9 Sheets—Sheet 1.

S. D. TUCKER.

Delivering Apparatus for Printing-Machines.

No. 196,502. **Patented Oct. 23, 1877.**

Fig. 1.

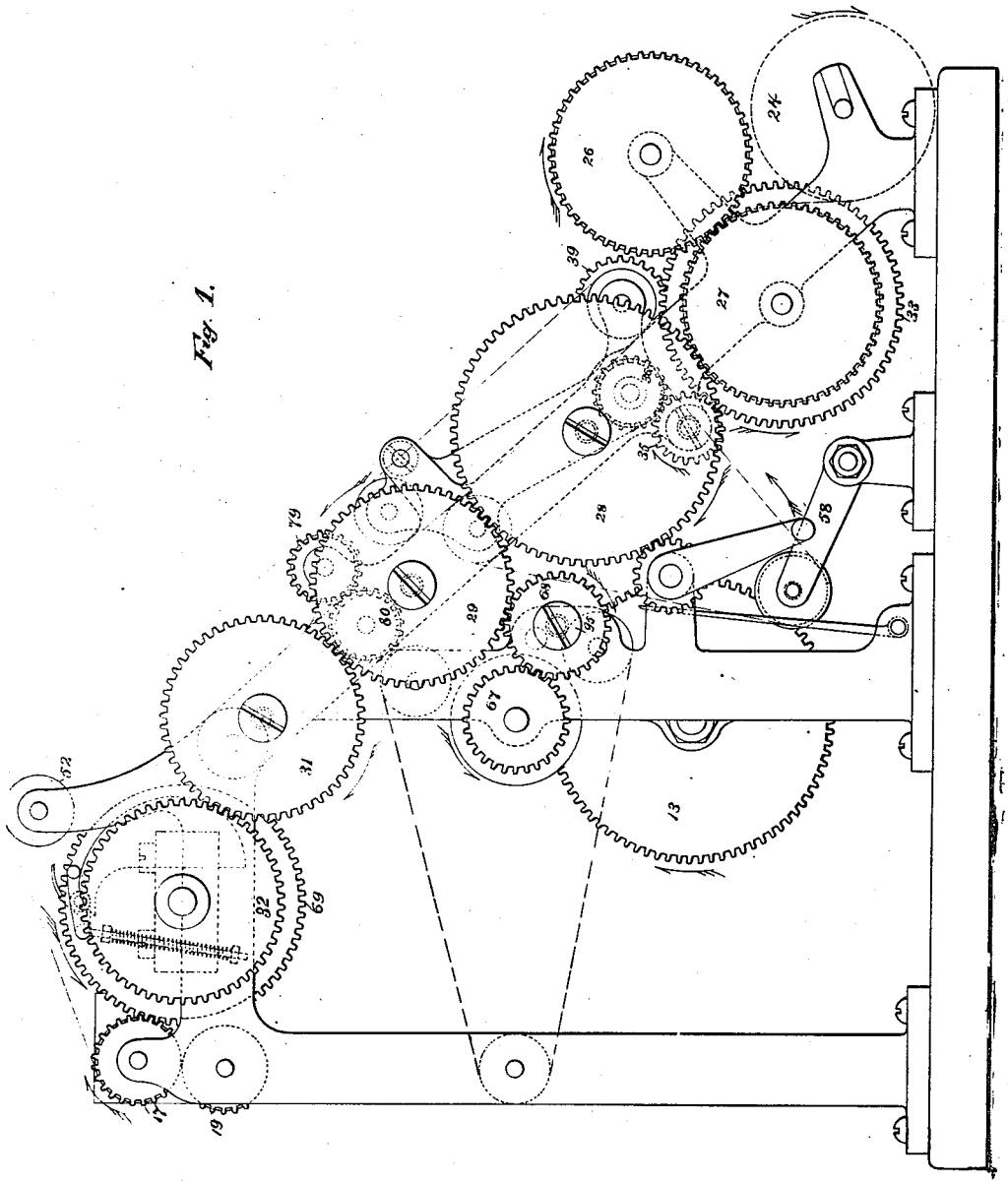

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Fig. 5.

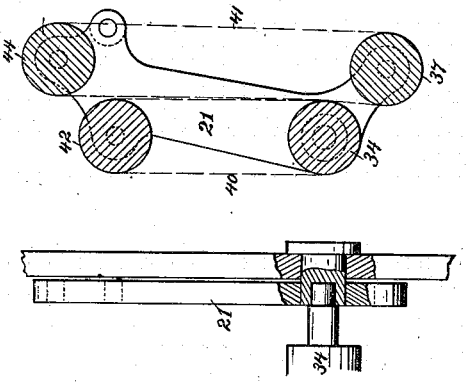
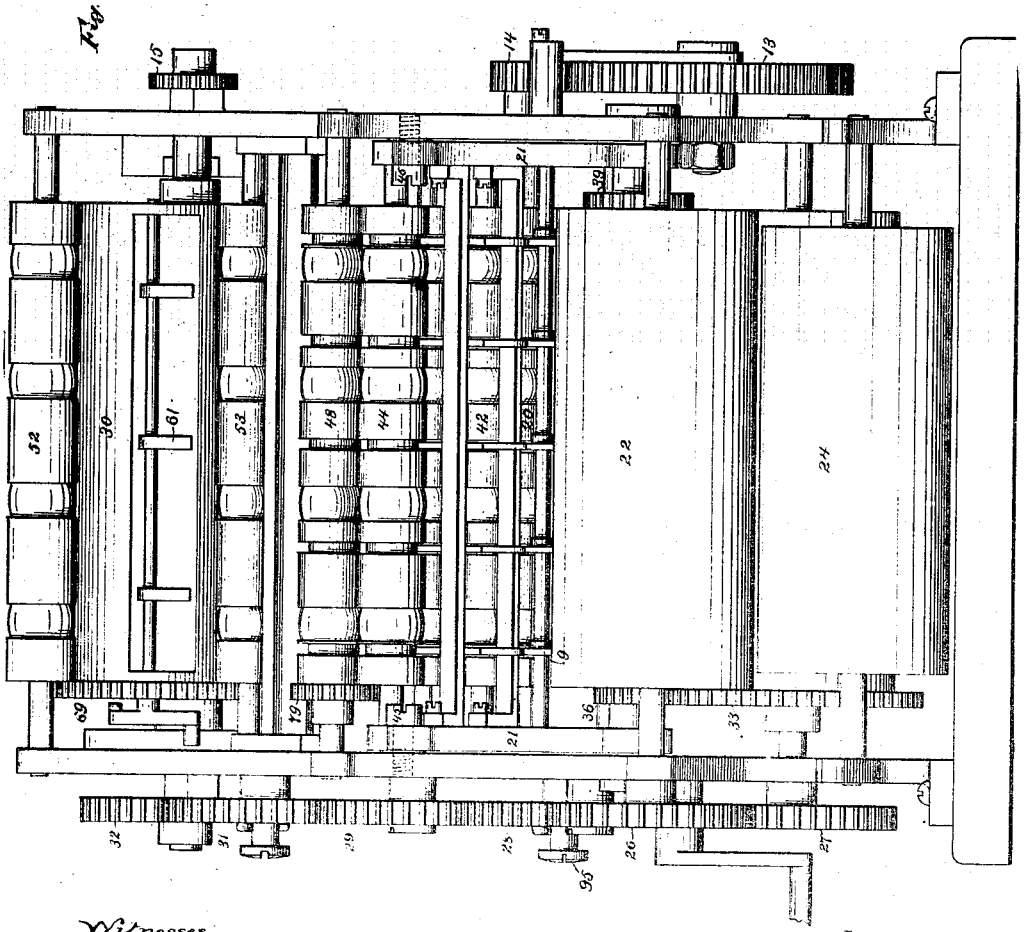


Fig. 2.



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9 Sheets—Sheet 3.

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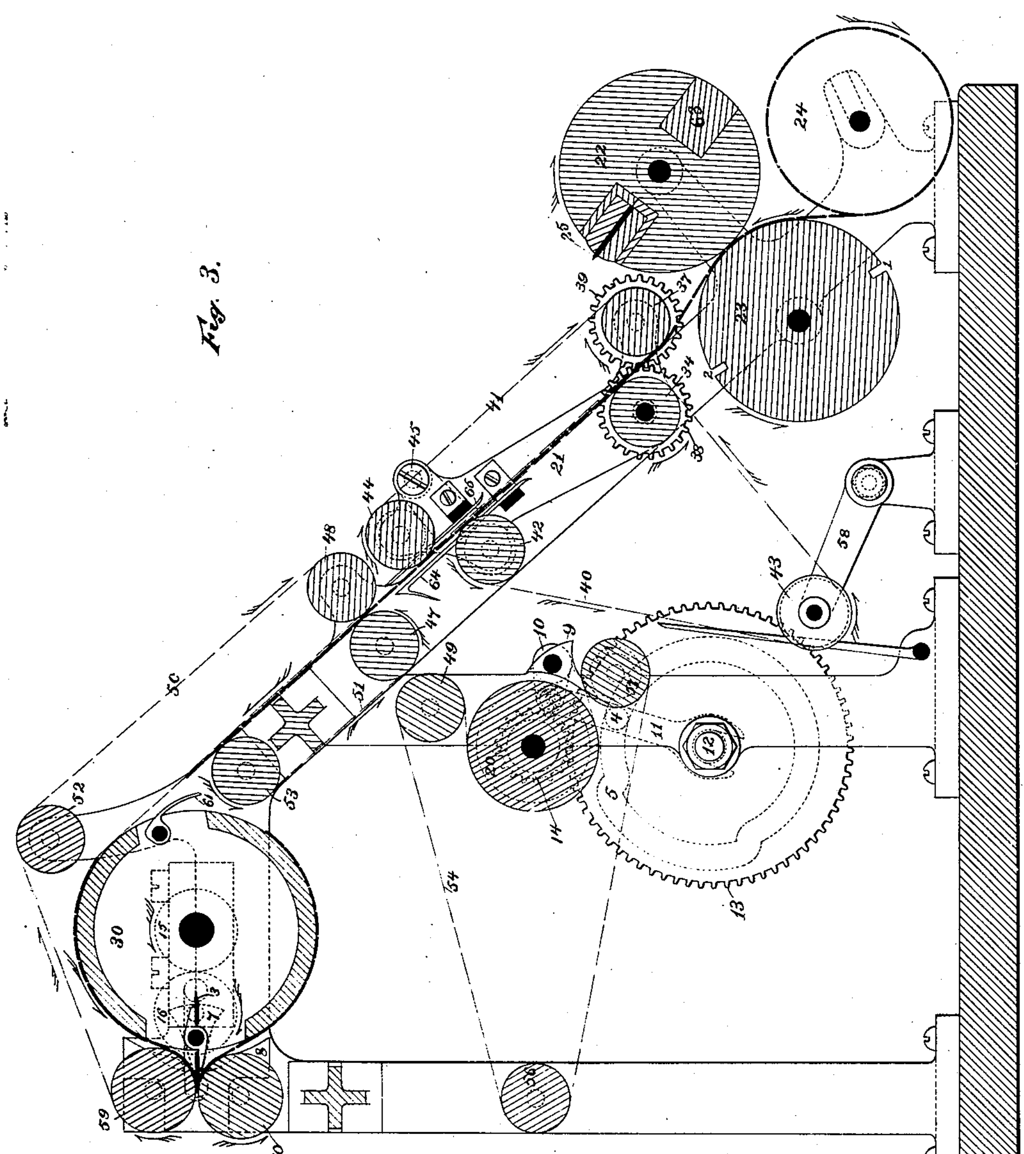
No. 196,502. **Patented Oct. 23, 1877.**



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9 Sheets—Sheet 4.

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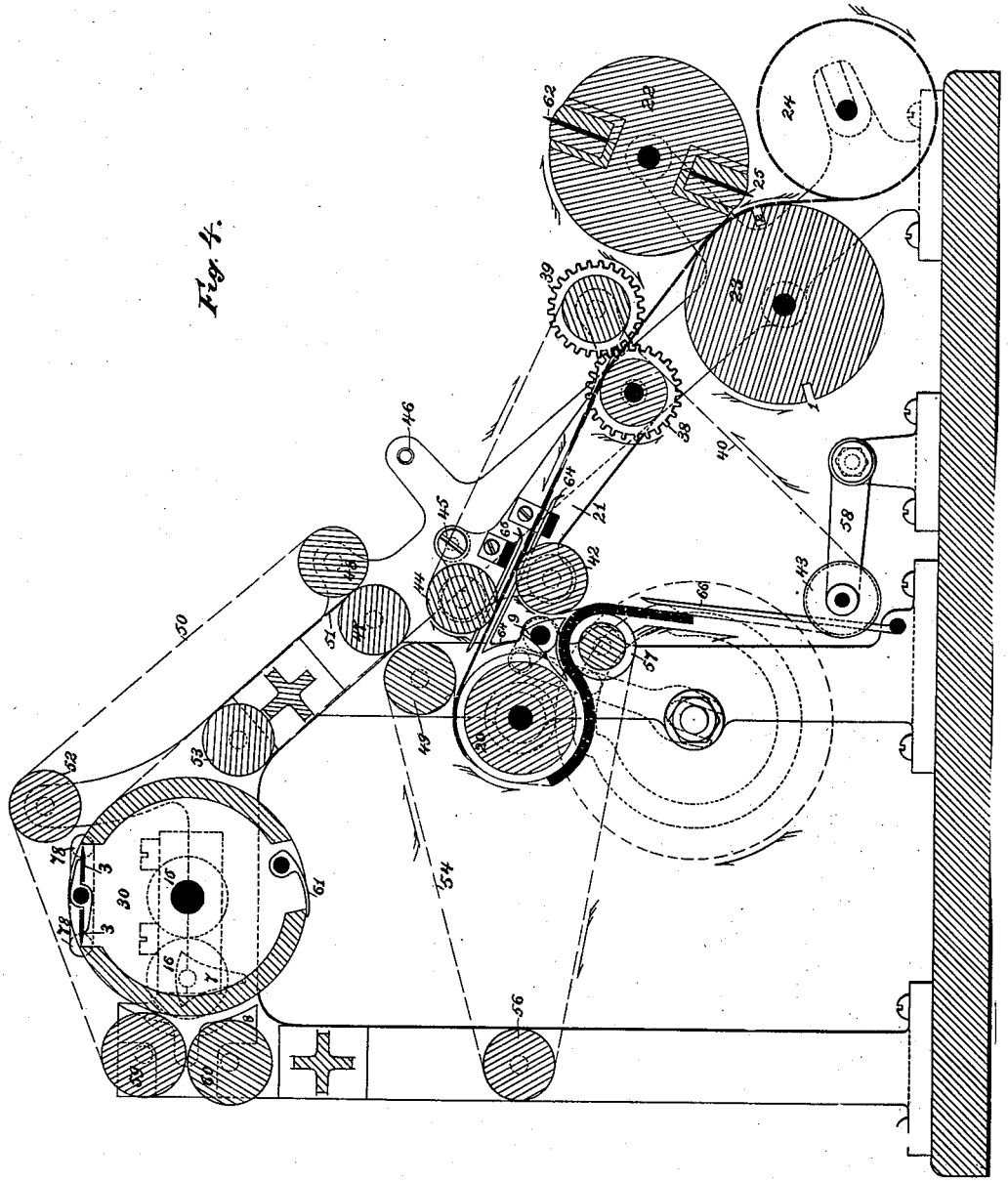
Delivering Apparatus for Printing-Machines.

No. 196,502. **Patented Oct. 23, 1877.**

Fig. 4.



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9 Sheets—Sheet 5.

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Delivering Apparatus for Printing-Machines.

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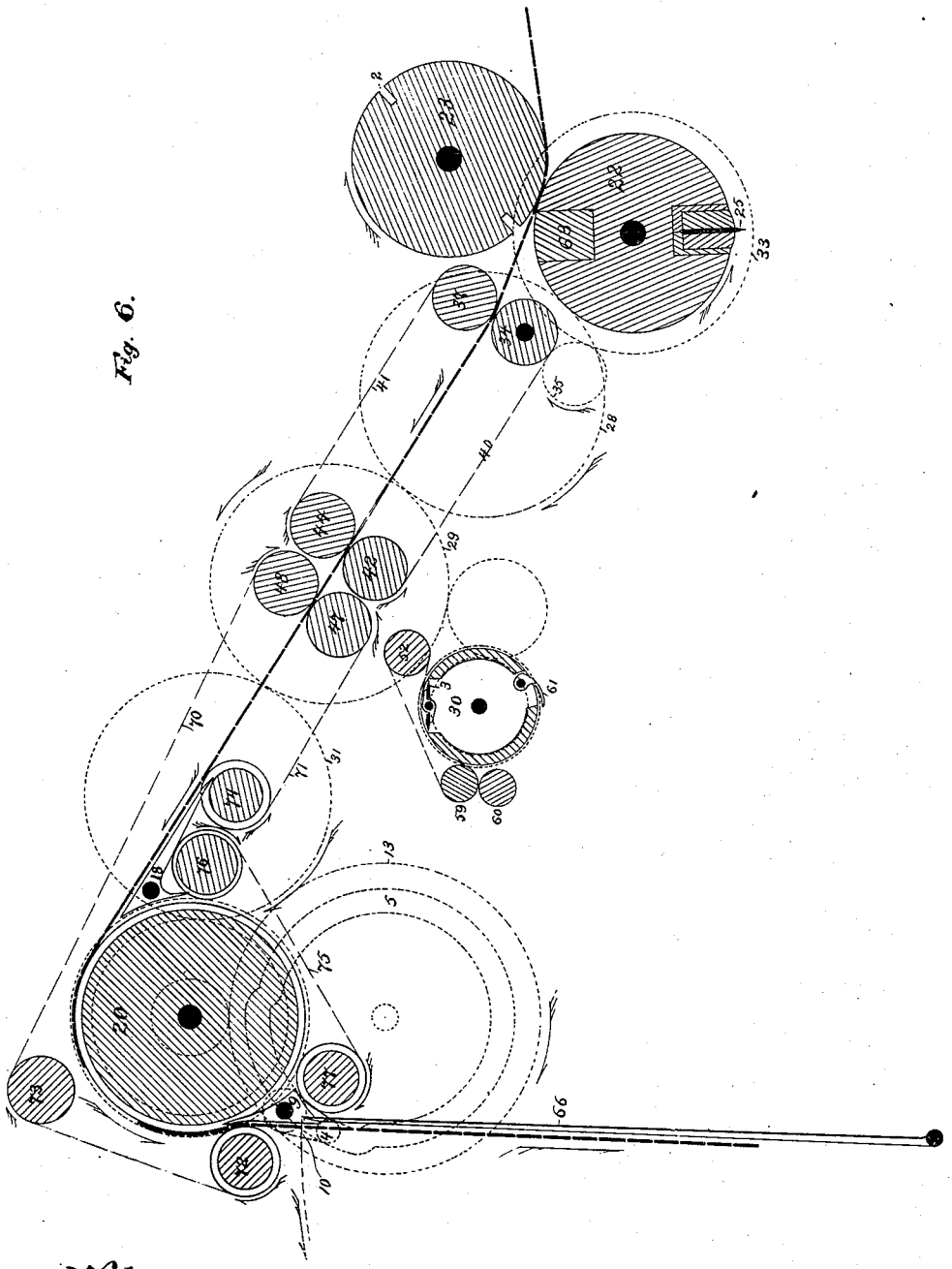
Fig. 6.



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9 Sheets—Sheet 6.

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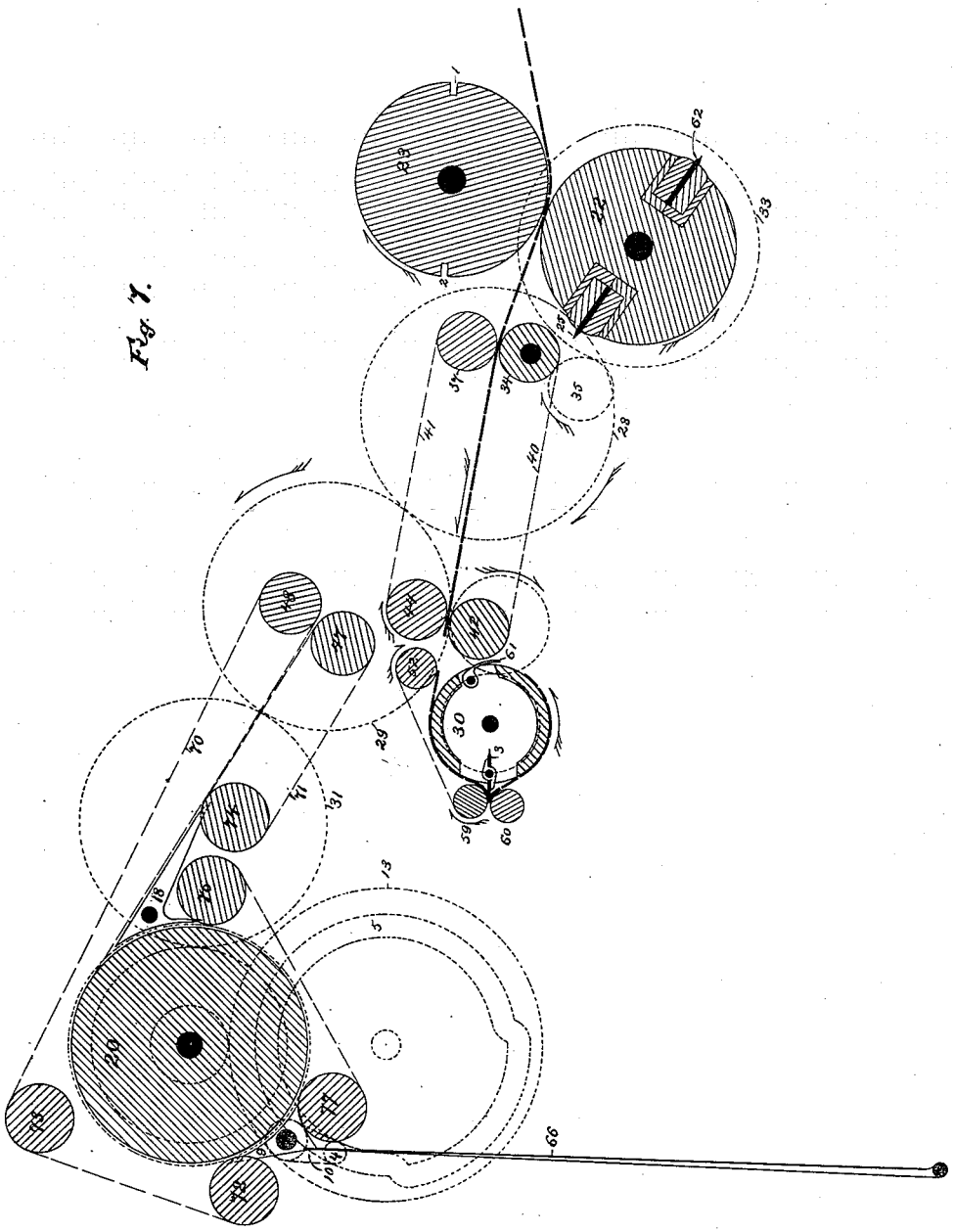
Delivering Apparatus for Printing-Machines.

No. 196,502. Patented Oct. 23, 1877.

Fig. 7.



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9 Sheets—Sheet 7.

S. D. TUCKER.

Delivering Apparatus for Printing-Machines.

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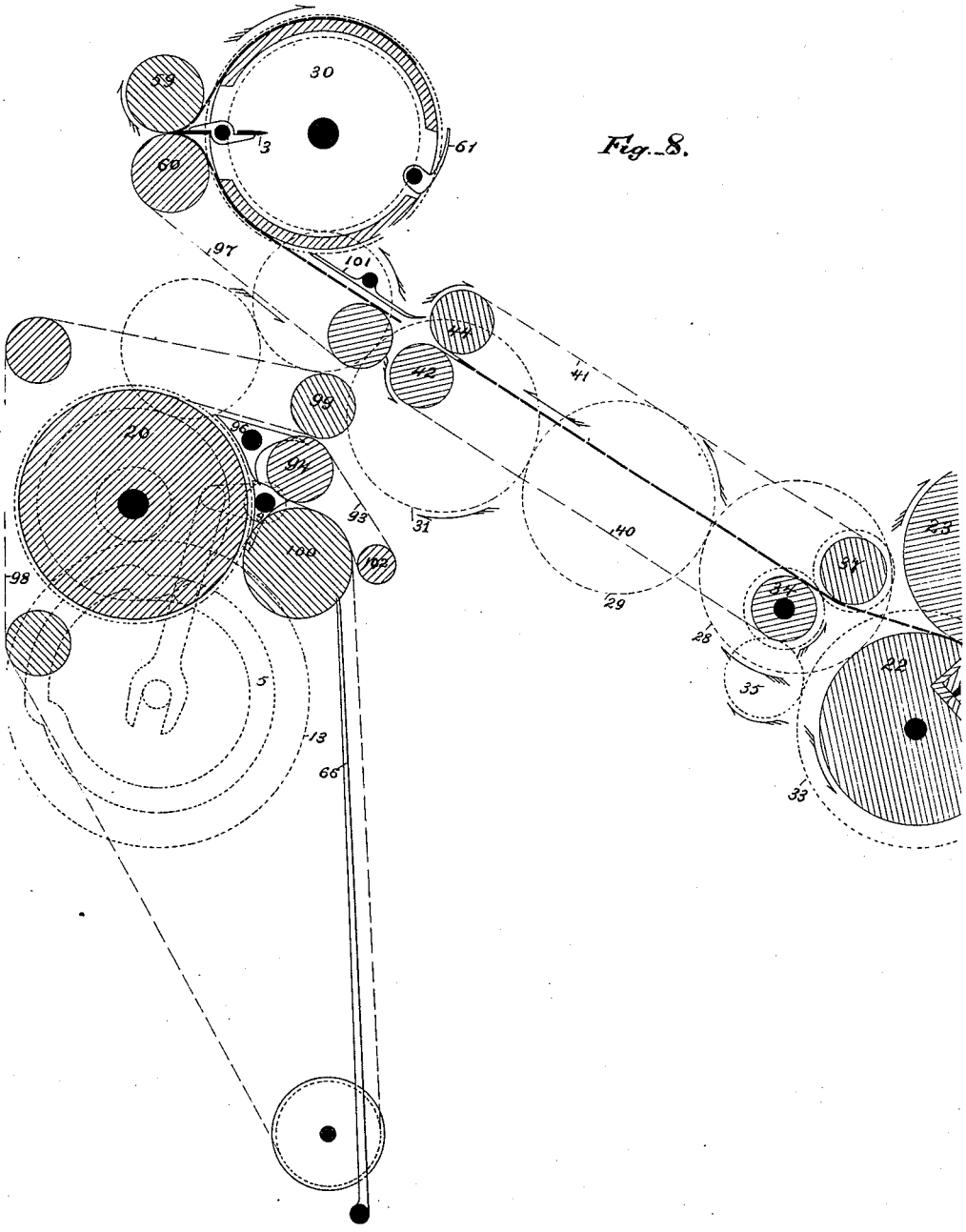

Fig. 8.

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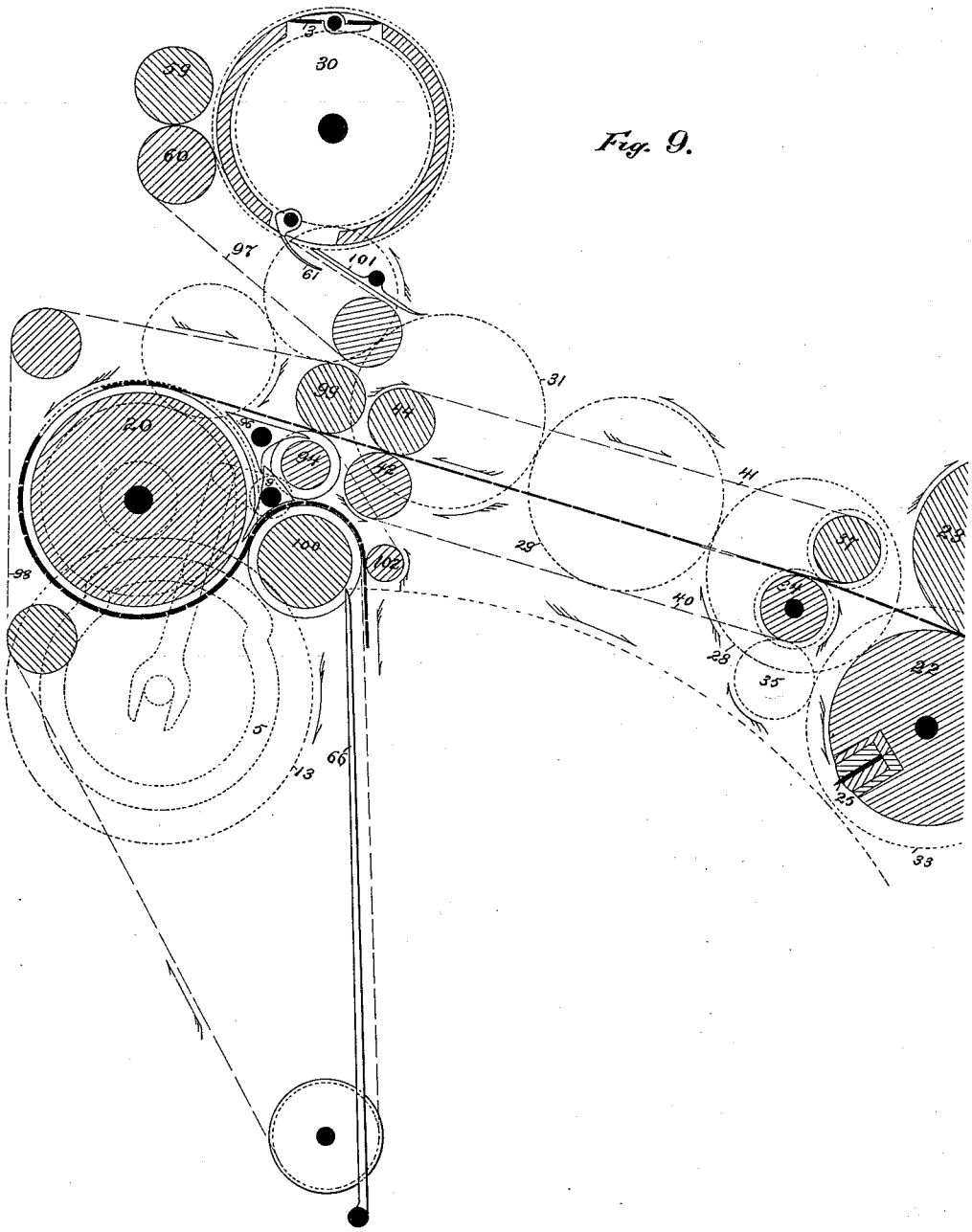

Fig. 9.

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9 Sheets—Sheet 9.

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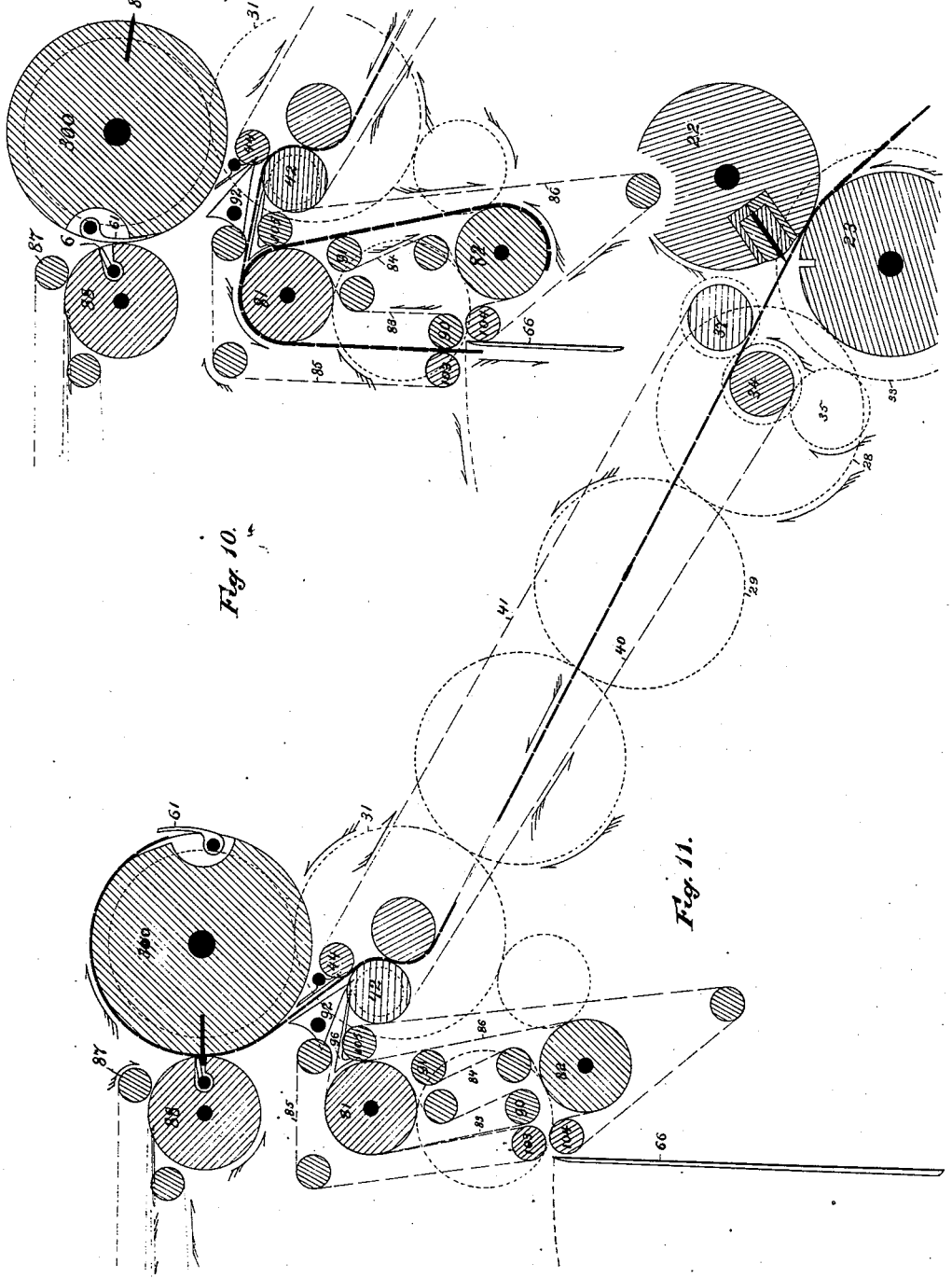

Fig. 10.

Fig. 11.

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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN DELIVERING APPARATUS FOR PRINTING-MACHINES.

Specification forming part of Letters Patent No. **196,502**, dated October 23, 1877; application filed September 15, 1877.

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, of which the following is a specification:

This invention relates to the mechanism for delivering the sheets produced by fast-printing mechanisms, and particularly such as are known as "web-perfecting," which, operating upon a web of paper, print the same upon both surfaces, and cut it into proper-sized sheets, thus producing many thousand sheets per hour.

Heretofore delivering mechanisms having a capacity equal to that of the press have been devised, and two forms of such mechanisms have met with practical success, viz: first, a revolving carrier supporting a folding-blade, which is automatically projected to double each sheet into co-operating devices, whereby successive sheets received from the printing mechanism are folded and delivered; second, a revolving carrier furnished with such accessories as give it the capacity to receive sheet after sheet, laid one upon another, until a predetermined number are thus gathered or accumulated, and then to strip said sheets in a single mass therefrom, and deliver the same upon the piling-table.

This invention consists in an apparatus which embodies both of the above-described mechanisms, or equivalents thereof, with a sheet-directing mechanism, which is capable of adjustment, so as to direct the sheets produced by the printing mechanism to either of the said delivering mechanisms, whereby the sheets may be folded or delivered flat, as may be desired.

The invention also comprehends other features, which are, however, so fully hereinafter explained as to need no preliminary description.

In the drawings, Figure 1 represents a side elevation; Fig. 2, a right-hand end elevation; Figs. 3 and 4, longitudinal sections, showing a folding mechanism adapted to the manipulation of eight-page sheets, and a gathering mechanism adapted to the manipulation of half-size or four-page sheets, the folding mechanism being shown as in operation in the former and the gathering mechanism in the latter figure; Fig. 5, a view of the directing-frame 21 detached. Figs. 6 and 7 are longitudinal sections, showing the gathering or accumulating mechanism adapted to the manipulation of eight-page sheets, and the folding mechanism adapted to the manipulation of half-size or four-page sheets, the gathering mechanism being shown as in operation in the former and the folding mechanism in the latter figure. Figs. 8 and 9 are similar views, showing a folding and a gathering mechanism, each adapted to manipulate the same sized sheets, the folding mechanism being in action in the former and the gathering mechanism in the latter figure. Figs. 10 and 11 are similar views, showing a modification of the folding and gathering mechanisms and the sheet-directing mechanism for guiding the sheets thereto.

The folding mechanism is illustrated as consisting of a rotating carrier, 30, supporting a revolving folding-blade, 3, and supplied with the necessary appurtenances for doubling or folding the sheets of paper while on the run, Figs. 1 to 9, inclusive, showing substantially the folding mechanism forming the subject-matter of the patent to S. D. Tucker, granted December 14, 1875, No. 171,196.

The mechanism for collecting or accumulating a quantity of sheets and delivering them in a single mass consists of an accumulating-carrier, 20, supplied with the necessary appurtenances to direct sheet after sheet upon its surface until a number have thus been accumulated, and then stripping and delivering the same in a single mass or body therefrom; that illustrated in Figs. 1 to 4, inclusive, being substantially the mechanism forming the subject-matter of the patent granted to Hoe and Tucker, June 26, 1877, No. 192,510.

One form of the sheet-directing mechanism consists of conducting-tapes mounted in a directing-frame, 21, which may be adjusted so as to deliver the sheets to either the folding mechanism, as in Fig. 3, or to the collecting or accumulating mechanism, as in Fig. 4.

The printing mechanism is not illustrated, for the reason that this apparatus is capable of being attached to any form of printing-machine, but preferably to such a one as operates upon a web of paper, prints the same

upon both its surfaces, and cuts it into proper-sized sheets.

In practice the printed web will be led from the printing mechanism directly between the cutting-cylinders 22 23, though, for convenience, it is herein illustrated as being led from off a roll, as 24.

The male cutting-cylinder 22 will preferably be of the same diameter and have the same surface-speed as the type and impression cylinders of the printing-machine, it being provided with a cutting-blade, 25, projecting from its periphery, so as to engage with a slot, 2, in the female cutting-cylinder 23, which latter cylinder may be of any appropriate size which will bring its said cutting-slot into proper action with the cutting-blade 25. These cutting-cylinders are geared together by the toothed wheels 26 27, so as to run in unison, the latter gearing with the toothed wheels 28, 29, 31, and 32 of a train, which drive the rotating carrier 30, and this carrier 30 has upon one end a toothed wheel, 69, which meshes with a similar wheel, 17, on the upper folding-roller 59, which wheel, gearing with a companion, 19, on the lower folding-roller 60, drives the said folding-rollers in unison. Motion from the printing-machine may be communicated to any of these gear-wheels by connecting toothed wheels; or a shaft and miter-wheels may connect one of the shafts of this apparatus with a shaft of the printing-machine.

A toothed wheel, 33, fast upon the shaft of the female cutting-cylinder 23, drives the shaft of tape-roller 34 through an idler, 35, and pinion 36, and this tape-roller 34 in turn drives its companion 37 by means of toothed wheels 38 39.

The tapes 40, which run around the roller 34, extend over similar rollers 42 43 and return to said roller 34, and the tapes 41 extend around the rollers 37 44.

The rollers 34 37 are at the rear end, and the rollers 42 44 are at the front end, of the frame 21, which frame swings upon the shaft of roller 34, (see Fig. 5,) and it is held in either of the positions shown in Figs. 3 and 4 by the screws 45, which enter holes 46 in the side frames. This directing-frame might be moved down from the positions shown in Figs. 1 and 3 to that shown in Fig. 4 by a segment-rack and pinion, or by any other approved device of similar character.

The construction of devices shown in Figs. 1 to 4, inclusive, is such as to require that the roller 42 shall be set in the rear of the roller 44; and in order that the directing-frame 21 shall properly guide the sheets which are driven through it by contact of the tapes 40 41, it is provided with sheet-directing guards 64 65, which, fastened to it, project through grooves in the rollers 42 44, and extend forward so as to form a conduit, the mouth of which may be brought into close proximity with the tape-rollers 47 48, or tape-roller 49 and accumulating-carrier 20.

The said tapes 40 41 and guards 64 65 will, in the position of Fig. 3, direct the sheets between the tape-rollers 47 48, from which extend tapes 50 51, the former of which extend from the tape-roller 48, in contact with the rotating carrier 30, around the folding-roller 59, and back over a carrying-roller, 52, to the roller 48, and the tapes 51 extend from the roller 47 over the roller 53 and back to said roller 47.

The set of tapes 50 is driven by the movements of the carrier 30, and the set 51 caused to run in unison therewith by the toothed wheels 79 80, which gear the rollers 47 48 together. These tapes guide the web to the rotating carrier 30, whose gripers 61 seize its leading edge and separate the web, if but partially severed by the cutting-cylinders, on the line of its partial severance, thus forming a sheet, which is carried past the folding-rollers 59 60 until its central portion or line of folding is in proper position before them, when the gripers release its leading edge, and the folding-blade is brought into action to double the sheet between the said folding-rollers 59 60, sheet after sheet being thus separated from the web and folded.

The movements of the carrier 30, its gripers, folding-blade, flying and stationary cams, in performing this folding-operation, are the same as in said Patent 171,196.

The folding-blade 3 is mounted upon a shaft capable of turning in the carrier 30, and is provided with actuating-arms 78, which are moved in the guideway formed by the stationary cam 8 and the flying cam 7, so as to project the folding-blade 3 between the folding-rollers 59 60, and thus double the sheet and force it into the nip of said folding-rollers.

The flying-cam 7 is mounted upon a shaft carrying a toothed wheel, 16, which meshes with a similar wheel, 15, fast upon the shaft of the carrier 30. (See Figs. 2 and 4.) This cam is thus rotated to form, in conjunction with the stationary cam 8, a guideway which shall move the folding-blade 3 out of the carrier, between the folding-rollers, and back into the said carrier once during each revolution of the carrier.

It is to be remarked that, notwithstanding the fact that this particular rotary folding mechanism is illustrated, any folding mechanism, and more particularly a rotating folding mechanism, may be substituted for one shown, as will hereinafter appear.

Thus arranged, the mechanisms will operate to receive the partially-severed web from a printing-press, separate it into sheets, and direct the same to the folding mechanism, by which they will be successively folded and delivered out of the folding-rollers 59 60, from whence they may, if desired, be directed to other folding mechanisms.

When the mechanisms are arranged in the positions shown in Fig. 4, the sheets emerging from between the tapes 40 41 and guards 64 65 will be directed to the accumulating-car-

rier 20, around which they will be directed by means of the tapes 54, which are stretched in contact with said cylinder, pass up over the tape-roller 49, around roller 56, and return to the carrier over the roller 57. Sheet after sheet will be caused to pass onto and around with the accumulating-carrier 20, each successive sheet overlying and resting upon the preceding one or ones, assisted by a switch, 9, whose front edge is curved to coincide with the accumulating-carrier 20, aided by the end of the guard 64, which is curved in like manner.

When a number of sheets (four in the present instance) have been thus collected or accumulated upon the carrier 20, the said switch 9 is moved into the position shown in Fig. 4, so that its lower end or toe, standing in front of the leading ends of the sheets, will enter grooves cut into the surface of the carrier 20, and thus intercept the accumulated sheets, and by its curved rear face, which coincides with the periphery of the tape-roller 57, guide the mass off over the said roller, and, by the aid of tapes 40, down before the fly-frame 66, which, vibrated by means common in printing-machines, will deliver the same upon the piling-table.

The said accumulating-carrier 20 derives its motion through a toothed wheel, 67, upon its shaft, and an idler, 68, from the toothed wheel 29, and the tapes 54 are moved by surface-contact with said carrier.

The switch 9 is vibrated at proper intervals by means of a crank-arm, 10, and connecting-rod 11, which rod, guided by its bifurcated portion, which embraces the shaft 12, carries a stud, 4, running in the cam-groove 5 of the toothed wheel 13, which is driven by a pinion, 14, on one end of the shaft of carrier 20.

The toothed wheel 13 has four teeth to every one of the pinion 14, and therefore makes one revolution to every four of the carrier 20, and thereby vibrates the said switch at proper intervals of time to cause the accumulation of four sheets and the delivery of the same in a single mass. This proportion may be varied according to the number of sheets desired to be accumulated and delivered. This gathering or accumulating apparatus is substantially like that illustrated in the patent to Hoe and Tucker, before referred to; but it is to be understood that any other construction of mechanism which operates to receive sheet after sheet, and collect or gather and deliver the same in a single mass therefrom, may be substituted for this part of my apparatus, as will hereinafter appear.

The tapes 40 might extend from the rollers 34 42 only, as in Fig. 5, and supplemental tapes, independently driven, be stretched down before the fly-frame 66, and deliver the sheets received from the accumulating-carrier. As illustrated, these tapes 40 are made to serve as conductors between the rollers 34 42, and also to direct the sheets from the accumulating-carrier, and as said tapes so arranged must have movements corresponding with those of the directing-frame 21, their roller 43 is hung in swinging arms 58, which may be held stationary in either of the positions shown in Figs. 3 and 4 by ordinary tightening screws or nuts.

The embodiment of this invention thus far described shows a folding apparatus adapted to the manipulation of large-sized sheets, as eight-page sheets, while the gathering or accumulating apparatus is of a size corresponding to that of half the above size, as four-page sheets.

It is obvious that when the two apparatuses are so proportioned the cutting-cylinder must be arranged to sever the web into either eight-page or four-page sheets, according as the directing-frame is adjusted to deliver the same to the folding or gathering apparatus.

When the said frame is delivering the sheets to the gathering or accumulating apparatus, and it is adapted to manipulate four-page sheets, a second cutting-blade, 62, is introduced into a socket in the male cutting-cylinder, which will then sever the web into half-sized sheets.

When the cutting-blade 62 is removed from the cylinder 22 its socket is filled by a block, as 63.

The cutting-blades 25 62 may be constructed, held in place, and removed as is illustrated in the patent to S. D. Tucker, August 8, 1876, No. 180,966; or they may be secured by screws passing through the cylinder, and tapped into them in like manner as the block 63 is held in the position shown in Fig. 3, to complete the surface of the cylinder when but one cutting-blade is used. Furthermore, either of said blades may be rendered inactive, as in the Patent 191,494, before referred to.

It is to be observed that the rotating carrier 30 is of a greater diameter than the cutting-cylinders, and that in consequence, when the web is nipped between the tapes 50 and its surface, it will be caused to advance with great rapidity, or be accelerated beyond the speed of travel which it would have in passing between the cutting-cylinders, and as the web is only partially severed by the cutting apparatus, each sheet will, by this construction, be torn or separated from the web, and likewise that, as the accumulating-carrier 20 is so geared as to run at greater surface-speed than the cutting-cylinders, the web delivered by the tapes 40 41 to the said carrier 20 will, when seized between the surface and the tapes 54, be accelerated in like manner, so as to advance it with rapidity, and thus tear each sheet from the web, and at the same time cause the successive sheets to be accumulated upon the said carrier with a space between their heads and tails, into which the toes of the switch 9 enter.

It is furthermore obvious that the cutting-blades might entirely sever the web into sheets, in which case the increased size or speed of

the carriers 30 20 will, as before, advance the sheets, so as to separate them a distance apart.

When the machine is adjusted so that the sheets are conveyed to the folding apparatus, it may be desirable that the gathering or accumulating apparatus should not operate. This may be accomplished by elongating the axis 95 of the idler 68, as in Fig. 2, so that the same may be thrown out of gear; and when the gathering or accumulating apparatus is in operation, and it is desired to cause the stoppage of the folding apparatus, the toothed wheel 31 may, in like manner, be thrown out of gear.

It is obvious that the accumulating-carrier 20 and its accessories may be arranged for the manipulation of large-size or eight-page sheets, and the rotating carrier 30 and its accessories be arranged for the manipulation of the half-size or four-page sheets. This is illustrated in Figs. 6 and 7, the former showing the cutting-cylinders 22 23 with one cutting-blade, 25, adjusted in place, by which the web will be severed, or partially severed, into large-size or eight-page sheets, which are delivered by the carrying-tapes 40 41, which are held in a directing-frame, as 21, to the tapes 70 71, which guide them to the accumulating-carrier 20. In this arrangement the tapes 70 will extend from the roller 48, in contact with the surface of the accumulating-carrier 20, around a roller, 72, and return to said roller 48 over a carrying-roller, 73. The tapes 71 will extend from the roller 47 to a roller, 74, and as this apparatus is arranged to deliver sheets at the front side, a third set of tapes, 75, are stretched from rollers 76 77, and in contact with one side of the accumulating-carrier 20, thus acting to hold the sheets upon the carrier at that portion of its surface which lies between the point of delivery and the point of reception of the sheets. Conductors 18 are also provided to aid in guiding the sheets onto the carrier from the point where the tapes 71 pass onto the roller 74, and to hold the sheet or sheets onto the carrier from the point where the tapes 75 pass onto the roller 76.

The accumulating-carrier 20 is driven, and its tapes and switch 9 and the fly 66 are operated, in substantially the same manner as that shown in Figs. 1 to 4, inclusive, as will be readily understood.

Fig. 7 illustrates this same arrangement of apparatus, with the tapes 40 41 adjusted so as to deliver the product of the printing-machine to the folding apparatus, which, in this instance, is shown to be of a size adapted to the manipulation of half-size or four-page sheets, the cutting-cylinder 22 having the auxiliary cutting-blade 62 adjusted in place so that, in conjunction with the cutting-blade 25 and the slots 1 and 2 in the female cutting-cylinder 23, it will properly divide the web.

The folding mechanism is actuated and its mode of operation is substantially the same as that hereinbefore described.

It is obvious that the folding and gathering or accumulating apparatuses may be adapted to the manipulation of sheets of the same size, and this is shown in Figs. 8 and 9. In that case the male cutting-cylinder, if of the proper size, will be provided with but one cutting-blade, and the partially-severed web or severed sheets will be conducted by the carrying-tapes 40 41 to either the folding or gathering apparatus, as may be desired, according to the position in which the directing-frame carrying the tapes 40 41 is adjusted. In Fig. 8 it is shown as delivering sheets to the folding apparatus, and in Fig. 9 to the gathering or accumulating apparatus. In these illustrations motion is communicated to the carriers 20 30, and they and their appurtenances are operated in substantially the same manner as that described with reference to Figs. 1 to 4, inclusive.

In Fig. 8 the sheets are shown as being led onto the carrier 30 from its under side, a set of tapes, 97, and a conductor, 101, receiving them from the tapes 40 41, and the gathering or accumulating apparatus is shown as delivering its sheets from the inner side. These sheets are directed onto and off from the carrier 20 by tapes 98 93. The former, extending from a roller, 99, pass around the carrier 20, over a receiving-cylinder, 100, thence down before the fly-frame, and return to the roller 99.

The second set of tapes, 93, extend from a roller, 94, to a roller, 102, and run in contact with the upper surface of the receiving-cylinder 100. A conductor, 96, placed between the roller 94 and the carrier 20, aids the passage of the sheets onto and around the accumulating-carrier.

When the switch 9 is in the position shown in Fig. 8, the sheets pass onto and around the carrier 20; and when the switch is in the position shown in Fig. 9, the accumulated sheets will be directed over the receiving-cylinder 100, and down before the fly-frame 66.

It has been said that this invention is not confined to the special construction of either of the delivering apparatuses herein illustrated, but that other forms of folding mechanisms might be adopted, and other constructions of accumulating or gathering apparatus used.

One modification of each of these apparatuses is shown in Figs. 10 and 11, where the folding apparatus is illustrated as composed of two rotating carriers, 300 88—one, 300, of which carries gripers 61 and a creasing-blade, 89, and the other oscillating nipping-fingers 6.

The sheets received by the gripers 61, and thereby directed between these carriers 300 88, will be released at the proper time, and their central portions doubled by the creasing-blade 89 into a recess in the carrier 88, as in Fig. 11, where the doubled edge will be seized by the movement of the oscillating nipping-fingers 6, and the sheet thus held is carried by its doubled edge between the said carrier 88 and a roller, 87, by which it will be folded flat. It may thence be delivered by tapes, as shown, and be further folded, if desired.

The carrier 88 may be geared to a toothed wheel on the shaft of carrier 300, so as to move in unison therewith, and its nipping-fingers 6 may be opened and closed by a cam-motion imparted to their shaft.

The accumulating-carrier is illustrated as formed by tapes stretched over two cylinders, 81 82. One set, 83, of these tapes is stretched over the cylinder 81, and extended by a carrying-roller, 90, to a point adjacent to the cylinder 82, and a similar set of tapes, 84, is, in like manner, stretched over the cylinder 82, and extended over a carrying-roller, 91, toward the cylinder 81. A third set of tapes, 85, extends from the entrance-point of the accumulating-carrier over a suitable carrying-roller, passes in contact with a portion of cylinder 81, and is stretched nearly parallel with the tapes 83 to the delivering-point of the said accumulating-carrier, where it is supported by a roller, 103. Another set of tapes, 86, is stretched around a roller, 105, at the entrance of the said carrier, passes in contact with the lower surface of the cylinder 82, and is led around a roller, 104, at the delivery-point of said carrier, and returns to the said roller 105.

The rollers 103 90, supporting the tapes 83 85, are hung in a swinging frame, by which they are rocked into the position shown in Fig. 11, to cause sheets received by the cylinder 81 to be guided onto the cylinder 82, and thus be carried around the two cylinders and wrapped in an endless course about this accumulating-carrier. These tapes will at the proper time, when the predetermined number are accumulated, be swung into the position shown in Fig. 10, whereby the sheets accumulated upon the carrier, as just described, will be directed down before the fly-frame 66, and delivered out of the machine, as before described.

The frame supporting the rollers 103 90 may be reciprocated by a cam or similar motion taken from any of the shafts of the machine, and the tapes 83 84 85 86 may be driven by the cylinders 81 82, or derive positive motion communicated by gearing to one or more of their rollers.

The gathering or accumulating apparatus might also be constructed on the same principle as that shown in the Patent No. 131,217, granted to Hoe and Tucker, September 10, 1872.

Another form of the sheet-directing mechanism is also herein shown, it being a simple switch, 92, acting in conjunction with the rollers 42 44, which are now made stationary, and direct the sheets emerging from between said rollers in either direction, according as it is desired that they shall be conducted to the folding or gathering mechanism. This switch may be operated by a simple hand-lever projecting from one side of the machine, which may be locked to hold the switch in either of the positions described.

Although the sheets are shown as passing in contact with the rotating carriers 30 300, it is obvious that they might pass between them and their co-operating devices as folding-rollers 59 60 in the one case and the carrier 88 in the other, the carriers 30 300 thus acting to support and carry the folding or creasing blade only; and it is further apparent that the folding apparatus need not be of the rotating order, but that any suitable folding mechanism adapted to rapid operation might be used; also, that the printing mechanism may be of any construction which will deliver its product to the tapes 40 41, to be by them conveyed into this delivery apparatus.

In Figs. 6 to 11, inclusive, the gear-wheels necessary to impart motion to the several devices are shown in dotted lines, and they, together with other parts, corresponding with like parts, (shown in Figs. 1 to 4, inclusive,) are correspondingly lettered, in order that the operation of each modification may be readily understood.

What have been herein described as tape-rollers may obviously be pulleys arranged upon a common shaft.

In Figs. 6 and 7 the accumulating-carrier 20 is shown as larger and the rotating carrier 30 as smaller than the cutting-cylinders. Thus each has a greater surface-speed than the said cutting-cylinders, for the reason that the one, though running turn for turn with the said cutting-cylinders, is of the greater diameter, and the other is geared to run at double their speed. The web, if only partially severed, is thus torn into sheets, which are separated a distance apart; or, if the cutting-cylinders entirely sever the web, the produced sheets are advanced so as to be separated one from the other.

In Figs. 8 and 9 the carriers 20 30, though running turn for turn with the cutting-cylinders, are of a greater diameter, whereby the same effect is produced.

In Figs. 10 and 11 the carrier 300 and the accumulating-carrier formed by the cylinders 81 82 and their carrying-tapes, while adapted for the manipulation of the same-sized sheets, have a greater circumferential extent than the cutting-cylinders, and thereby advance the sheets, so as to separate them one from another.

The following is not claimed herein: printing, cutting, web or sheet controlling, and rotary folding mechanisms, in any combination with each other; and the particular construction of folding apparatus illustrated in Figs. 10 and 11; also, the tapes 50 51, arranged to lead directly onto the carrier 30 or 20.

What, therefore, is claimed is—

1. The combination of a sheet-folding mechanism and a sheet collecting or accumulating mechanism with a movable sheet-directing mechanism, whereby sheets may be directed to the one or to the other to be folded or flown flat, all substantially as described.

2. The combination, with a printing mechanism, of independent sheet folding and col-

lecting or accumulating mechanisms and a sheet-directing mechanism, all substantially as described.

3. The combination, with independent sheet folding and collecting or accumulating mechanisms, one adapted to the manipulation of one size of sheets, and the other to the manipulation of another size of sheets, and a sheet-directing mechanism, of cutting-cylinders provided with removable or non-operative cutters, whereby a web may be severed into proper-sized sheets and folded or accumulated for delivery, substantially as described.

4. The independent folding and gathering or accumulating mechanisms combined with the cutting-cylinders, so that the distance each of said mechanisms is separated from the cutting-cylinders shall correspond to the length of the sheets that are to be folded or collected, whereby the web shall be properly separated to form said sheets, all substantially as described.

5. The combination of the guard 64, the movable frame 21, the rollers 47 48, having tapes leading to the carrier 30, with the accumulating-carrier 20, substantially as described.

6. The combination of the adjustable tapes 40, the rollers 47 48, having tapes leading to the carrier 30, with the accumulating-carrier 20, 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:
H. T. MUNSON,
N. S. MUNSON.