No. 628,557. Patented July 11, 1899.

H. STAMM.

FLAT BED PERFECTING PRESS.

(Application filed Nov. 23, 1897.)

(No Model.) 2 Sheets—Sheet 1.

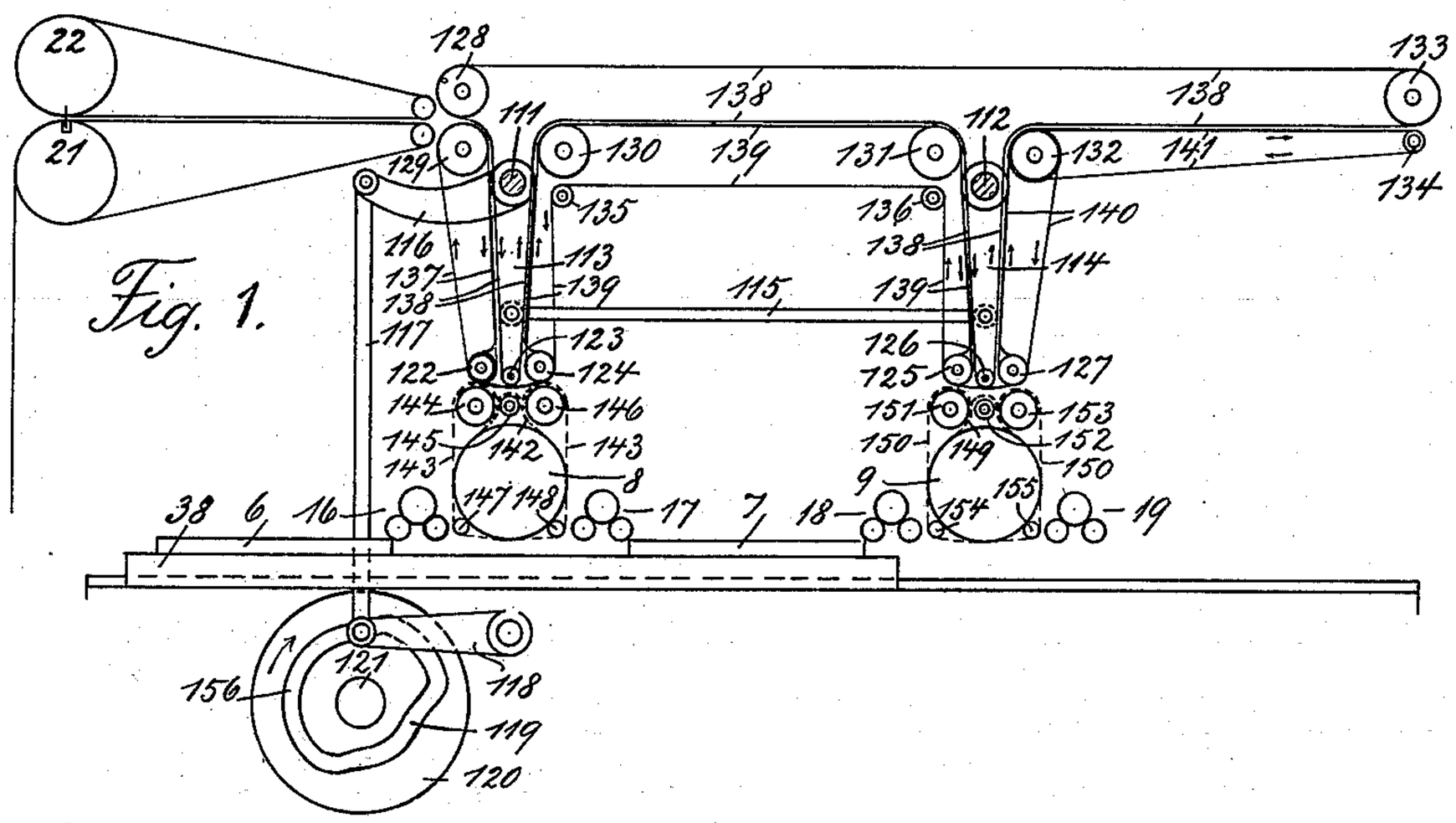

Fig. 1.

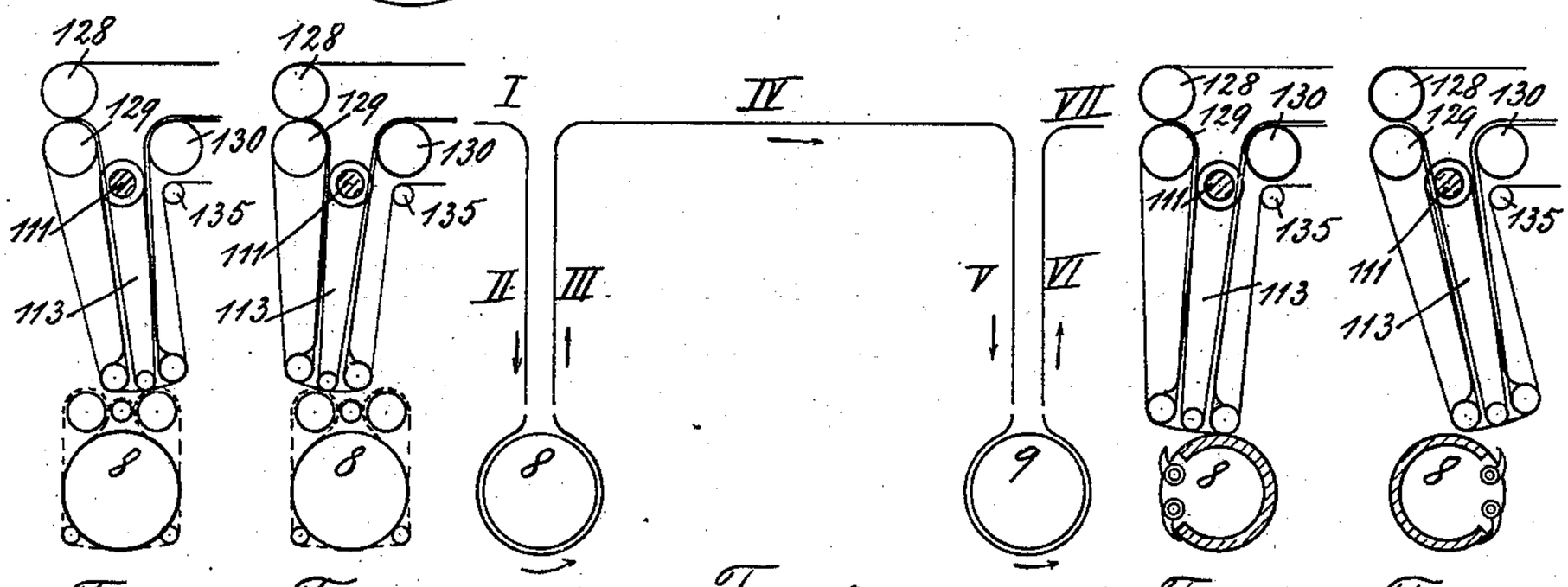

Fig. 5 Fig. 6 Fig. 2 Fig. 7 Fig. 8

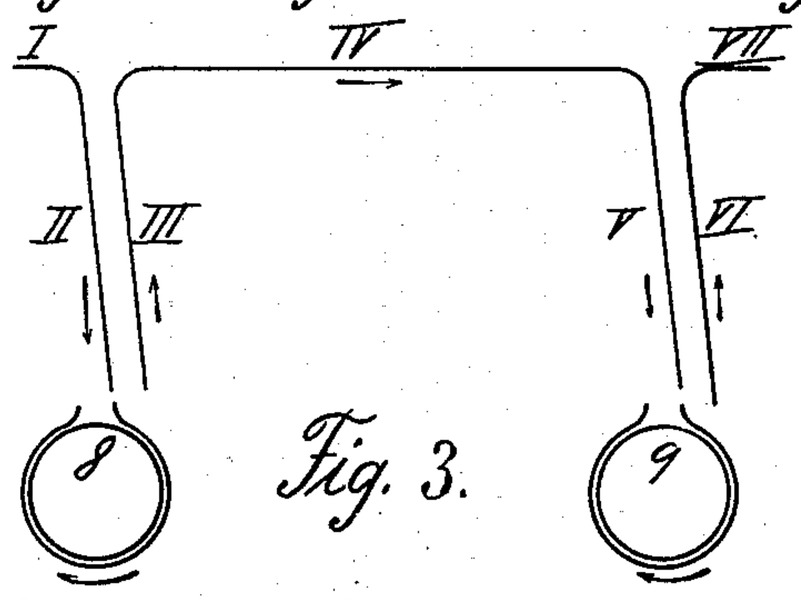

Fig. 3.

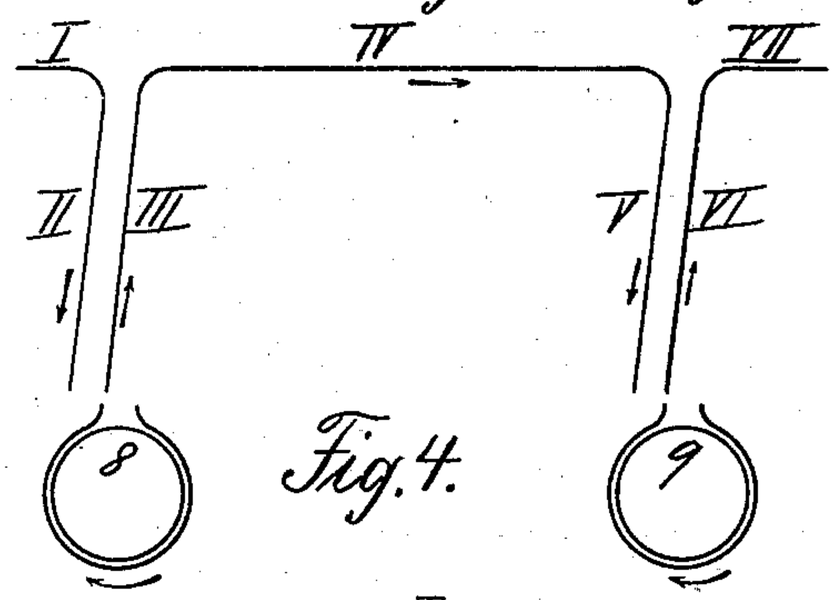

Fig. 4.

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No. 628,557. Patented July 11, 1899.

H. STAMM.

FLAT BED PERFECTING PRESS.

(Application filed Nov. 23, 1897.)

(No Model.) 2 Sheets—Sheet 2.

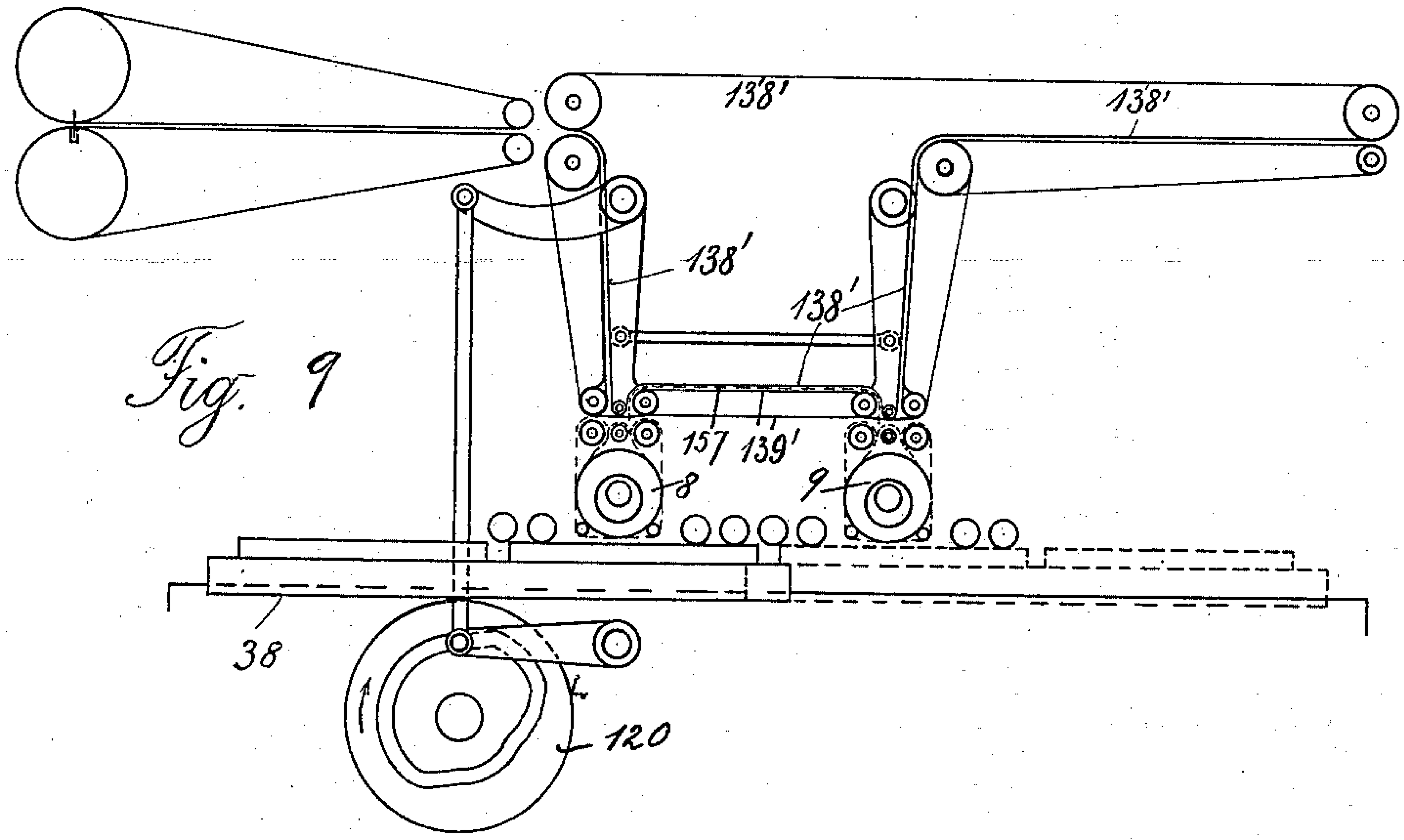

Fig. 9

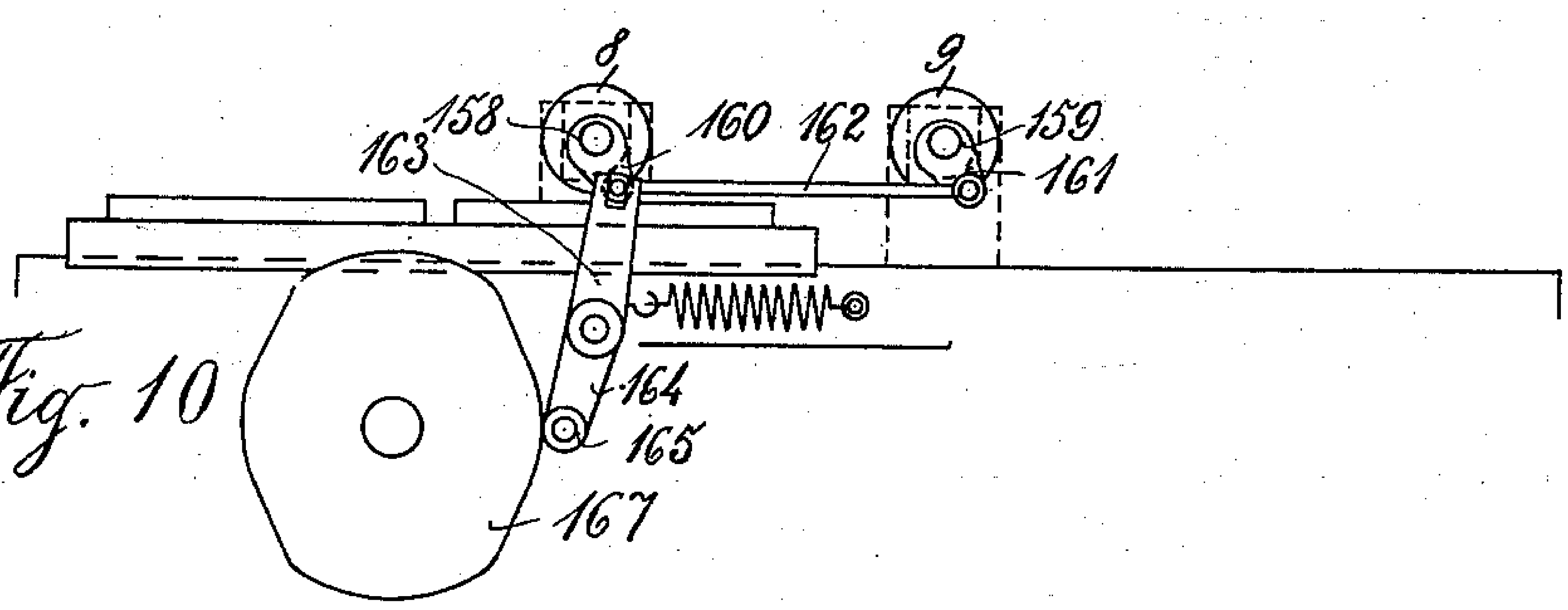

Fig. 10

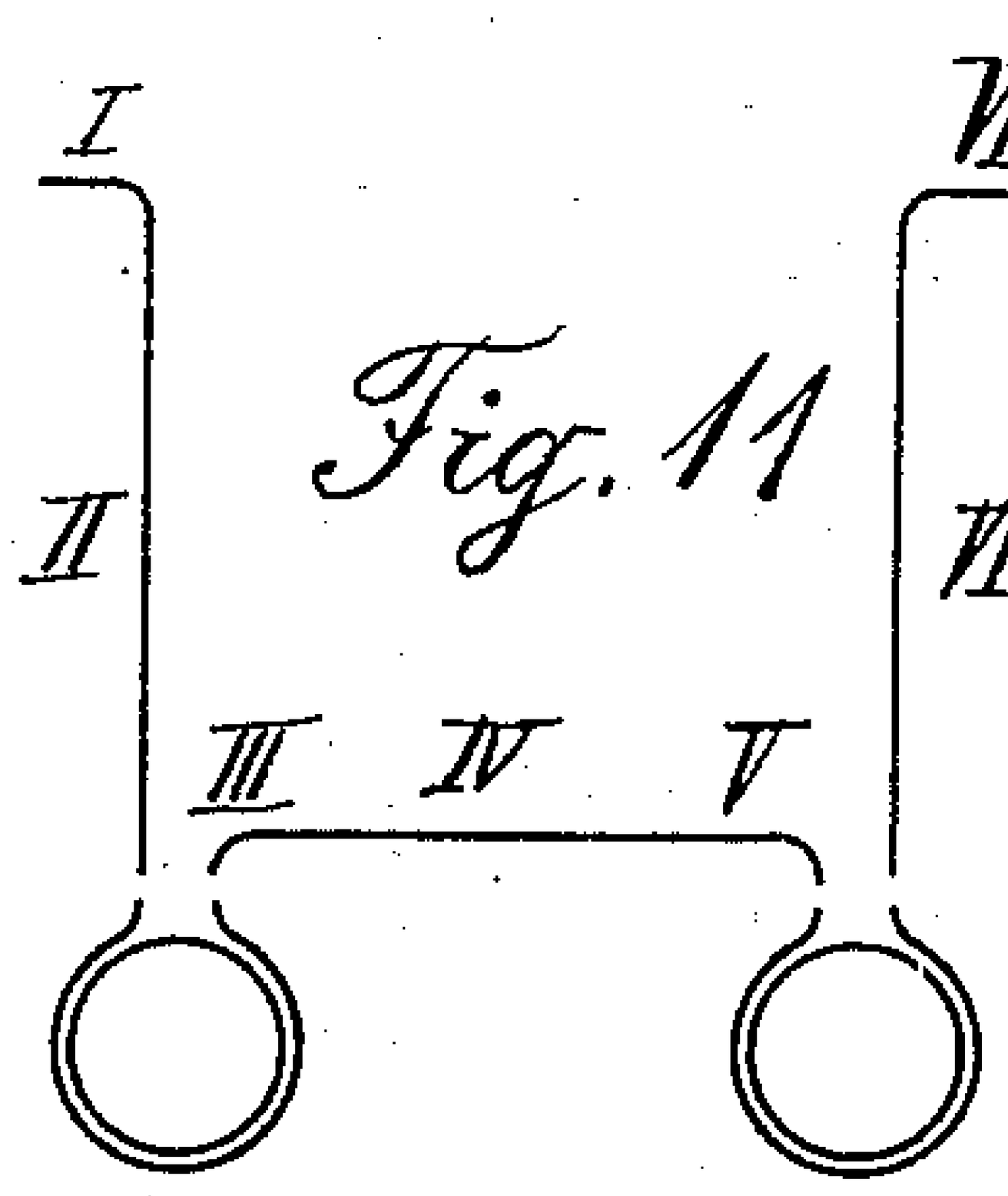

Fig. 11

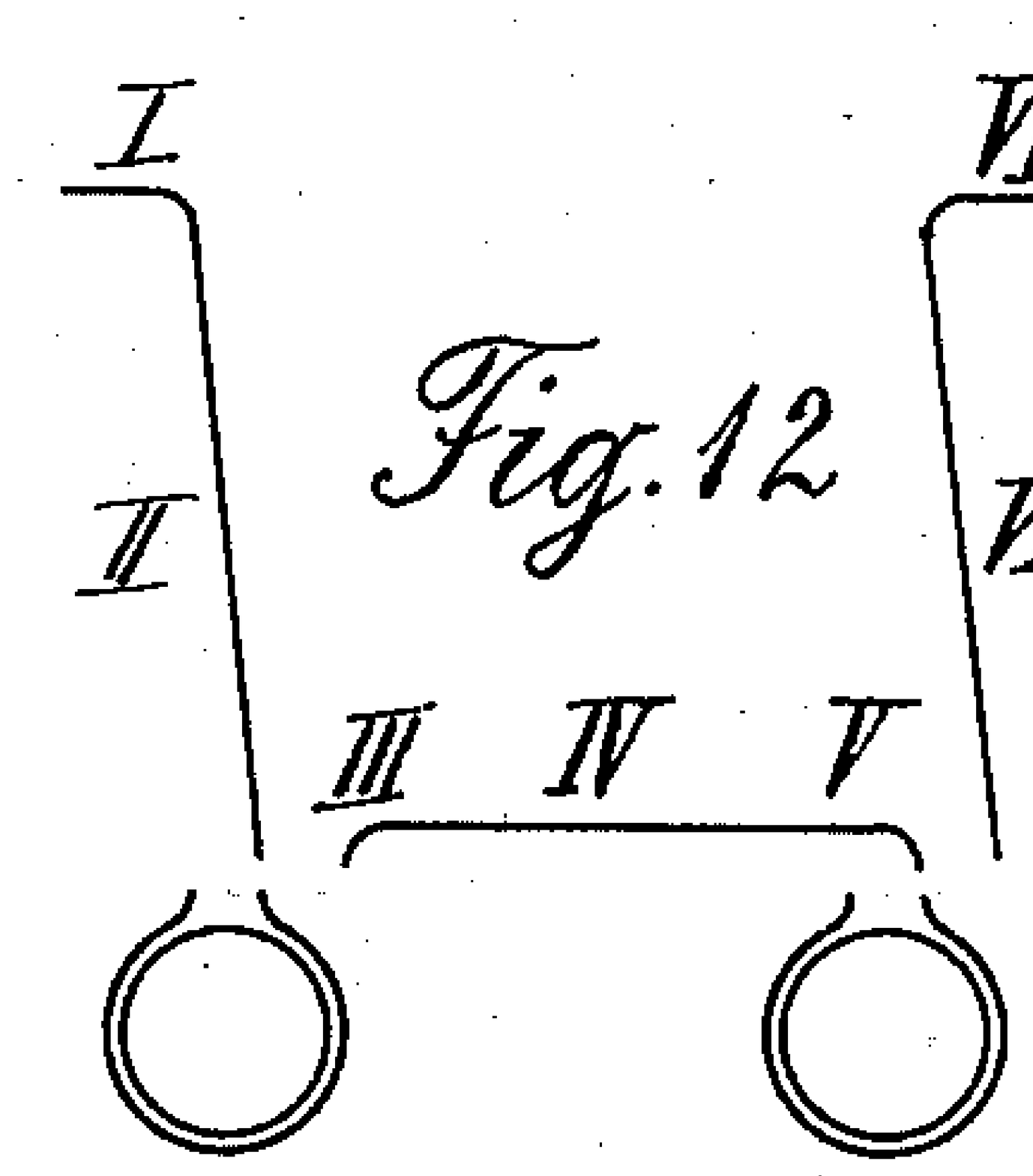

Fig. 12

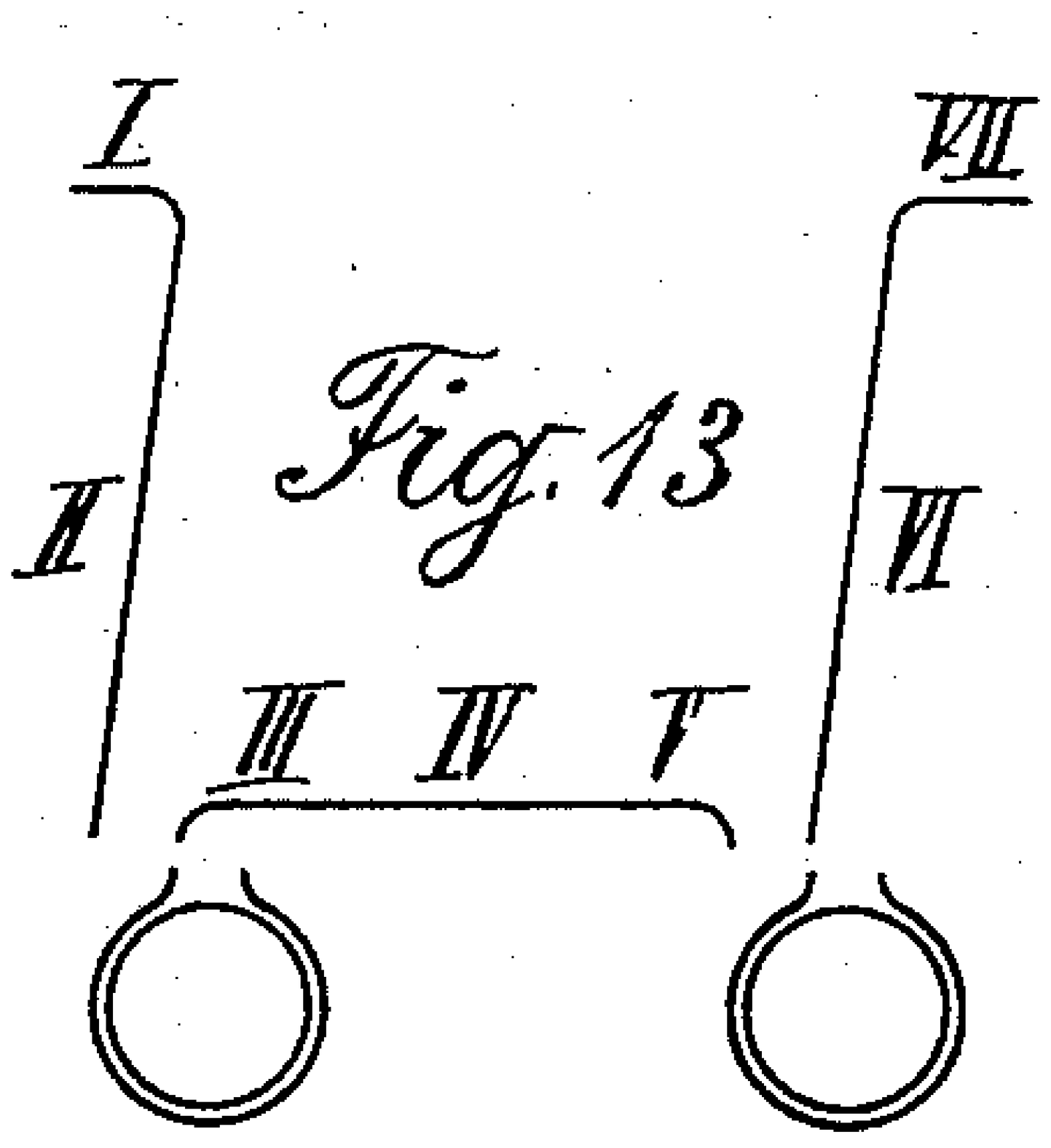

Fig. 13

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UNITED STATES PATENT OFFICE.

HENRY STAMM, OF PLAUEN, GERMANY, ASSIGNOR TO ARTHUR HELLMANN, OF BERLIN, GERMANY.

FLAT-BED PERFECTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 628,557, dated July 11, 1899.

Application filed November 23, 1897. Serial No. 659,563. (No model.)

To all whom it may concern:

Be it known that I, HENRY STAMM, a citizen of Switzerland, residing at Plauen, in the Voigtland, Germany, have invented new and useful Improvements in Perfecting-Presses, (patented in Germany, No. 93,687, bearing date May 16, 1896; in France, No. 256,522, bearing date May 21, 1896; in Great Britain, No. 11,684, bearing date May 29, 1896, and in Austria, Reg. 46, p. 5109, bearing date December 18, 1896,) of which the following is a specification.

My invention relates to flat-bed perfecting-presses fed from a roll of paper or with single sheets in which two oscillating impression-cylinders work in unison and together with two reciprocated type-forms; and the objects of my improvements are, first, to provide a press of the said kind fully utilizing the given time by each cylinder performing a print at each oscillation; second, to reduce the travel of the bed and of the type-forms; third, to prevent offset and blurring of the first print during and after the second impression, and, fourth, to avoid tearing and breaking of the paper when feeding from a roll. I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side view of one feature of my invention, further explained by the diagrammatical views, Figs. 2 to 4, inclusive, and by the detail views, Figs. 5 to 8, inclusive; and Fig. 9, a side view of a modification, further explained by Figs. 10 to 13.

Similar letters refer to similar parts throughout the several views.

In the drawings I have fully represented the parts constituting my invention, but only indicated as much as needed for the general understanding of the working of the other parts of the press.

The frame of the machine is provided with tracks for the bed 38, carrying the first and the second type-forms 6 7, respectively. To the bed are fixed racks, meshing, as usual in oscillating presses, with gear-wheels mounted on the ends of the shafts of the first and second impression-cylinders 8 and 9, respectively. A reciprocating movement is imparted to the bed by any convenient means, as well known, from the main driving-shaft 121. Thus by the rotary movement of the main shaft the bed is reciprocated in opposite directions and the cylinders oscillated in unison therewith. The type-forms are inked by inking-rollers 16 17 18 19, provided at both sides of each cylinder. In the drawings I have supposed inking apparatuses with rack-and-cam distribution only, but the press can obviously be likewise fitted with table rack-and-cam distribution.

The paper is unwound from a roll and passes between feeding and cutting cylinders 21 22, where it is severed into single sheets, which then are carried to the impression-cylinders and to a delivery-table by means of endless tapes. The severed sheets are alternately delivered to either side of each impression-cylinder, one series of sheets running around the first impression-cylinder 8 from the left to the right and from the right to the left around the second impression-cylinder 9, and the other series of sheets running in opposite directions around the impression-cylinders, respectively. The sheets thus alternately presented to each cylinder at each oscillation are printed on both sides and then carried to the delivery-table, where they are piled by a fly or folded, as the case may be.

In contradistinction to presses of similar construction I have reduced as much as possible the use of tapes by providing only one common guideway run through by all sheets in one and the same direction. For this purpose portions of the tapes are guided on rollers journaled in rock-arms, which are provided above either impression-cylinder, carrying each a pair of supplying-tapes to supply the sheet to be printed, and a pair of withdrawing-tapes to receive and take along the printed sheet, and as the arms are rocked the supplying and the receiving tapes are alternately transplaced with respect to the cylinders, so that the sheets are alternately run around the same from the right and from the left.

Referring to Fig. 1, 111 and 112 are rock-shafts journaled in the frame of the machine, carrying at each end arms 113 and 114, respectively, connected together by a rod 115. A lever 116 is mounted on shaft 111 and connected by a rod 117 to another lever 118, piv-

oted to the machine-frame and engaging with a roller in a groove 119 of a cam-disk 120, mounted on the main driving-shaft 121. There are tape-rollers 122 123 124 journaled in the rock-arms 113 and similar rollers 125 126 127 carried by the rock-arms 114, the other tape-rollers 128 129 130 131 132 133 134 135 136 being stationary and journaled in the machine-frame. Endless tapes 137 138 139 140 141 are guided on the said rollers, as clearly shown in Fig. 1, continuously running in the directions indicated by arrows and drriven by any convenient means. The sheets supplied to the first impression-cylinder 8 by means of the portions running together of tapes 137 and 138 are received and forwarded and supplied to the second impression-cylinder 9 by the respective portions of tapes 138 139. They are received again after the second impression by the tape portions 138 140 and finally delivered by the portions running together of tapes 138 and 141. The sheets are carried around the impression-cylinders by means of cylinder-tapes 142 143, guided on stationary rollers 144 145 146 147 148, and by tapes 149 150, guided on stationary rollers 151 152 153 154 155, respectively. The tapes 142 143 and 149 150 are oscillated in unison with the respective impression-cylinders. In the position of the rock-arms represented in Fig. 1 a sheet is supplied from the left to the first impression-cylinder 8, entering between rollers 144 145 and tapes 142 143, the bed beginning its stroke from the left to the right and driving the cylinder 8 and tapes 142 143 accordingly. At the same time a sheet printed before on one side is analogously supplied to the second impression-cylinder 9. During the said bed-stroke the concentric portion 156 of groove 119 passes the roller of lever 118, and the rock-arms therefore keep their place, so that the sheets having been carried around the cylinders and leaving the same between rollers 145 146 and 152 153, respectively, enter the withdrawing portions of tapes 138 139 and 138 140, respectively. The sheet leaving the first impression-cylinder and printed on one side is then forwarded to the second impression-cylinder and the sheet leaving the latter and printed on both sides is forwarded to the delivery at the next bed-stroke from the right to the left; but at the reversing movement of the bed-stroke the arms 113 114 are rocked to the position represented in Fig. 5 by reason of the curved portion of groove 119 passing then the roller of lever 118, and sheets are supplied to the cylinders from the right and carried around and by the same from the right to the left. During the printing of the sheets arms 113 114 are rocked again, so as to assume the position represented in Fig. 6 by reason of the most projecting portion of groove 119 passing then the roller of lever 118, so that the sheets leaving the cylinders between rollers 144 145 and 151 152, respectively, can enter the withdrawing-tape portions 138 139 and 138 140, respectively. At the next reversing movement of the bed the arms are rocked again to the position represented in Fig. 1, and so on.

The courses of the sheets for the several positions of the rocking arms are represented and indicated by arrows in the diagrammatical views, Figs. 2, 3, and 4, corresponding to Figs. 1, 5, and 6, respectively—that is, when the parts are in the positions indicated in Fig. 1, the arms 113 and 114 being substantially vertical, the sheet to be delivered to the impression-cylinder 8 will move along a path indicated in Fig. 2 by the arrow below the numeral II, and the arms 113 and 114 remain stationary, while the said impression-cylinder 8 is oscillated, owing to the movement of the impression-bed thereunder in a direction from left to right. Therefore the printed sheet will leave said cylinder 8 along the path indicated by the arrow below the numeral III. After the sheet referred to has left the cylinder 8 and before it has reached the roller 131, for example, the arms 113 114 will be shifted into the positions indicated in Fig. 5, so that the feed-path of the next sheet to the cylinder 8 will be indicated by the arrow below the numeral II and the feed-path of the sheet previously printed by said cylinder 8 will be as indicated by the arrow below the numeral V in Fig. 3. When in this position, it will be seen that the second sheet is fed to the opposite side of the cylinder 8 from that to which the first sheet was fed and the said first sheet has its unprinted surface presented to the cylinder 9—that is, instead of entering the path concentric with the cylinder 8 by passing between the rollers 144 145, as in the first case, the sheet will enter the said path by passing between the rollers 145 146. As the cylinders are oscillated by the bed moving from right to left the arms 113 114 are shifted into the positions indicated in Fig. 6, so that the sheet leaving the cylinder 8, for example, will pass out between the rollers 114 115 and between the rollers 123 124 along the path indicated by the arrow below the numeral III in Fig. 4. Before the next sheet leaves the path II or the second sheet aforesaid leaves the path V the arms 113 114 will be shifted to the positions shown in Fig. 1, and therefore the unprinted face or surface of the aforesaid second sheet will be brought into contact with the cylinder 9, it moving through the path indicated by the arrow 4 below the numeral V in Fig. 2.

Figs. 7 and 8 show a modification in which the cylinder-tapes are dispensed with and grippers made use of. Fig. 7 represents the position of rock-arm 113 when supplying a sheet to the cylinder from the left and Fig. 8 the position when supplying the sheet from the right, the respective positions for receiving and withdrawing the printed sheets being symmetrical with respect to the positions represented, as will be understood without further figures.

From the foregoing description it will be

clear that in my invention the bed-stroke is reduced to the travel of only one type-form and that at each oscillation of each cylinder a sheet is printed on one side, the given time being thus fully utilized and no idle movement taking place. As concerning the other objects of my invention stated heretofore, it will be observed that tearing and breaking of the paper are obviously avoided by severing the paper into sheets just as it enters the conveying-tapes, and blurring on the second impression-cylinder is prevented, as the sheet performs no relative movement with respect to the cylinder-surface, but is carried around the cylinder in unison with the same, while offset is obviated by the comparatively long travel of the sheet from the first to the second impression-cylinder, the fresh print thus being allowed to dry by the influence of the air.

In the feature of my invention heretofore described the travel of the sheet from the first to the second impression-cylinder is much larger than a single bed-stroke—say, the triple or quadruple of the same—as it must necessarily be an odd multiple thereof, for the printing of both sides of a sheet by two cylinders in my system not being possible but by running the sheets around the cylinders from opposite sides a sheet printed by the first impression-cylinder when the bed moves from the left to the right cannot receive the second impression but at the next bed-stroke performed from the right to the left—*i. e.*, the next second, fourth, or sixth stroke, and so on, and as the next second stroke will be inoperative in this respect the sheet by reason of the long travel from the first to the second cylinder not yet having reached the latter the second impression of a sheet takes place, but at each fourth or sixth stroke following the first impression-stroke. Observing, further, that a sheet must clear the cylinder-tapes at the same stroke it will be printed in order to allow of the entrance of the next sheet it follows that the sheet is carried by steps from the first to the second impression-cylinder during the third or fifth bed-strokes, as stated before. However, in order to make perfect register it may be desirable to reduce as much as possible the travel of the sheets from the first to the second impression-cylinder, so that the second impression immediately takes place after the first impression—*i. e.*, at the next second bed-stroke. This can be best attained by conveniently modifying the features of my invention represented by Figs. 1 to 8, as will now be described with reference to Figs. 9 to 13, inclusive. Comparing Fig. 9 to Fig. 1 the said modification essentially consists in substituting a straight endless tape 139′ for the angular tape 139 of Fig. 1, modifying the course of tape 138 of Fig. 9, as appearing from tape 138′ of Fig. 9, and conveniently approaching to each other the two impression-cylinders 8 9, the other tapes and the rock-arms admitting of no change. The stroke of the bed is accordingly increased, so that the sheet printed on one side by the first impression-cylinder at the same bed-stroke is brought to the position 157, Fig. 9, clearing the tapes of this cylinder and ready to enter with its foremost edge the tapes of the second impression-cylinder at the next bed-stroke; but by approaching the impression-cylinders and increasing at the same time the bed-stroke each type-form will obviously travel underneath both cylinders. It will therefore be necessary to periodically raise the cylinders. This is effected by the well-known means represented in Fig. 10. The cylinders are journaled in movable eccentric-boxes 158 159, provided with levers 160 161 and connected by a rod 162. A spring-actuated two-armed lever 163 164 is pivoted to the machine-frame, bearing with a roller 165 against the edge of a cam-disk 167, mounted on the main driving-shaft. By these means the cylinders are raised, as shown, by the spring at the beginning and ending of each bed-stroke and lowered by passing of the projecting edges of the cam-disk 167 by roller 165 during the printing period. Figs. 11, 12, and 13 are diagrammatical views of the course of the sheets as described with reference to Figs. 2, 3, and 4, corresponding to Figs. 11, 12, and 13, respectively.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a flat-bed perfecting-press the combination of a reciprocated bed or beds carrying a first and a second impression type-form, a first and a second impression-cylinder oscillated by the bed or beds in unison therewith, one set of feeding-tapes, one set of tapes for supplying sheets to either side of the first impression-cylinder, one set of tapes for receiving the printed sheets from either side of the first impression-cylinder and supplying the same to either side of the second impression-cylinder, and one set of tapes for receiving the printed sheets from either side of the second impression-cylinder and delivering the same, substantially as and for the purposes described.

2. In a flat-bed perfecting-press the combination of a reciprocated bed or beds carrying a first and a second impression type-form, a first and a second impression-cylinder oscillated by the bed or beds in unison therewith, one set of feeding-tapes, one set of tapes for supplying sheets to either side of the first impression-cylinder, one set of tapes for receiving the printed sheets from either side of the first impression-cylinder and supplying the same to either side of the second impression-cylinder, one set of tapes for receiving the printed sheets from either side of the second impression-cylinder and delivering the same, a set of stationary tape-rollers, two sets of movable tape-rollers provided above the impression-cylinders, and means for shifting the movable tape-rollers and alternately presenting the supplying and the receiving tapes to either side of the impression-cylin-

ders, substantially as and for the purposes described.

3. In a flat-bed perfecting-press the combination of a reciprocated bed or beds carrying a first and a second impression type-form, a first and a second impression-cylinder oscillated by the bed or beds in unison therewith, one set of feeding-tapes, one set of tapes for supplying sheets to either side of the first impression-cylinder, one set of tapes for receiving the printed sheets from either side of the first impression-cylinder and supplying the same to either side of the second impression-cylinder, one set of tapes for receiving the printed sheets from either side of the second impression-cylinder and delivering the same, a set of stationary tape-rollers, two sets of movable tape-rollers journaled in rock-arms provided above the impression-cylinders, and means for rocking the said rock-arms and alternately presenting the supplying and the receiving tapes to either side of the impression-cylinders, substantially as and for the purposes described.

4. In a flat-bed perfecting-press the combination of a reciprocated bed or beds carrying a first and a second impression type-form, a first and a second impression-cylinder oscillated by the bed or beds in unison therewith, one set of feeding-tapes, one set of tapes for supplying sheets to either side of the first impression-cylinder, one set of tapes for receiving the printed sheets from either side of the first impression-cylinder and supplying the same to either side of the second impression-cylinder, one set of tapes for receiving the printed sheets from either side of the second impression-cylinder and delivering the same, a set of stationary tape-rollers, two sets of movable tape-rollers journaled in rock-arms provided above the impression-cylinders, and means for rocking the said rock-arms and alternately presenting the supplying and the receiving tapes to either side of the impression-cylinders, substantially as and for the purposes described.

5. In a flat-bed perfecting-press the combination of a reciprocated bed or beds carrying a first and a second impression type-form, a first and a second impression-cylinder oscillated by the bed or beds in unison therewith, one set of feeding-tapes, one set of tapes for supplying sheets to either side of the first impression-cylinder, one set of tapes for receiving the printed sheets from either side of the first impression-cylinder and supplying the same to either side of the second impression-cylinder, one set of tapes for receiving the printed sheets from either side of the second impression-cylinder and delivering the same, a set of stationary tape-rollers, two sets of movable tape-rollers journaled in rock-arms provided above the impression-cylinders, means for rocking the said rock-arms and alternately presenting the supplying and the receiving tapes to either side of the impression-cylinders, and means for raising and lowering the impression-cylinders, substantially as and for the purposes described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY STAMM.

Witnesses:
A. HAM,
H. A. TUNER.