

(No Model.)

4 Sheets—Sheet 1.

J. H. STONEMETZ.
PRINTING PRESS.

No. 472,318.

Patented Apr. 5, 1892.

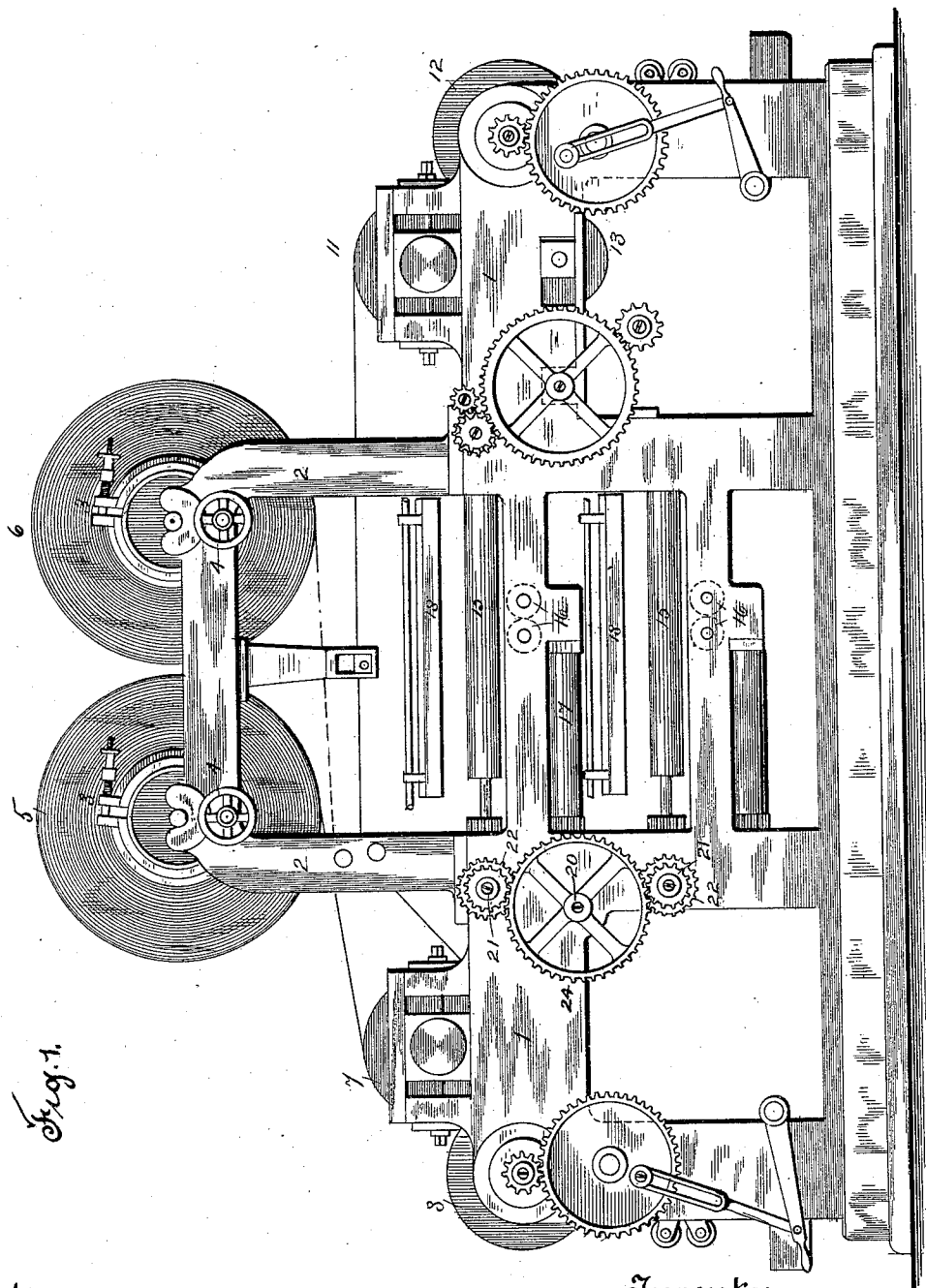


Fig. 1.

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(No Model.)

4 Sheets—Sheet 2.

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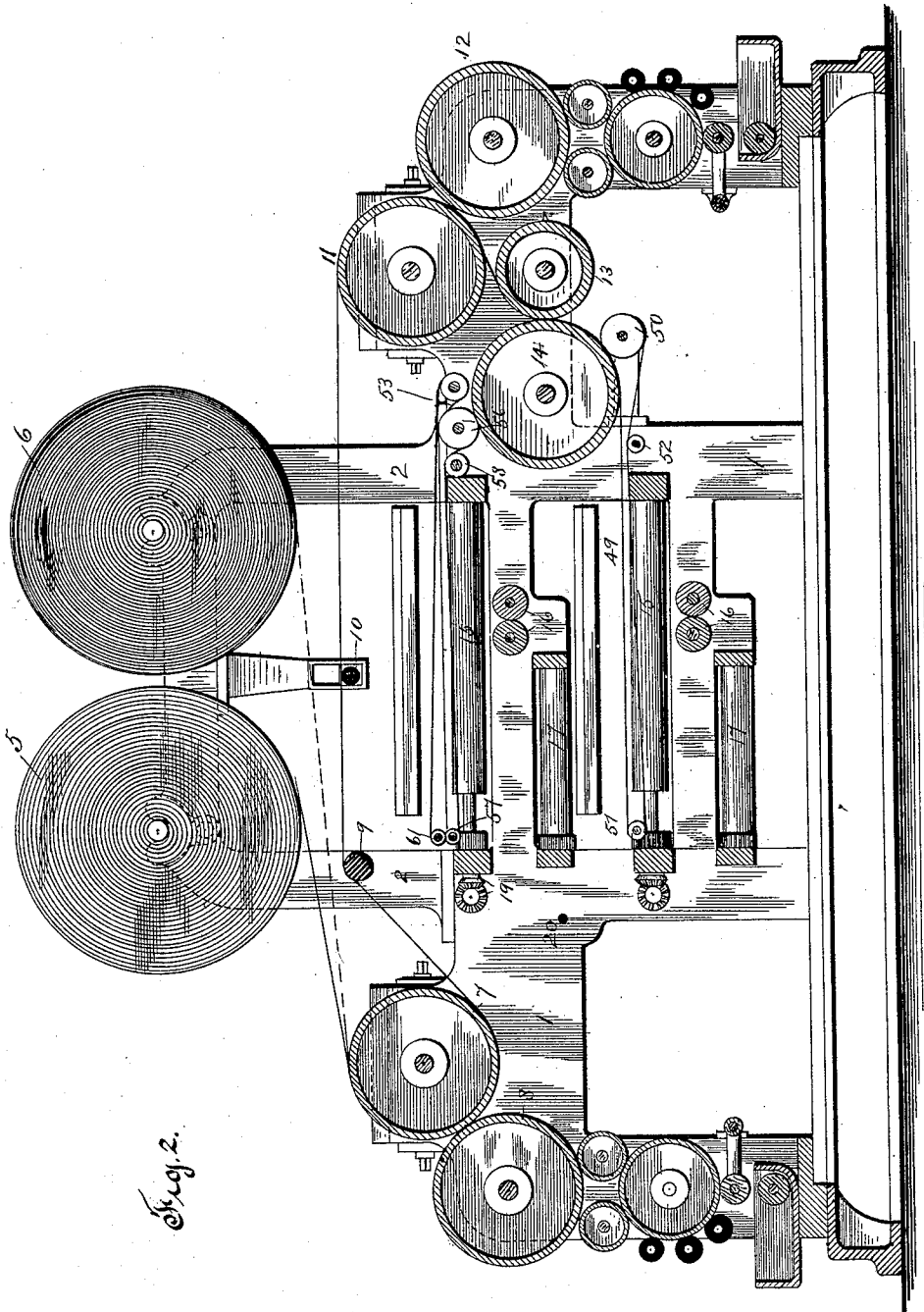


Fig. 2.

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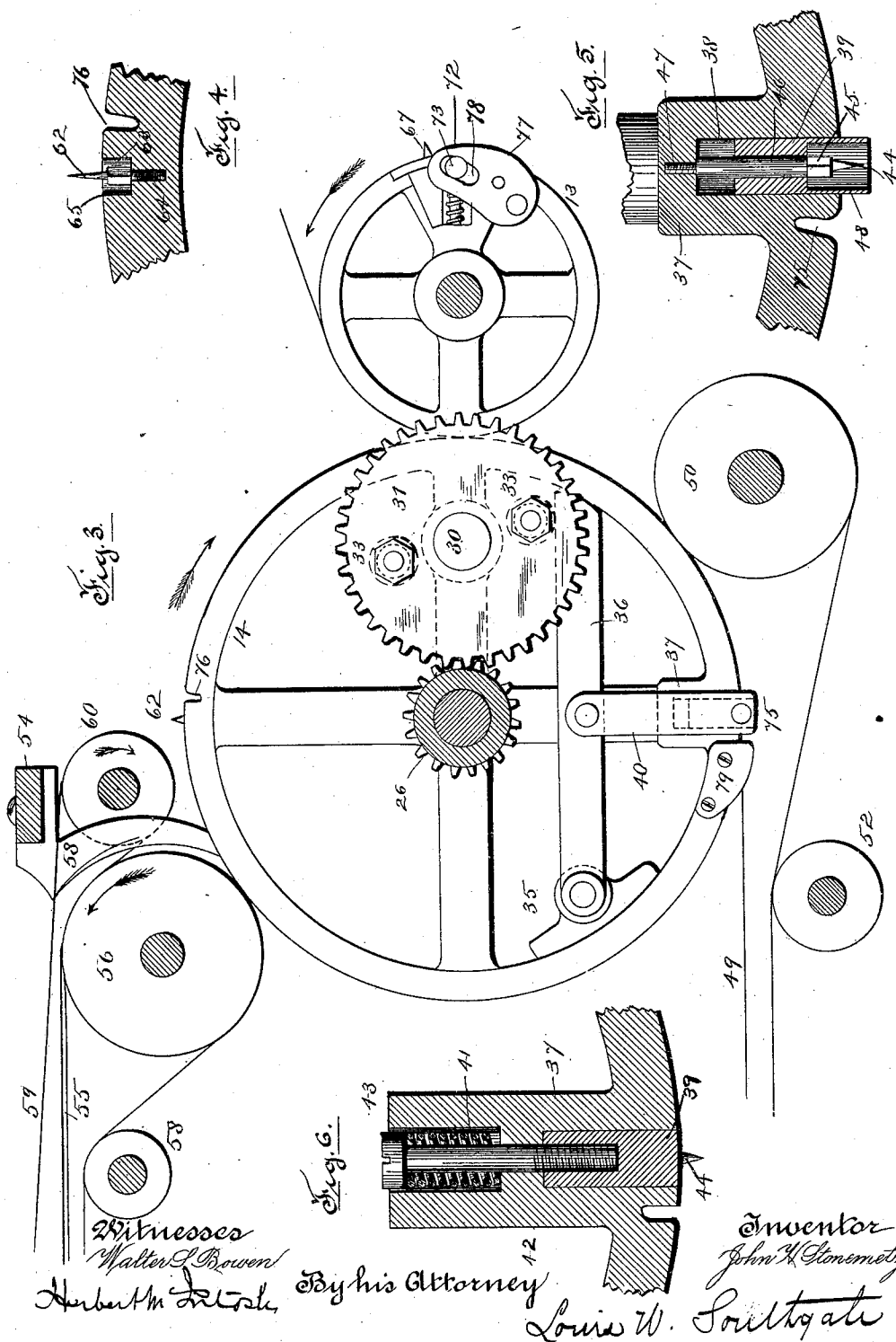
(No Model.)

4 Sheets—Sheet 3.

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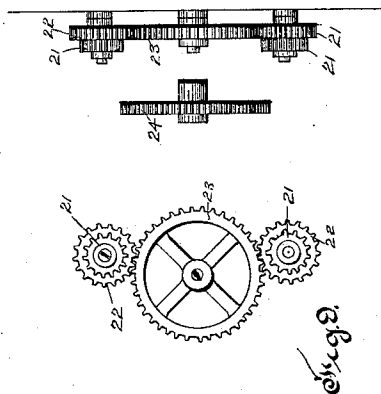
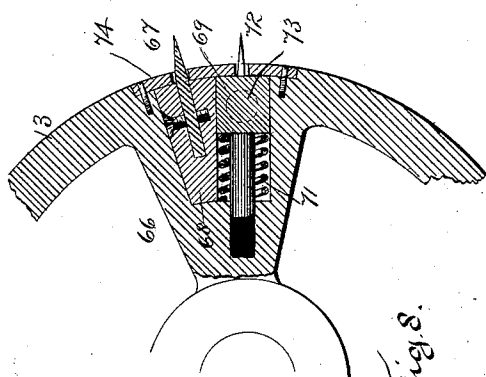
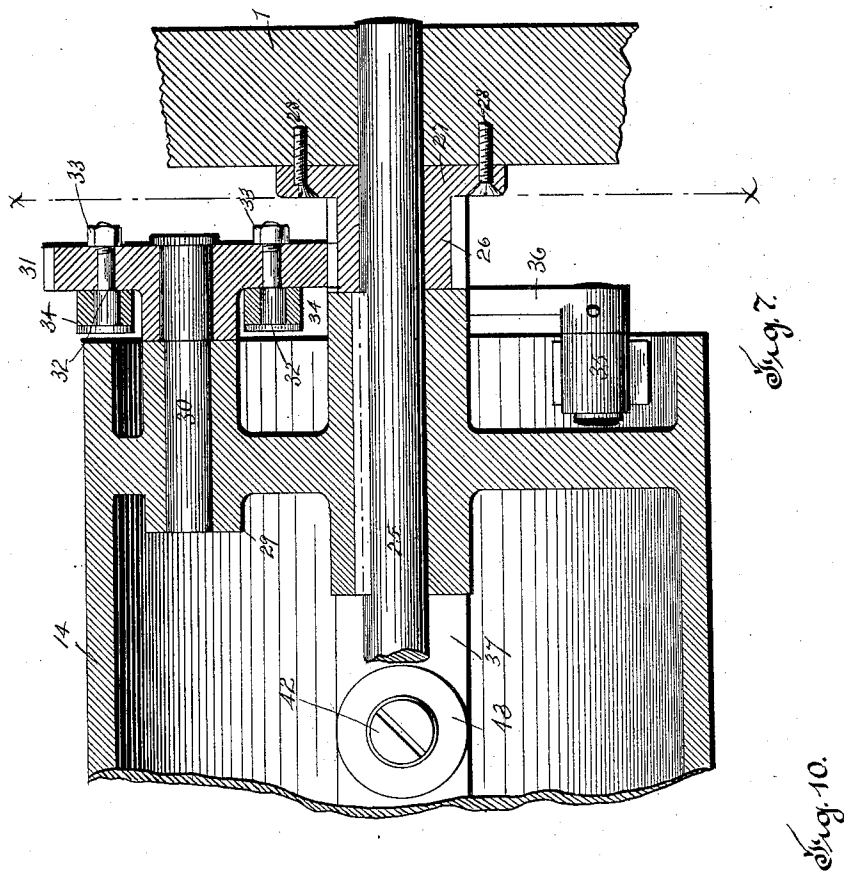
(No Model.)

4 Sheets—Sheet 4.

J. H. STONEMETZ.
PRINTING PRESS.

No. 472,318.

Patented Apr. 5, 1892.



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UNITED STATES PATENT OFFICE.

JOHN H. STONEMETZ, OF MILLBURY, MASSACHUSETTS, ASSIGNOR TO THE STONEMETZ PRINTERS' MACHINERY COMPANY, OF SAME PLACE.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 472,318, dated April 5, 1892.

Application filed July 11, 1891. Serial No. 399,133. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. STONEMETZ, a citizen of the United States, residing at Millbury, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Printing-Presses, of which the following is a specification.

The aim of this invention is to produce a new and improved web-press and folding-machine; and to this end the invention consists of the device described and claimed in this specification and illustrated in the accompanying drawings.

Referring to said drawings, Figure 1 is a side elevation of the complete machine. Fig. 2 is a sectional elevation of the complete machine. Fig. 3 is a sectional view taken on line *xx*, Fig. 7, of the collecting and switch cylinders. Figs. 4, 5, and 6 are detail views of the impaling-pins and the removing-bar used on the switch-cylinder. Fig. 7 is a horizontal sectional view of the switch-cylinder, as shown in Fig. 3. Fig. 8 is a sectional elevation showing the impaling-pins and the knife carried by the collecting-cylinder; and Figs. 9 and 10 are front and side elevations, respectively, of the change-gearing used in connection with the folding mechanism.

The press consists of the usual side frames 1 1, and mounted on each of these side frames are the brackets 2 2, which support the rolls of paper. These brackets are arranged so as to support or carry two rolls, as shown, and the rolls have the usual friction devices 3 3 and adjusting-screws 4 4. The web is led from the under side of the rolls. With this construction the time usually required to take out the spindle of the used roll and adjust the frictions, &c., is saved, because as the paper is being drawn from one roll a new roll may be placed in the other set of bearings and everything made ready, so that the instant the paper is all used on the one roll the web from the other roll can be instantly started into the press. From either roll 5 or 6, as the case may be, the web passes partially around tympan or impression cylinder 7, and thus in contact with the type or form cylinder 8, thus printing one side. Then over guide-roll 9, adjustable guide-roll 10, across the ma-

chine, partially around tympan or impression cylinder 11, and thus in contact with the type or form cylinder 12, where the web is perfected and the second side printed. The roll 10 is mounted in bearings, which are adjustable vertically in hangers which are suspended from the brackets 2 2, and thus perfect register may be obtained. From the impression-cylinder 11 the web is carried to the collecting-cylinder 13 and switch-cylinder 14, the details of which will be described further on.

The impression-cylinders are adjustable relatively to the type-cylinders, and all the cylinders are driven from the usual train of spur-gearing on the back of the machine, which it is not thought necessary to show and describe.

Mounted below the type-cylinders are sets of inking apparatuses of any of the usual constructions, and as the same form no part of this present invention the same will not be further described.

Intermediate between the two sets of type and impression cylinders is mounted a folding mechanism, which, so far as the broad scope of my invention is concerned, may be of any known form, and may be arranged to give the sheet any desired number of folds.

By the word "intermediate," as above used, is meant between vertical lines passing through or inside of the cylinders which will be inside of and clear the inking devices.

By arranging the folding mechanism in this manner neither the web nor the sheets will pass over or under the inking devices, and thus lint or dirt from the same will not have a chance to get into the inking-rolls. The preferred arrangement is to use two folding-machines and to mount one folding-machine above the other and thus economize space.

As shown, each folding-machine consists of the three pair of folding-rollers 15, 16, and 17. The details of this folding-machine and its driving and tucker mechanisms have been so many times described by me and are so well understood that it is not thought necessary to go into the details thereof in this case.

From the switch-cylinder the sheets are delivered alternately under the tucker 18, and over the first fold-rollers 15 15 of each fold-

ing-machine, or all the sheets are directed to one folder.

Each folding-machine is driven by means of pairs of bevel-gears 19 19 from a shaft carried across the machine, and said shafts are driven from a driven shaft 20, which is carried across the machine, and which is driven from the train of spur-gearing that drives the type and impression cylinders. On the ends of each of the shafts that drive the folding-machines are fastened the two pinions 21 22. (See Figs. 9 and 10.) Adapted to fit on the end of the shaft 20 are two driving-gears 23 and 24. The smaller gear 23 has a short hub, so that when the same is fastened on the shaft 20 the same will mesh with the larger pinions 22 22, and thus the folding-machines will be driven at their slow speed. The larger gear 24 has a longer hub, so that when the same is placed on the shaft 20 the same will mesh with the outer smaller pinions 21 21, and thus the folding-machines will be driven at their faster speed. The relation between these two sets of change-gearing is such that the two speeds are in the ratio of two to one, or, as will be further described, the folding-machines may be driven twice as fast to handle two four-page papers as when folding an eight-page paper, the speed of the other parts of the machine remaining the same; or, again, by removing one of the pinions and by use of the fast speed, either folder may be made to handle all the eight-page sheets.

The details of the collecting and switch cylinder will now be described. The collecting and cutting cylinder 13 is one-half as large as the switch-cylinder 14, and makes two revolutions to one of the switch-cylinder; or, in other words, the peripheral speed of each cylinder is the same. On the shaft 25 of the switch-cylinder 14 is fitted the pinion 26, and the latter is fastened to the frame 1 by the flange 27 and screws 28. On one of the spokes of the cylinder 14 is formed the hub 29, and fastened in the same is the stud 30. Running on this stud 30 is the gear 31, in mesh with the stationary pinion 26. The gear 31 is twice the size of pinion 26, and therefore for every two revolutions of the cylinder 14 the gear 31 will turn on its axis once, as the pinion 26 and gear 31 form a sun-and-planet train. At points diametrically opposite on the gear 31 are fastened the removable studs 32. The same are held in place by nuts 33, and mounted on the studs between heads on the same and the gear are the rollers 34. Bolted on the inside of the cylinder 14 is a small bearing 35, and a short shaft is journaled in the same, and on the outside end of this shaft is fastened the lever 36, and the same is in position to be struck by the rollers 34. The cylinder 14 has a raised section 37, extending the entire length on the inside of the same, and planed in the same is the slot 38, and working in this slot is the removing-bar 39. This bar is connected by link 40 to lever 36, and the bar is normally drawn in by springs

41, surrounding screw 42, and bearing against the head of the same. The screws 42 are tapped into bar 39 and work in raised bosses 43. These bosses are counterbored to receive the springs, and, as seen, the springs bear against the shoulder thus formed and the head of the screw. Thus by turning the screw the tension of the springs may be regulated. A series of removable impaling-pins are tapped into the bottom of slot 38 and pass through the removing-bar 39. These pins consist of the points 44, round portion 46, fitting the bar, the squared portion 45, and the screw-threaded shank 47. The holes in the bar for the reception of the pins are counter-bored, as at 48, so that a socket-wrench may be fitted onto the squared portion 45 of the pins and the same thus withdrawn. Now, it will be seen that if the bar 39 is pushed out it will force the edge of the sheet from the pins 44. The bar 39 is normally kept in the slot so as to expose the pins 44 by means of the springs 41; but as soon as a roller 34 strikes lever 36 the bar will be pushed out and the sheet forced off. The gear 31 is so set that the bar will operate only when the pins are in their lowest position, as shown in Fig. 3. Now, as the gear 31 revolves only half as fast as cylinder 14, and as there are two rollers 34, all the sheets carried by the pins 44 will be thrown off at this point. Again, if one roller 34 is removed every other sheet will be thrown off, or, if we remove both pins, no sheets will be thrown off. The sheets that are thrown off at this point are carried by tapes 49 to the lower folding-machine. These tapes 49 are endless and pass around pulleys 50 in contact with the cylinder 14, pulleys 51, and pulleys 52. A set of stripper-fingers 53 is carried by the bar 54 and fits in the slots in the cylinder 14 in the usual manner at the point indicated. A series of endless tapes 55 run around pulleys 56, 57, and 58 and in contact with the cylinder 14, as shown. Another set of tapes 59 run around pulleys 60 and 61 and in contact with pulley 56, and the whole is so arranged that the strip-pers 53 strip the sheets from cylinder 14, and that the same are then carried by the tapes 55 and 59 to the upper folding-machine. Thus all the sheets that pass the lower point are delivered to the upper folding-machine. The pulleys 50, 56, and 60 are driven from cylinder 14 by suitable spur-gearing, as shown in Fig. 1. Another set of removable impaling-pins 62 are fastened in the cylinder 14 at a point diametrically opposite to pins 44. These pins have the squared portion 63 and the screw-threaded shank 64, and the cylinder is counterbored, as at 65, so that the pins can be removed by a socket-wrench. It is understood, of course, that the cylinder 14 has a lever mechanism at each end for operating the bar 39.

The construction of the cutting and collecting cylinder will now be described. The same has an inside ledge 66, and held in the same

is the knife 67, which is fastened in the strip 68, which latter fits in a slot planed in the ledge 66. Working also in this slot is the bar 69, which has the depending stems 70, and surrounding the same are the springs 71, which thus act to normally keep the bar forced out. Fitting in the bar are the removable impaling-pins 72, and on the ends of the bar the turned projections 73. Fitting over the knife and the bar is the cover 74. The knife 67 works in two diametrically-opposite slots 75 and 76 in the cylinder 14, and thus sheets are cut off that are equal to the circumference of cylinder 13. An equivalent construction would be, of course, to slot cylinder 13 and to place two knives at points diametrically opposite on cylinder 14. On each end of cylinder 13 are pivoted the cams 77, and the latter have slots 78, that engage the projections 73 of bar 69. These cams are set so as to engage cams 79, fastened to the side of cylinder 14. Thus as the cams come in contact the bar carrying the pins is forced in, and thus the sheet that is carried by the pins 72 is thrown off and seized by pins 44 and thus transferred from one cylinder to the other.

The operation of the complete machine will now be described. Suppose, first, that a four-page paper is desired. The folders are now driven at their fast speed by the gearing before described. The web printed on both sides is delivered to the collecting and switch-cylinders, as before described. The switch-cylinder is arranged as shown—that is, with both sets of impaling-pins 62 and 44 in place and with both rollers 34 in gear 31; but the impaling-pins 72 are removed from the cylinder 13 or the bar 69 held in its innermost position. This may be done by fastening the cams 77 in their innermost position. In other words, the cylinder 13 is now simply a cutting-cylinder and has no impaling-pins in operative position. Now suppose the web cut off by the knife 67, working in the slot 76. The impaling-pins 62 will now carry the front edge of the web around the cylinder 14. When now the knife 67 works in the slot 75, a sheet will be cut off and left on the cylinder 14. This sheet will be stripped from the cylinder by strippers 53 and the same delivered to the upper folding-machine, as before described. The edge of the web just cut off will be carried by the pins 44 onto the cylinder 14, and a sheet will be cut off as soon as knife 67 again meshes in slot 76. As the lever 36 is set to operate at every revolution of the cylinder 14, the sheet thus carried by the pins 44 will be thrown off on tapes 39 and thus delivered to the lower folder, as before described. Thus a four-page paper is cut off and alternately delivered to each folder. Suppose now that an eight-page paper is desired, the folding-machines are run at their slow speeds, as before described. The impaling-pins 62 are removed from cylinder 14 and the pins 72 set so as to operate in the cylinder 13, and one roller 33 is removed from

the gear 31. Suppose now that the web has been just cut off by knife 67, working in slot 76. Now the pins 72 will carry the front edge of the web around cylinder 13. When the cylinder 13 has made a complete revolution, the knife 67 will cut off a sheet by working in slot 75. As this action takes place the pins 72 will be drawn in by reason of the two cams 77 and 79 coming together, and the pins 44 on cylinder 14 will carry the front edges of the web and of the sheet that has just been carried around the cylinder 13 onto cylinder 14. The web will be again cut off by the knife 80 meshing in slot 76. The double sheet thus formed is carried around cylinder 14 by the pins 44, and as there is only one roll 34 in the gear 31 the double sheets will be only delivered onto the tapes 49 at every alternate revolution of the cylinder, and every other double sheet will be carried up to strippers 53. Thus as a double sheet is formed at every revolution of cylinder 14, and as the same is always carried by the pins 44, an eight-page paper is formed and is delivered alternately to each folding-machine.

It is understood that the type-cylinders are of the usual construction—that is, the circumference of the same is made so as to receive two sets of plates—so as to print two four-page papers or one eight-page paper at each revolution. Suppose that it is desired to fold all the eight-page papers in either one of the folders. That particular folder only is driven at the fast speed by means of the change-gearing before described for folding four-page papers. If the lower folder is the one used, both rollers 34 are used, and thus all the sheets or eight-page papers are delivered onto the tapes 49 and thus to the lower folder, as the lever 36 works at every revolution of the cylinder 14. If the upper folder is the one used, the same is driven at the fast speed and the lower folder thrown out. Both rollers are taken out of the gear 31, and as lever 36 is not operated at all, all the eight-page papers are carried up to the strippers 53 and thus to the upper folder. Thus it will be seen that a machine is provided that will print and fold either four-page or eight-page papers in a very rapid and accurate manner.

The details of construction herein shown may be greatly varied by a skilled mechanic without departing from the scope of my invention.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The cylinder 14, having a set of impaling-pins, a removing device adapted to throw the sheet off said impaling-pins, the fixed pinion 26, the gear 31, carried by said cylinder, and connections between said gear and said removing device, substantially as described.

2. In a printing-press, the cylinder 14, having the impaling-pins 44, the bar 39, arranged to force the sheets from said pins, the fixed pinion 26, and the gear 31, carried by cylin-

der 14, meshing with said pinion, and connections between said bar 39 and gear 31, substantially as described.

3. In a printing-press, the combination of
5 the cylinder 14, having the impaling-pins 44, the bar 39, arranged to throw or force the sheets from the said pins, the fixed pinion 26, and the gear 31, carried by cylinder 14, meshing with said pinion, studs carried by said
10 gear 31, and lever 36, against which said studs are adapted to strike, said lever 36 being connected to bar 39, substantially as described.

4. In a printing-press, the cylinder 14, having the impaling-pins 44, the removing-bar
15 39, the adjustable springs 41 for drawing the same in, the fixed pinion 26, the gear 31, carried by cylinder 14, meshing therewith, studs carried by said gear, the lever 36, and link 40,
20 connected to bar 39 and arranged to throw the same out, substantially as described.

5. The combination of cylinders 13 and 14, said cylinder 13 having one member of a sheet-severing device and the cylinder 14 the
25 the other member, the said cylinder 14 having the pins 44 and automatically-operating means for throwing the sheets from the pins 44 and the pins 62, and the strippers adapted to strip the sheets from pins 62, substantially
30 as described.

6. The combination of the cylinders 13 and 14, said cylinders each having a member of a sheet-severing device, said cylinder 14 having the pins 62 and the pins 44, means for auto-
35 matically throwing the sheets from the pins

44, so that these sheets will be directed in one pathway and the strippers adapted to remove the sheets carried by pins 62, so that these sheets will be sent into a different pathway from the sheets carried by pins 44, in
40 combination with devices, such as traveling tapes, forming said double pathway, substantially as described.

7. The combination of cylinders 13 and 14, said cylinders each having a member of a
45 sheet-severing device, the cylinder 13 provided with means so that the same will act as a collecting-cylinder, the cylinder 14 having the pins 44, to which the collected sheets are delivered from cylinder 13, means operating
50 at every second revolution of cylinder 14 to remove the collected sheets from said pins 44 and direct the same to one pathway, the strippers acting to take the collected sheets from pins
55 44 at the revolutions of cylinder 14 when the automatic removing mechanism does not operate, and to direct the sheets to a second pathway, whereby the collected sheets are alternately directed in different pathways,
60 in combination with devices such as traveling tapes, forming said double pathway, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN H. STONEMETZ.

Witnesses:

LOUIS W. SOUTHGATE,
JAMES J. RAFFERTY.