft 68, which is driven through the train 99 98 97 from the pinion 93 on the shaft 19 of carrier 20. It carries at one end a toothed wheel, 73, which meshes with a similar wheel, 74, on the shaft of folding-roller 61, which latter gears with the wheel 75 on the roller 62, said rollers thus being revolved in unison and at the same surface-speed as the carrier 30. Its rotary folder 6 is fast upon a shaft, 1, which turns in arms 7 8, fixed upon a rocking shaft, 9, hung in the heads of said carrier 30, one, 8, of which arms has an extended shank carrying a stud or friction-roller, which runs in the groove of the stationary cam 21, which is fixed to the side frame, by which construction of parts said cam will rock the arms 7 8 and project the blade-shaft 1 outward from and inward toward the center of the carrier 30 at each revolution of the latter.

The blade-shaft 1 is also provided with a pinion, 3, fast upon it, which pinion is geared with an intermediate toothed wheel, 4, which turns freely on the shaft 9, and remains constantly geared with a stationary toothed wheel, 5, fixed to the frame-work, in this instance be-

ing attached to the cam-wheel 21, Fig. 11; and as this intermediate wheel, 4, and arms 7 8, supporting the blade-shaft 1, to which the pinion 3 is fixed, are hung on the same shaft, 9, the said pinion 3 will remain constantly geared with, and be driven by, the said intermediate wheel, 4, whatever may be the degree to which the blade-shaft 1 is projected by the cam 21.

The operation of this mechanism is as follows: As the carrier 30 revolves, it carries with it the shaft 9, the intermediate wheel, 4, the blade 6 and its shaft 1, and pinion 3, thereby causing the wheel 4 to be turned by the stationary wheel 5, and to constantly rotate the folding-blade 6 through the pinion 3. Thus, at each revolution of the carrier 20, the said folding-blade will be rotated a number of times, according to the proportion its carrying-pinion 3 has to the driver 5. In this instance this proportion is as 1 is to 4; and hence the blade 6 will make four rotations to each revolution of the carrier 30, and will be turned outward from the center and toward the periphery of the carrier four times during each single revolution of said carrier, as is indicated by dotted lines in Fig. 10. When, however, the folding-blade is approaching the folding-rollers 61 62, the stud or friction-roller on its arm 8 will, by entering the depressed portion of the stationary cam-wheel 21, cause the blade-carrying shaft to be gradually moved outward from the center of said carrier; and since said shaft is constantly rotating the blade, these combined movements will cause said blade to be projected toward and entered between the folding-rollers 61 62, Figs. 4 and 6, its edge thus being caused to move in a curved line nearly coinciding with the surface of the roller 61; and the depressed part of this cam 21 is so shaped that when the blade has been fully entered between said rollers, as in Fig. 4, by the outward movement of its shaft and its rotation therewith, its continued rotation will withdraw it from the folding-rollers, while its shaft 1 is gradually moved inward, so as to draw the folding-blade within the periphery of the carrier, the movements of said shaft and folding-blade and the curved line, the edge of the latter described, being the reverse of those which projected the said blade.

During the remaining portion of a single revolution of this carrier the stud or friction-roller on the arm 8 runs in that part of the groove of the cam-wheel 21 which is concentric with the carrier-shaft 68, so that no outward or inward movement of the blade-shaft 1 occurs, and though the shaft and blade continue their rotation the edge of the latter will not be protruded beyond the periphery of the carrier. Thus the edge of the constantly-rotating folding-blade will travel in the path indicated by the dotted lines of Fig. 10, and be turned outward and projected once to co-operate with the folding-rollers 61 62, and be turned inward to and outward from the center of the carrier without protruding beyond its periphery three times during each single revolution of said carrier.

This construction of mechanisms for actuating the folding-blade is in like manner adapted to be used when the blade-carrier is a simple revolving frame-work supporting the shaft 9, in using which the paper is directed in front of or before the folding-rollers 61 62 and does not pass onto said carrier.

The sheet-conducting mechanism interposed between these primary and secondary sheet-manipulating mechanisms for conveying the sheets from one to the other consists of sets of tapes 22 and guards 18. These tapes are stretched over a roller, 23, in the grooves of which the switches 70 of the carrier 20 play, to a roller, 24, near the carrier 30, in grooves of which enter the ends of conductors 25, which extend to a point near the periphery of said carrier 30. These tapes are driven through the wheels 92 59 from the carrier 20, and thus run with a like surface-speed. The guards 18 are supported above and about parallel with said tapes, and extend from grooves in the roller 81 to a point over the carrier 30.

Operation: The sheets from the web-press are conducted to the carrier 20 by means of the tapes 51 52, and the first incoming sheet is seized by the gripers 95, and held upon the carrier during nearly a whole revolution of the same, the switches 70 being rocked, as in Fig. 5, and the griper-discharging cam 64 rocked, as in Fig. 7, during this movement of the carrier. As this first sheet runs in contact with the pasting-disk 66 it receives a line of paste on its outer surface, upon which sheet, as it reaches the entrance-channel, the next incoming sheet is laid, so that the front edges of both sheets are seized and held upon the carrier by the gripers 95, the two thus being laid one upon the other as the carrier revolves, and becoming united by the line of paste. At this time the switches 70 will have been rocked into the position of Fig. 6, and the discharging-cam 64 will have been rocked so as to intercept the rock-arm of and open the gripers 95, as in Fig. 8, and the two sheets thus released will be delivered through the discharging-channel onto the sheet-conducting tapes 22, which deliver them onto the carrier 30, where they are seized by the gripers 33, which are operated by their spiral spring in connection with the fixed cam 34. Thus held, the sheets are carried around upon the surface of the carrier 30, as in Fig. 5, and released at the proper time for their middle portion to be acted upon by the rotating folding-blade 6, as in Figs. 4 and 6, by the action of which blade the attached sheets are doubled into the nip of the rollers 61 62, from which they emerge in a once-folded condition.

In this operation it is to be observed that two sheets are gathered together or accumulated one upon the other, so that they occupy but one-half of their original space in the di-

rection of their travel, and that they are discharged as one and conducted to the secondary mechanism with the same speed at which they were manipulated by the primary. When they reach and are seized by the secondary, they are forced to take up its speed, which is much less than the primary, and are thus caused to move more slowly as they are manipulated by that mechanism, and that consequently they occupy a considerable time relatively in moving out of the conducting-channel. During this movement of them at slow speed, the first one of the next pair of sheets is passing around the primary carrier, and when the second sheet is laid upon it at the second revolution of said carrier and passes into the channel, the first pair of sheets will have been disposed of and the channel freed for their reception.

In the rapid manipulation of large sheets of paper it has been found by experience that only such as are of a high grade or quality can be driven or pushed from one mechanism to another, and even these are liable to have their leading ends curled or buckled up, thereby clogging the apparatus. In order, therefore, to deliver such large sheets smoothly and surely from one mechanism to another, particularly such as are of a low quality of paper, without their being liable to buckle up, I have provided at a point between the carriers 20 30 sheet-forwarding rollers 26 27, which are driven at the same speed as the carrier 20 by means of the pinion 32 on the shaft of the latter, which meshes with the wheel 99. The shaft of the roller 26, which roller may be driven by surface contact with its companion, or in any other suitable manner, is hung in arms projecting from a rock-shaft, 28, which is moved by a rock-arm, 29, Figs. 1 and 2, actuated by a cam-groove, 31, formed on the inner face of the wheel 99. This roller is thus moved intermittingly into and out of contact with the roller 27, Figs. 4 and 5, and is cut away so as to span the guards 18 when in contact with the roller 27. (See Fig. 2.) The roller 26 is moved into operative contact with its companion 27, so that, when the pair of sheets emerging from the primary mechanism reaches them, they are nipped and positively driven onward by said rollers, which continue to act until the leading end of the sheet is about seized by the secondary mechanism, when the roller 26 is raised and said sheets left wholly within the control of the secondary mechanism, which carries them onward at its slow speed and manipulates them, as before described.

The primary sheet-manipulating mechanism may have the construction shown in Fig. 12, where its carrier 20 (which may or not have gripers) is illustrated to be a cylinder provided with devices adapting it to aid in collecting two sheets, so that the same are brought together and discharged in a single body. With this carrier is combined a secondary sheet-manipulating mechanism, constructed as hereinbefore described, but operated at one-half the speed of the primary by means of the toothed wheels 38 39, which connect the wheel 72 and pinion 93. This carrier 20 is nearly embraced by the series of tapes 52, which, leading from the web-cutting cylinders in like manner as before explained, pass over the roller 85, around the carrier 20, and over the roller 86, and return around the roller (see Fig. 12) placed near the carrier 30, the rollers being driven from the toothed wheel 96 by gearing in like manner as are the rollers 81 82 84. Their companion tapes 55 lead from the cutting mechanism, as do the tapes 51, and pass over the roller 85 through grooves in a nipping-roller, 87, and return over pulleys 40, located over the carrier 30. The tapes 52 55 are thus so disposed that they form the conducting-channel conveying the sheets from the carrier 20 to the carrier 30.

The nipping-roller 87 is provided to nip the sheets discharged from the carrier and insure their onward movement.

In this construction of the primary the entrance-channel is constituted by the switches 100, which are vibrated through the rod 101 from a cam, 102, on the shaft 68 of the carrier 30, and operate to direct the first incoming sheet between them and the roller 85, and into the position Fig. 12, to direct the second sheet over its surface and onward between the rollers 86 87. The said first sheet is thus guided around with the carrier 20 and directed over the roller 86 by the fixed guide 103, and with the second one laid upon it the two are guided together between the rollers 86 87. The switch may be so timed as to collect two sheets or any multiple thereof before discharging the same. In this operation the sheets are manipulated and caused to occupy one-half their former space in the direction of their travel as they leave the primary carrier in substantially the same manner as before described, and they are delivered to the secondary mechanism, which is the same structure hereinbefore described, and thus has time to manipulate them at a reduced speed, as has been set forth.

It is obvious, from the foregoing description, that the collecting mechanism of the primary may, when arranged to deliver its product to the secondary, be adjusted to collect not only two sheets, but any multiple thereof.

A folding mechanism constructed and operated as herein shown and described may obviously be connected directly with a web-printing machine, and deliver its once-folded products from folding-rollers 61 62 directly onto a piling-table, to a vibrating or other flying apparatus, or to a folding mechanism of any description.

The following, which forms part of the subject-matter of my application filed March 14, 1879, is not claimed: the combination, with a revolving sheet-carrier and means for collecting many sheets thereon, of a pasting-disk running in working relation to the periphery

of said carrier, whereby two or more sheets are collected and united by longitudinal lines of paste.

What is claimed is—

1. The combination of a primary sheet-manipulating mechanism, the rotating carrier of which is provided with means for collecting sheets together upon its surface, with a secondary sheet-manipulating mechanism provided with folding devices, the folding-blade whereof shall operate at each second revolution of the primary mechanism, the said mechanisms being separated a distance apart equal, or nearly so, to the length of a sheet, and connected by a single sheet-conducting mechanism, all substantially as described.

2. The combination, with a revolving carrier, 20, provided with means for collecting many sheets thereon and delivering them in a single body therefrom, and a revolving carrier, 30, provided with rotary folding devices and means for actuating it at or about one-half the surface-speed of the carrier 20, of a sheet-conducting mechanism connecting the two, all substantially as described.

3. The combination, with a sheet-manipulating mechanism and a mechanism conducting the sheets discharged therefrom, of intermittingly-acting forwarding-rollers, as 26 27, all substantially as described.

4. The combination, with a sheet-collecting mechanism revolving at high speed and a folding mechanism revolving at low speed, of interposed sheet-forwarding rollers running at high speed and acting intermittingly, all substantially as described.

5. The combination, with a revolving sheet-carrier and means for collecting many sheets thereon, of a pasting-disk mounted in stationary bearings and running constantly in operative relation to said carrier, whereby two or more sheets are collected, all but the last one of the collected body receive a longitudinal line of paste, and all of said collected sheets are united together, all substantially as described.

6. A folding mechanism consisting of a revolving carrier, a rotating folding-blade supported upon a shaft by said carrier, mechanism for moving said shaft toward and from the center of the carrier, and a pair of folding-rollers, all substantially as described.

7. In a folding mechanism, the combination, with a revolving carrier supporting a folding-blade which is rotated, of a stationary cam, as 21, and mechanism connecting it with the folding-blade shaft, whereby the projection of the said blade into co-operative relation with the folding-rollers is accomplished, all substantially as described.

8. The combination, with the folding-blade whose shaft is mounted in rock-arms, its pinion 3, and driving-wheel 5, of the intermediate wheel, 4, pivoted on the shaft 9, whereby, while its shaft is moved out and in to project and withdraw said folding-blade, its pinion shall remain geared with said intermediate wheel to properly rotate said blade, substantially asdescribed.

9. The combination, with a revolving carrier, of the single folding-blade 6 and shaft 1, pinion 3, arms 7 8, shaft 9, cam 21, intermediate wheel, 4, and stationary driving-wheel 5, substantially as described.

10. The combination, with a revolving carrier or cylinder supporting a folding-blade, of means for rotating said blade and projecting it from and withdrawing it toward the center of said carrier, whereby the rotations of said blade are made within the periphery of the carrier, except where it is protruded therefrom to co-operate with the folding-rollers, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

STEPHEN D. TUCKER.

Witnesses:
SAML. S. MOTLEY,
CHAS. W. CARPENTER.