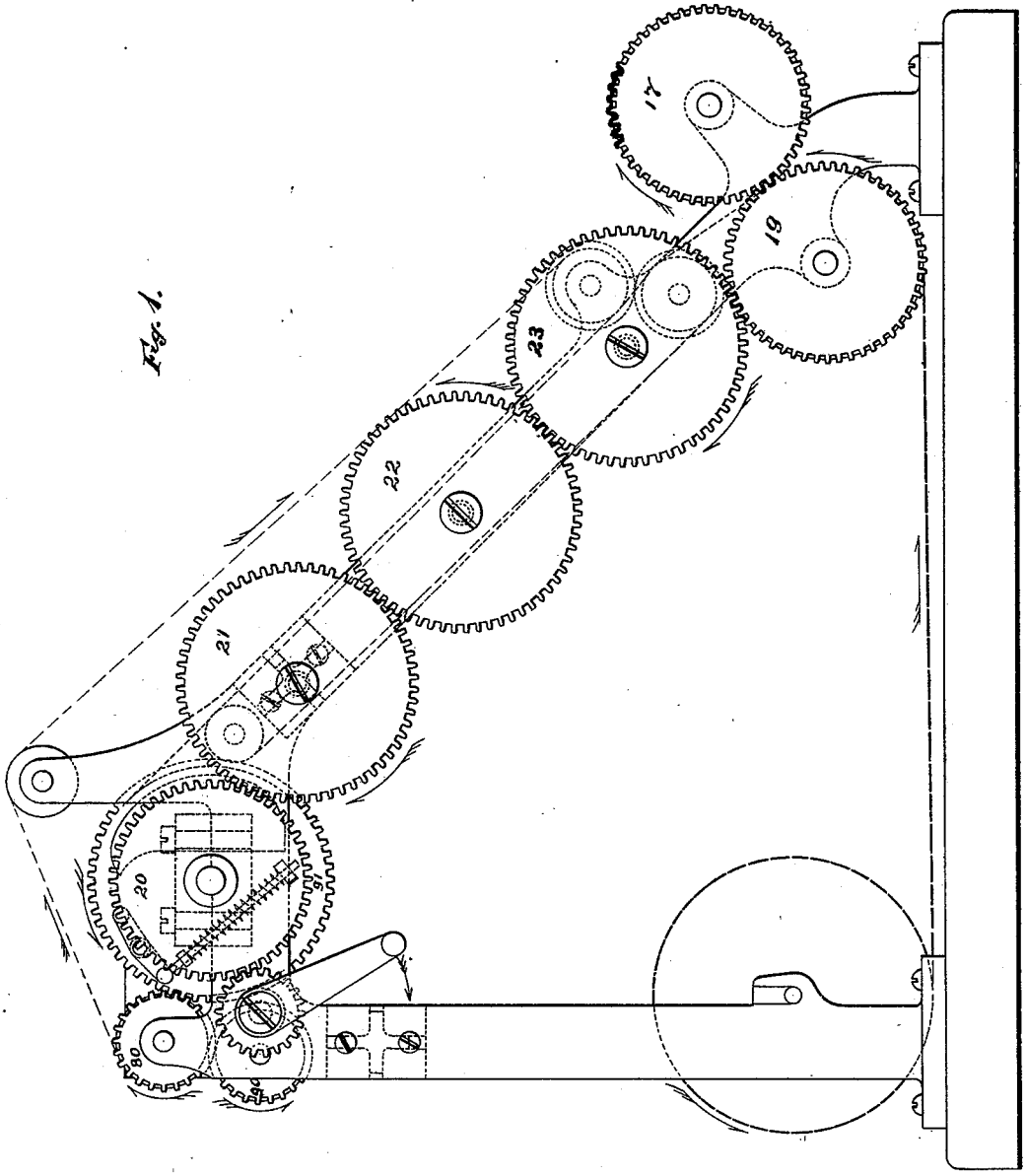
5 Sheets—Sheet 1.

S. D. TUCKER.

Sheet-Delivering Apparatus for Printing-Presses.

No. 213,793. **Patented April 1, 1879.**

Fig. 1.



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5 Sheets—Sheet 2.

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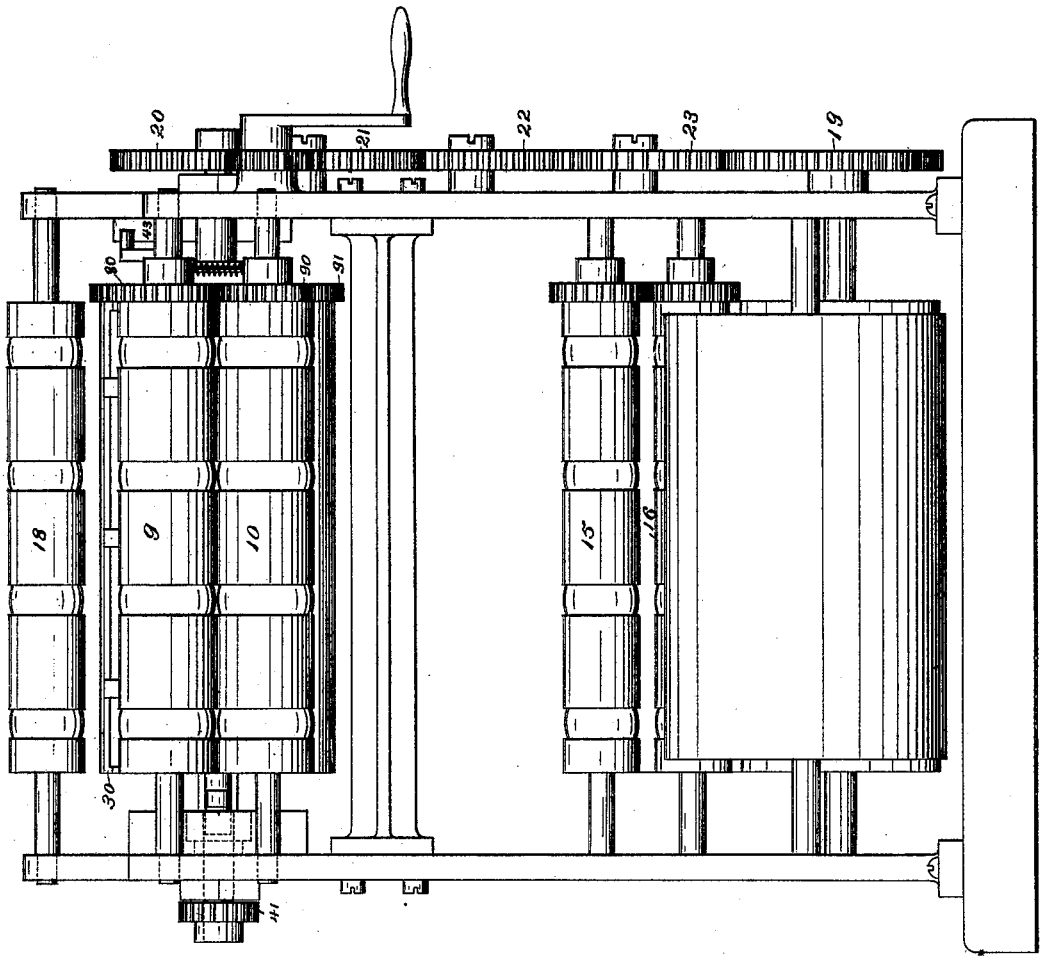

Fig. 2.

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5 Sheets—Sheet 3.

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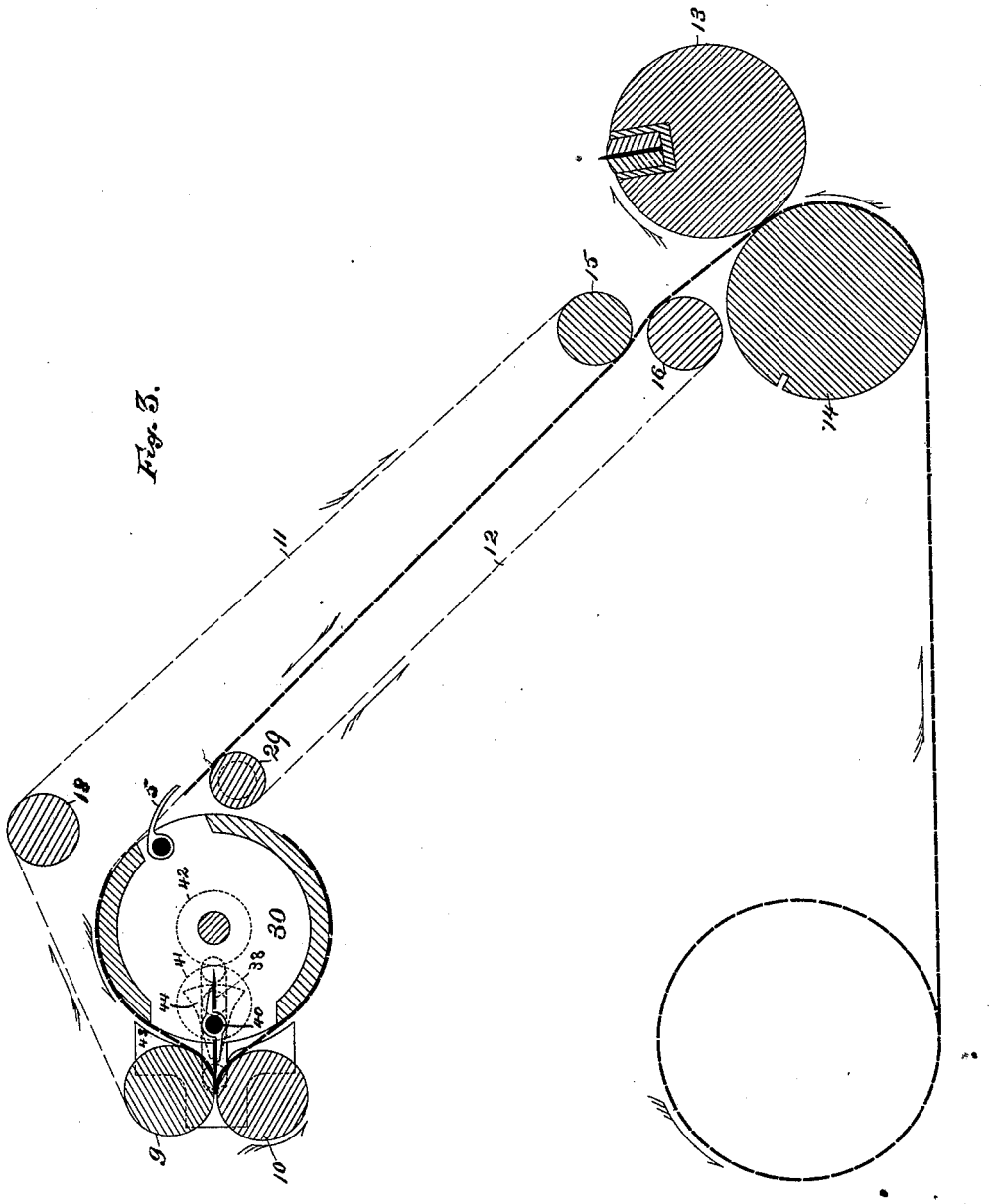
No. 213,793. **Patented April 1, 1879.**

Fig. 3.



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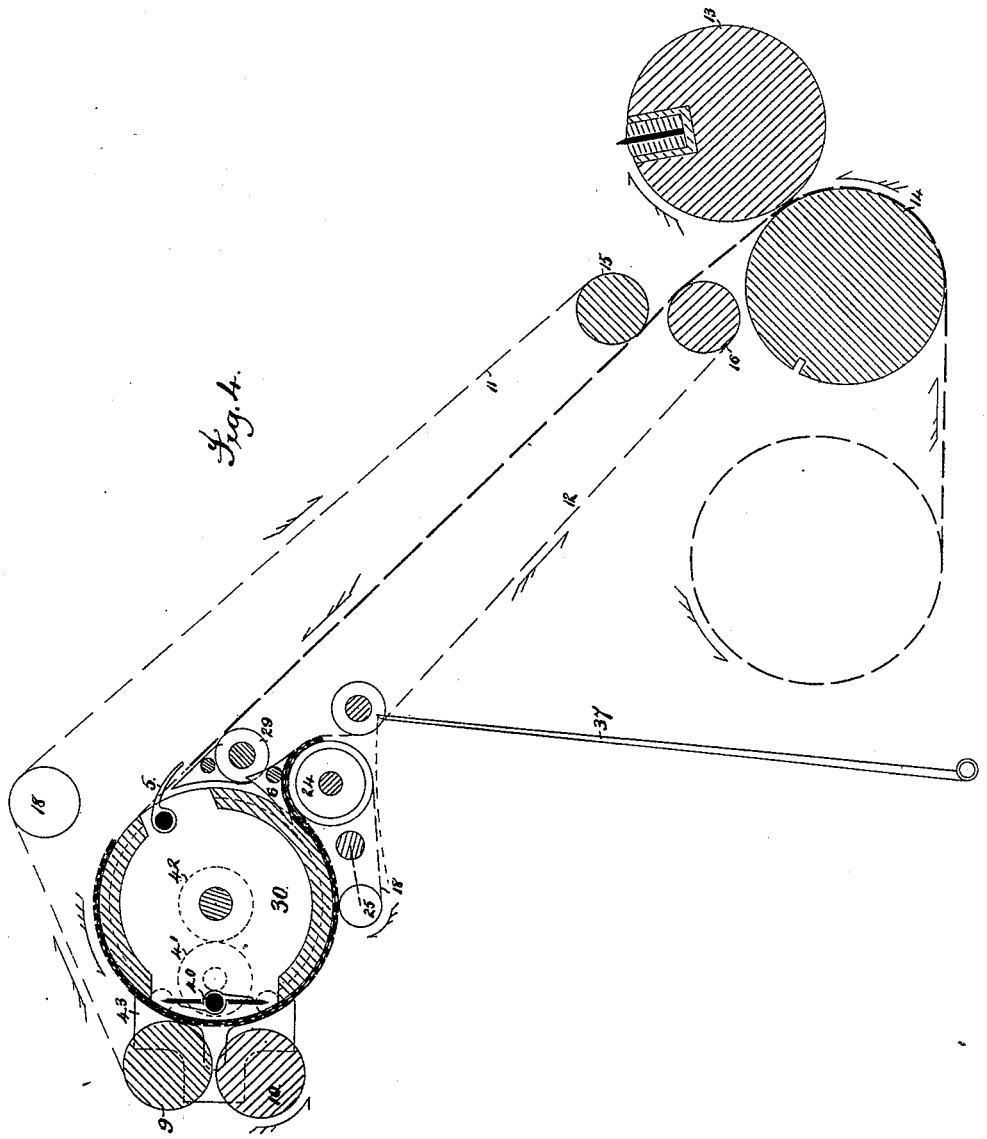
5 Sheets—Sheet 4.

S. D. TUCKER.

Sheet-Delivering Apparatus for Printing-Presses.

No. 213,793. **Patented April 1, 1879.**

Fig. 4.



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5 Sheets—Sheet 5.

S. D. TUCKER.

Sheet-Delivering Apparatus for Printing-Presses.

No. 213,793. Patented April 1, 1879.

Fig. 4.

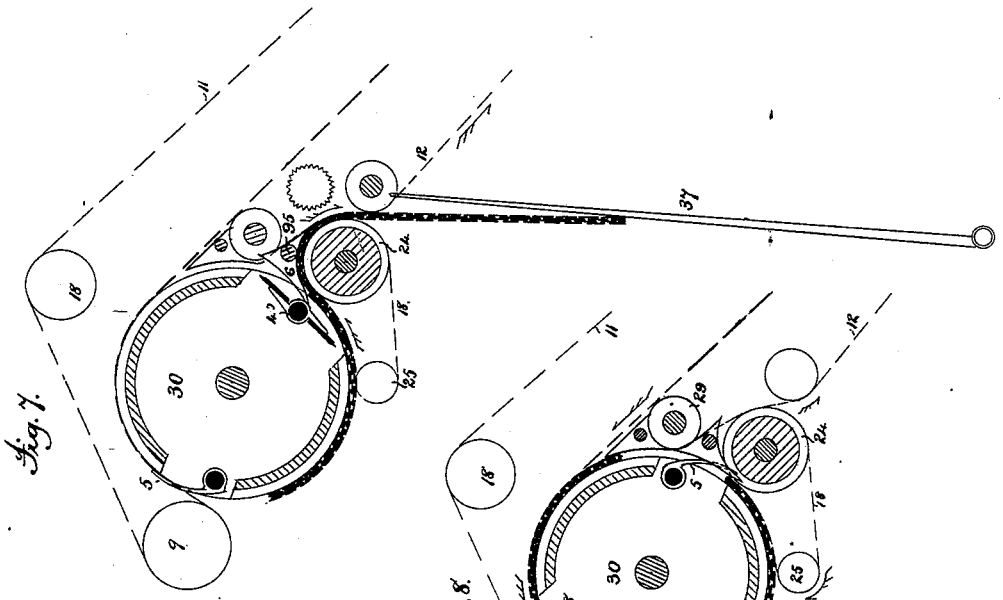


Fig. 8.

Fig. 5.

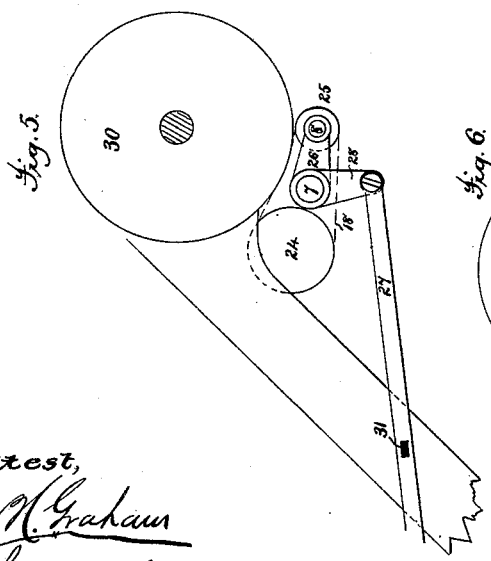
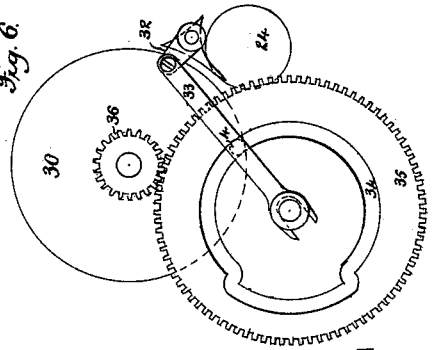


Fig. 6.



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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN SHEET-DELIVERING APPARATUS FOR PRINTING-PRESSES.

Specification forming part of Letters Patent No. **213,793**, dated April 1, 1879; application filed June 21, 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 Sheet-Delivery Mechanism, of which the following is a specification:

Apparatus for delivering sheets from printing-machines have been constructed in which the sheets are conducted by carrying-tapes from the printing or cutting cylinders to and directed upon a delivering-cylinder, from which they are delivered out of the machine.

In such apparatus, however, the tapes which carry the sheet from the printing or cutting cylinders to the delivering-cylinder have one set (usually the upper) partially surrounding the said delivering-cylinder, said tapes being carried into, or nearly into, contact with the surface of said delivering-cylinder by deflecting-rollers, which carry the tapes into close proximity to the surface of the delivering-cylinder, such arrangement necessitating a sharp or abrupt turn in the path formed by the tapes in which the sheets travel.

In this arrangement of devices the heads of the sheets approach the surface of the delivering-cylinder at nearly right angles, and are thereby rendered liable to abut against the cylinder and be doubled or gathered and jam or clog at the point of their entrance upon the surface of the delivering-cylinder.

The present invention consists in arranging the carrying-tapes so as to convey the sheets directly onto the surface of the delivering-cylinder without the intervention of any deflecting or guiding rollers, whereby the sheets are caused to travel at a tangent to the circumference of the delivering-cylinder, which provides for them a path of travel which, having no abrupt turns, guides the sheets smoothly, and avoids any tendency to crumple, jam, or clog.

An apparatus embodying my invention is illustrated in the accompanying drawings, which represent, in—

Figure 1, a side elevation; Fig. 2, an end elevation, and in Fig. 3 a sectional elevation. Figs. 4 to 8 illustrate my improvement applied to a gathering-cylinder.

The apparatus illustrated in Figs. 1 to 3 is especially designed to deliver successive sheets of paper in a once-folded condition, the delivering-cylinder 30 being provided with a folding-blade of the rotative order, which co-operates with folding-rollers 9 10, as is fully described in Letters Patent No. 171,196, granted to me December 14, 1875.

It may, however, embody a delivering-cylinder furnished with means for gathering or accumulating many sheets in succession thereon, and then stripping the same in a single mass therefrom, as is done in the well-known Hoe perfecting-press, all of which is particularly described in Letters Patent No. 191,494, granted to me May 29, 1877, and is herein illustrated in Figs. 4 to 8, inclusive; or the delivering-cylinder may be a carrier which directs sheets alternately from or successively at two or more points of its circumference, as is described in Letters Patent Nos. 197,694 and 197,700, granted to me November 27, 1877.

The printing mechanism may be of any type which is capable of delivering printed sheets into the carrying-tapes 11 12; but it is preferable to combine this mechanism with a perfecting-press which prints upon a web and cuts the same into suitable sheets.

The cutting-cylinders 13 14 of such a press are alone herein illustrated, it being understood that the paper web, printed on both sides, after leaving the last type and impression cylinder, passes between the said cutting-cylinders, which sever it into sheets and deliver the same in succession to the tape-rollers 15 16. The upper set, 11, of carrying-tapes run from the roller 15 directly onto the delivering-cylinder 30, pass around one of the folding-rollers 9, and return over leading-rollers 18 to the roller 15. The lower set, 12, of these carrying-tapes run from the roller 16 over a roller, 29, set in close proximity to the surface of the delivering-cylinder 30, and return to the roller 16.

The cutting-cylinders are geared together by toothed wheels 17 19, so as to run in unison, and will be driven from the press by a toothed wheel upon one of the last type or impression cylinders.

The delivering-cylinder 30 is considerably larger than the cutting-cylinders, and, being geared thereto by a train of toothed wheels, 20 21 22 23, is caused to run turn for turn therewith, but at a greater surface speed, thus advancing each sheet produced by the cutting-cylinders, as it is nipped between the tapes 11 and the surface of the cylinder 30, with an accelerated speed, which separates sheet from sheet, and causes a space to be formed between the head and tail of each sheet. This accelerated speed of the cylinder may, of course, be utilized to tear sheet from sheet when the cutting-cylinders only perforate the line of severance.

The leading end of each sheet is guided directly onto the surface of the cylinder by means of the tapes 11 12, which run parallel with each other from the rollers 15 16 to the pulleys 29, and thus form a tangential pathway, guiding the sheets smoothly and evenly onto said cylinder.

In the apparatus shown in Figs. 1 to 3, inclusive, each successive sheet guided onto the cylinder 30 passes between its surface and the tapes 11, and is carried onward by the contact of the two until the center of the sheet is before the folding-rollers 9 10, when the folding-blade 38 (which is mounted on a shaft, 40, and automatically rotated by means of a stationary cam, 43, and a flying-cam, 44, revolved by means of pinions 41 42) comes into action, and doubles the sheet into the nip of the rollers 9 10, as in Fig. 3, which rollers, being geared together by wheels 80 90, and driven by wheel 91 on the cylinder 30, (see Fig. 1,) feed it out of the machine. The leading end of the sheet may be seized by gripers 5, which close upon it at or near the point of its reception upon the cylinder 30, and release it just a little before the folding-blade acts upon it. But these gripers need not be used, since the sheet will be carried onward by the cylinder and tapes, so that its leading end will droop down off the former until the sheet is doubled into the nip of the folding-rollers.

The motions and operation of the folding-blade and its actuating devices are not herein set forth, since they are fully described in the Patents Nos. 171,196, dated December 14, 1875, and 191,494, dated May 29, 1877, hereinbefore referred to.

The construction and operation of the gripers 5 is also omitted, as they are specifically described in the last-named patent.

When it is desired that the delivering-cylinder 30 shall perform the function of gathering or accumulating many sheets upon its surface and deliver the same in a single pack or body, said cylinder is furnished with the mechanisms shown in Figs. 4 to 8, inclusive, which mechanisms and their arrangement are particularly described in the aforesaid Patent No. 191,494, but will be briefly explained herein.

A third set of endless tapes, 18, are stretched around a receiving-cylinder, 24, and a roller, 25, which latter is supported upon a shaft, 8, hung in arms 26, fast upon shaft 7. This shaft 7 is connected, by an arm, 28, with a rod, 27, by which the roller 25 and the tapes 18 may be held up against the delivering-cylinder 30, as in Figs. 4, 5, 7, 8, by means of a key passing through a hole, 31, in the rod, and entering one in the side frame, or be rocked down from that position when the folding operation is to be effected.

There is a series of switches, 6, hung upon a shaft, 95, between the delivering-cylinder 30 and the receiving-cylinder 24, which shaft is rocked by means of an arm, 32, and connecting-rod 33, the latter being provided with a pin, 4, entering the cam-groove 34, cut in the face of the wheel 35, which latter is revolved by a pinion, 36, fast on the shaft of the delivering-cylinder 30.

These mechanisms being adjusted as shown, and the folding-blade 38 thrown out of action by removing its flying-cam 44, or otherwise, as described in said Patent No. 191,494, the first sheet carried onto the cylinder 30 will pass around the same to the point of its entrance thereon, where it will receive a second sheet upon it, as in Fig. 8, and this operation will be repeated until a suitable quantity has been collected, according as the pinion 36 is proportioned to the wheel 35, when the cam 34, having rocked the switches 6 into the grooves in the cylinder 30, the mass of sheets will be directed down before the fly-frame 37, as in Fig. 7, which, vibrated, will lay them in a flat pile.

The gripers 5 may be omitted, as heretofore described, and the third set of tapes be arranged as is shown and explained in the aforesaid Patent No. 191,494, or as in the Patent No. 193,056, July 10, 1877.

In some cases where the paper is poor and limp, or the machine runs at a low rate of speed, it is desirable to place guards parallel with the tapes 11 between the pulleys 29 and the cylinder 30, as in Fig. 4, and, as has been hereinbefore explained, so that the leading end of the sheet may not droop down or follow the peripheries of the pulleys 29. But by making the pulleys 29 of small dimensions the guards may be omitted, (see Fig. 3,) as the space between them and the cylinder 30 will be so short that ordinary paper will be carried onto the cylinder 30 without impediment or danger of buckling or clogging.

Having now fully described the invention, what is claimed is—

1. The combination, with cutting-cylinders and with a delivering-cylinder, of two sets of accelerated tapes, one set terminating at pulleys in close proximity to said cylinder, and the other set passing onto the surface of said cylinder, the two sets of tapes thus disposed

acting to convey sheets directly upon said delivering-cylinder, all substantially as described.

2. The combination of the gathering-cylinder 30 with the tapes 11 12, operating to deliver the printed sheets directly onto the gathering-cylinder, substantially as specified.

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,

GEO. H. GRAHAM.