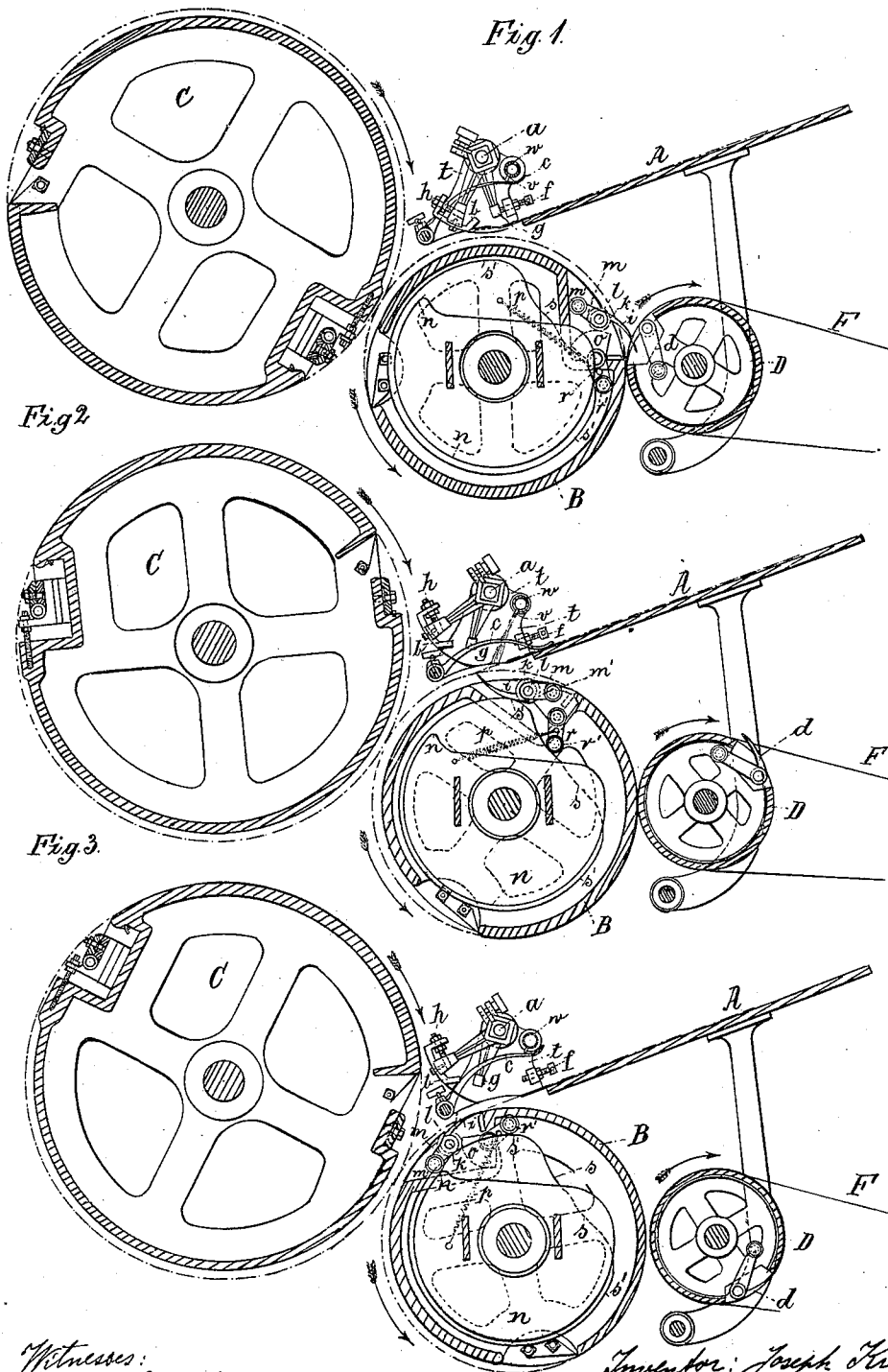


J. KRAYER.

ROTARY PRINTING PRESS FOR PLANOGRAPHIC PRINTING PLATES.

No. 579,832.

Patented Mar. 30, 1897.



Witnesses:
H. N. Jenkins
A. J. Wetmore.

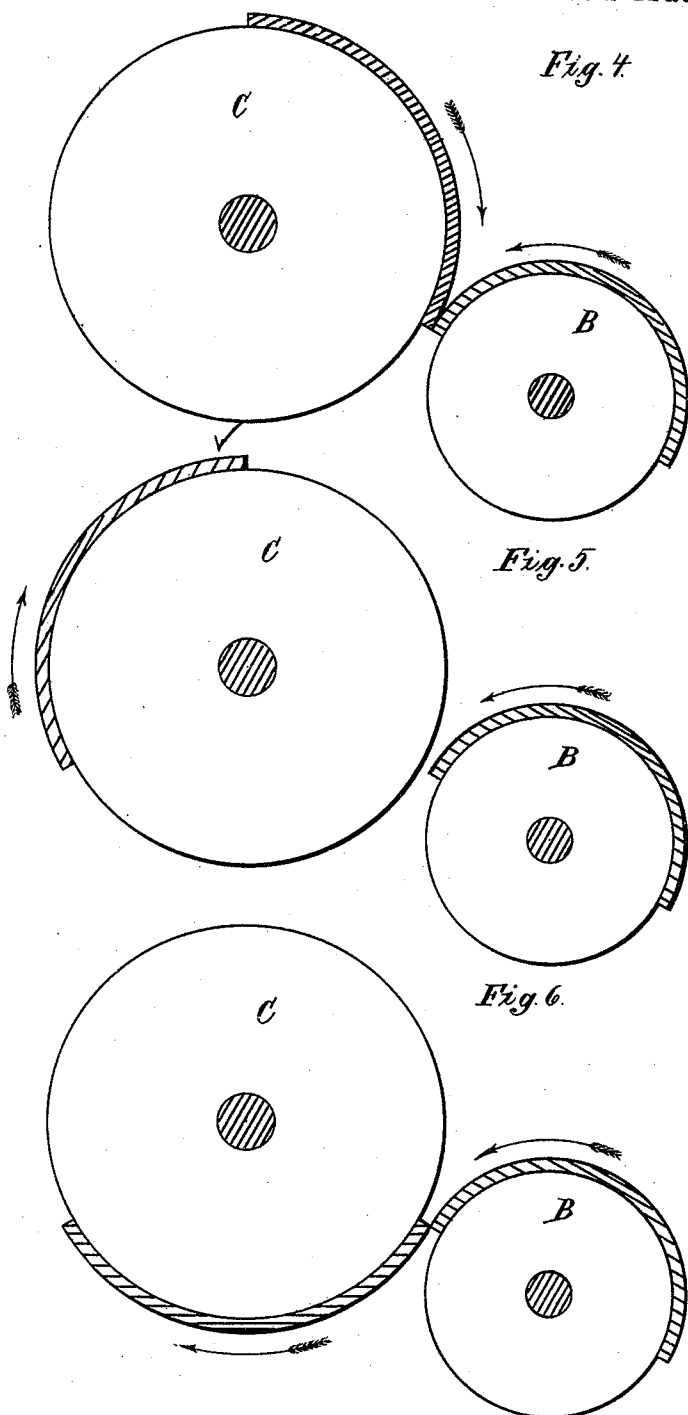
Inventor: Joseph Krayer
by G. Rittman,
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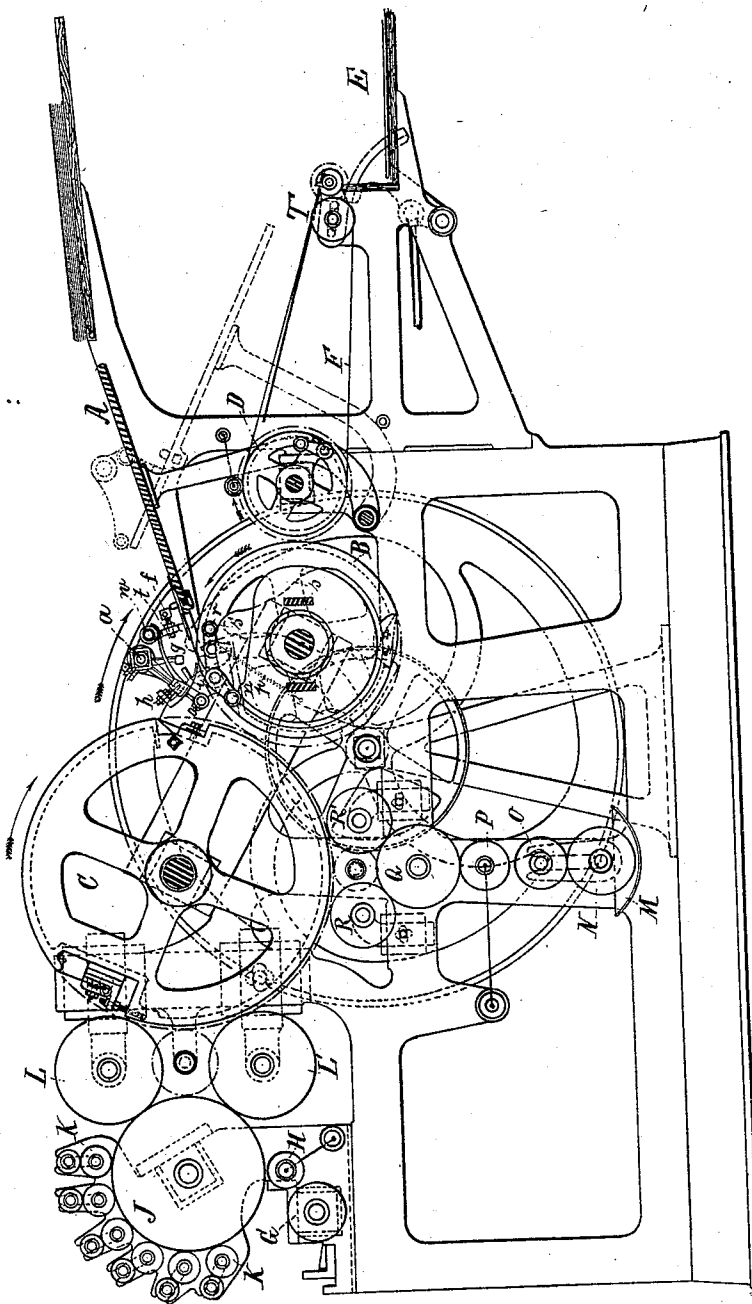
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Fig. 7.



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(No Model.)

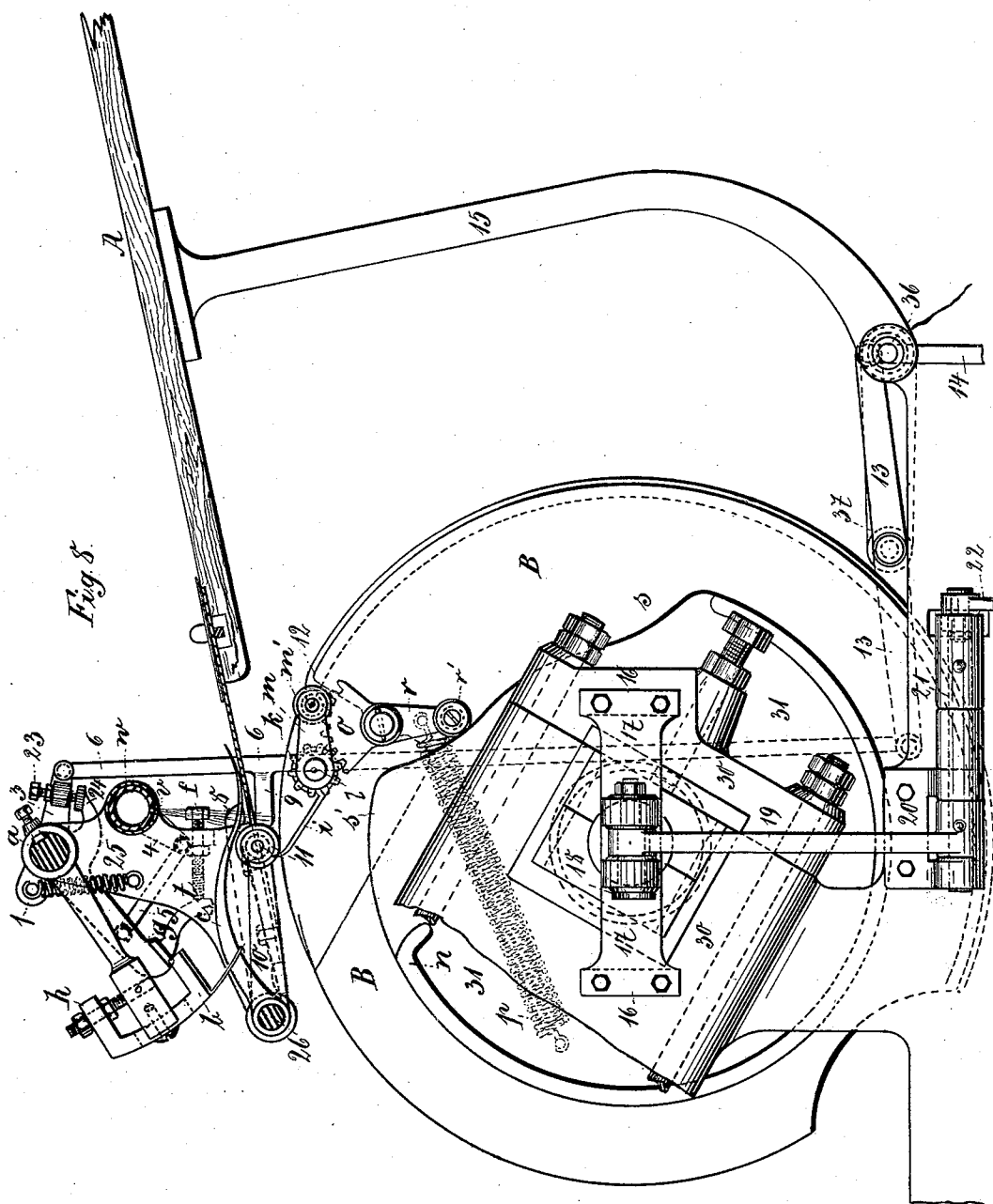
5 Sheets—Sheet 4.

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(No Model.)

5 Sheets—Sheet 5.

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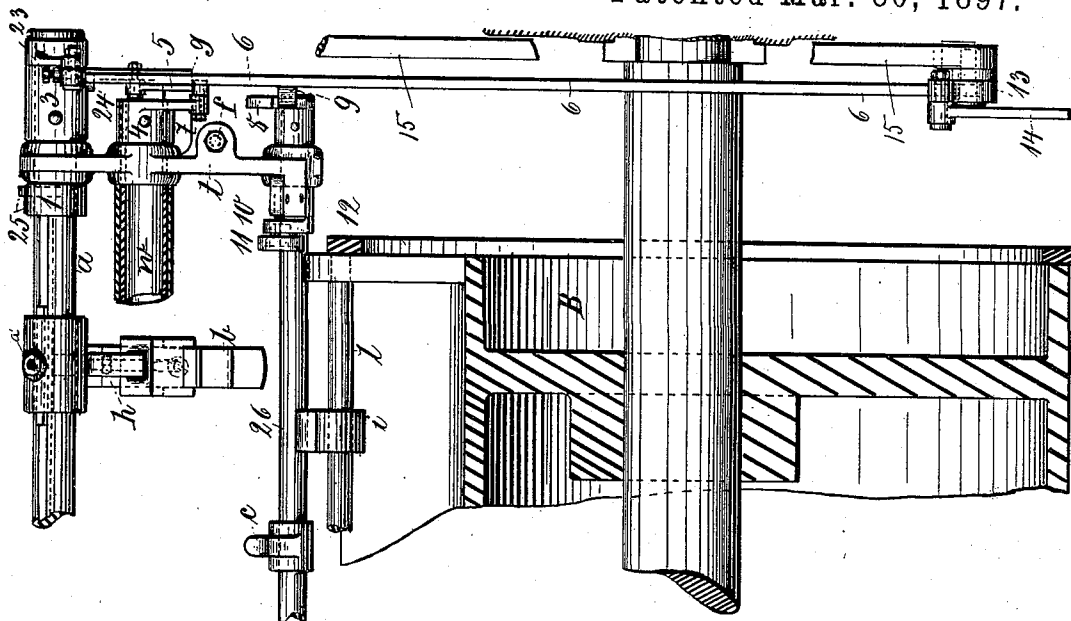
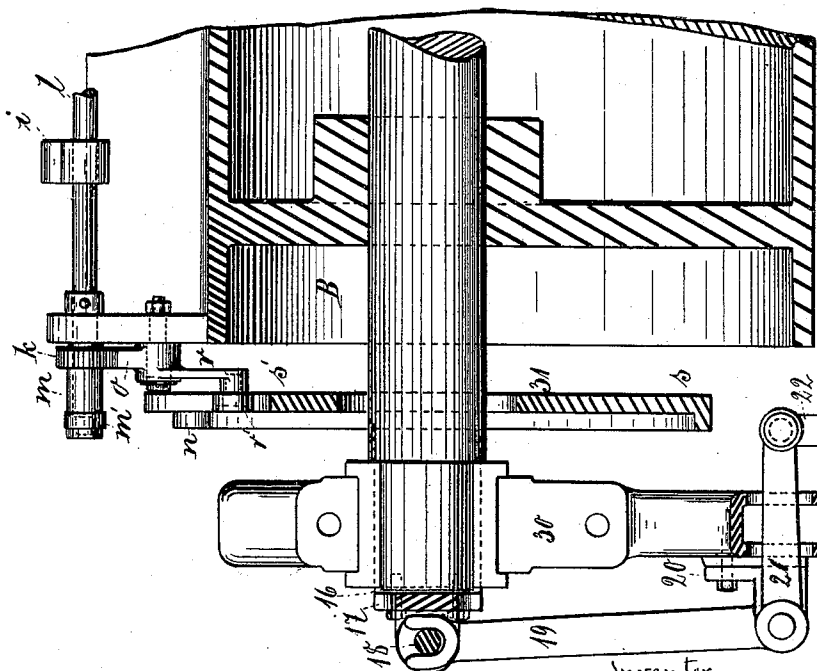


Fig. 9.



Witnesses

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Inventor.

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UNITED STATES PATENT OFFICE.

JOSEPH KRAYER, OF JOHANNISBERG, GERMANY.

ROTARY PRINTING-PRESS FOR PLANOGRAPHIC PRINTING-PLATES.

SPECIFICATION forming part of Letters Patent No. 579,832, dated March 30, 1897.

Application filed April 4, 1895. Serial No. 544,435. (No model.) Patented in England April 19, 1895, No. 7,882.

To all whom it may concern:

Be it known that I, JOSEPH KRAYER, a subject of the Emperor of Germany, residing at Johannisberg, in the Empire of Germany, have invented certain new and useful Improvements in Rotary Printing-Presses for Lithographic Printing-Plates, (for which I have received Letters Patent in England, No. 7,882, dated April 19, 1895;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The rotary press forming the object of this invention is designed to produce prints from plates of aluminium metal which have been secured upon a cylinder. Many devices have been designed to attain this result without attaining practical success, for the machines were either unfit to produce a satisfactory result or the prints were not sufficient to answer the demands in quality. A machine answering practically to the expectations of the trade must fulfil the following conditions: First, it should produce at least as good work as an ordinary flat-bed press; second, it should produce more work than the flat press; third, it should be easy to handle. All this is attained by the rotary press described below and shown in the accompanying drawings, wherein—

Figures 1, 2, and 3 are cross-sections through the plate-cylinder and press-roller, showing the same and the elements feeding and guiding the paper in different positions. Figs. 4, 5, and 6 illustrate diagrammatically the different positions of the coöperating surfaces of plate-cylinder and press-roller. Fig. 7 is a side elevation of the press, partly in section. Fig. 8 is an enlarged side view of the paper-inserting mechanism and the double gripper. Fig. 9 is a broken sectional view of mechanism shown in Fig. 8.

The sheets of aluminium, zinc, and the like serving as printing-plates are secured upon a cylinder C, (the plate-cylinder,) which is of such dimensions that the surface to be actually covered by the plates is only one-third of the whole circumference. The press-roller B, having as its object to give the impression upon the sheet of paper to be printed, has a diameter equal to only two-thirds of the

diameter of the plate-cylinder C. Both cylinders are in gear by cog-wheels and revolve with equal circumferential velocity. Consequently the press-roller B makes three revolutions while the cylinder C makes two only, and, besides, the surfaces of the two cylinders which come in contact shift at each revolution for one-third of the circumference of roller C, as illustrated by Figs. 4, 5, and 6.

The figures show that only one half of the surface of the press-roller is used for the impression, while the other half is set back; also, the roller C has only one-third of its surface adapted to receive the plates, while the other two-thirds are set back, forming the surface of a somewhat smaller cylinder. Consequently the impression between these two rollers can be only made when their said projecting surfaces are in rolling contact with each other. This is effected when the press-roller B has made three revolutions and roller C has made two, Figs. 4, 5, 6, and 7. For the same reason the printing-surface of roller C passes the moistening-rollers R R' and the the inking-rollers L L', Fig. 7, twice before an impression is effected, so that a double inking-in of the plate occurs before each impression, while in the ordinary machines of this kind only one inking-in is effected. It is obvious that in this respect the new machine offers great advantages. In order to obtain perfect proofs, it is, however, also necessary that the sheets when repeatedly carried between the rollers for impression have the same position of front stops made at the first impression. This is comparatively easy in machines with rollers having an intermittent rotary motion, and therefore many constructors set the press-roller fast and let it revolve alternately. It is obvious that the efficiency of the machine is hereby lessened, and to avoid loss in the number of impressions obtainable the machine must be so arranged that the sheets are well registered, even at a continuous revolution of the cylinder. To this end the machine is constructed in the following way:

The table A, Figs. 1, 2, 3, and 7, is arranged close above press-roller B, being but slightly inclined. The paper-shifter of known construction (not shown in the drawings) pushes the sheet on table A crosswise into the right

position. The ordinary front stops, however, are insufficient to guide the sheet in the other direction, and in their place a device is used as shown in Figs. 1, 2, 3, and 7.

5 The table A is provided at both sides with supports *t*, wherein a shaft *a* oscillates. The front stops *b* are adjustably secured on this shaft or bar, capable of being moved on it lengthwise. The stops *b* have the object to
10 limit the position of the sheet at its lower edge and simultaneously to carry the sheet at this edge.

To allow more or less of the paper to pass under the grippers *i*, an arm *g* is secured on
15 shaft *a* and leans against a set-screw *f*, arranged in one of the lateral supports *t*. By adjusting the screw *f* the shaft *a* is turned and the stops *b* are more or less removed from the table A. The edge of the paper will cor-
20 respondingly project more or less over the table, and thus more or less paper comes under the grippers *i*. By the adjustment of the screw *f* the paper sheet will therefore take its position on the press-roller B more or less
25 advanced.

It may happen that the front edge of the sheet be more advanced on one side than on the other, and to readily meet this difficulty I have arranged the marks *b* in holders so as
30 to be adjustable by screws *h*. The same result may be obtained also by making the supports *t* adjustable.

The stops *b* should swing back in order to clear the way for the paper when it is held by
35 the grippers. Therefore fingers *c* are arranged to come down upon the paper, Fig. 2, and hold it on the table A while the stops swing back. These fingers go back in the moment in which the grippers catch hold of the sheet.

40 In order to prevent the grippers *i* striking against the edge of the sheet, which might displace it, provisions are made that shortly before the grippers approach the paper a current of air strikes the edge of the paper, passing
45 through holes *v* of a pipe *w*, into which air is pressed, so that said edge of the sheet is pressed down smoothly upon the surface of the cylinder. For the exact printing it is necessary that the grippers on the roller re-
50 volving continuously press upon the sheet always on the same spot. To this end the gripper-bar *l* is provided with two different mechanisms for imparting motion. The grippers before seizing the paper must be so wide open
55 as to touch neither the table A nor the paper, and therefore the grippers, with the gripper-bar *l*, must be turned for about one hundred and eighty degrees and must then close quickly. This quick motion cannot be exe-
60 cuted with sufficient accuracy in the manner at present in use, and in order to obtain a movement of the grippers which is certain I employ a device opening the grippers and pre-
65 paring their back motion, whereupon a second mechanism forces the grippers to close. These two mechanisms coöperate in the following manner: The spring *p*, secured to the

lever or arm *r* of the toothed sector *o*, has the tendency to open the grippers by means of the teeth of said sector and pinion *k*. The
70 roller *r'* of arm *r* in passing over the cam-surface *s* effects this, Fig. 1, and the grippers pass wide open under the table A. When the roller *r'* of arm *r* arrives upon the cam *s'*, the grippers *i* close as the arm *r* is lifted by *s'*.
75 The lever *m*, being secured on *l*, swings thereby forward, and its roller *m'* comes in contact with the cam-surface *n*, thus closing the grippers *i* quickly and with certainty.

The method of working the machine is as
80 follows: The sheet of paper is placed on the table A against the previously-adjusted stops *b*, Fig. 1. Shortly before the grippers *i* of the press-roller B close and take hold of the paper the fingers *c* descend upon it, and the
85 stops *b* recede. From the pipe *w* air is now blowing upon the edge of the paper, pressing it against the cylinder B, Fig. 2. The grippers *i*, moved by the cam *s'*, arm *r*, sector *o*, pinion *k*, lever *m*, and cam *n*, close and seize
90 the paper in the same moment the fingers *c* go up, and the grippers *i* carry the paper forward with the press-roller B, Fig. 3. After the impression the grippers deliver the paper upon the discharge-drum *d*, the grippers *d* of
95 which seize the sheet, Fig. 1, and carry it, as soon as the grippers *i* on roller B open to release it, for a part of its circumference upon said drum D until it arrives upon a system of
100 ribbons F, by means of which it is brought upon the rake T, which turns the paper over and deposits the sheets, printed face upward, upon the table E, Fig. 7. When the grippers *i* open to abandon the printed sheets to the drum D, the disk with the cam-surfaces *n s s'*
105 is shifted sideways in such a manner that the grippers *i*, while roller *r'* of arm *r* passes behind *s'*, remain fully open during the following two revolutions of press-roller B, and they rest with their points against the edge of
110 press-roller B. When the press-roller B at the next revolution comes into the position indicated by Fig. 1, the disk with the cam-surfaces *n s s'* moves in again, the roller *r'* of arm *r* runs upon the cam *s'*, and the grippers *i*,
115 closing, take hold of a fresh sheet of paper, and a new impression is effected in the above-described manner. During the three revolutions of cylinder B the roller C has only made two, and its surface covered with the plate of
120 aluminium or zinc has twice passed in front of the moistening-rollers R R', which are covered with rubber and any suitable fabric capable of holding water. The rollers R R' take up moisture from a roller Q, having the same cir-
125 cumferential velocity as roller C. The water is carried up from the trough M by means of intermediate rollers N O P, as shown in Fig. 7.

As stated above, the cylinder C passes for
130 each impression with the plate twice before the rollers R R' and also twice before the inking-rollers L L'. These latter are arranged on the side of the plate-cylinder in

order to give easy access to the same. They take the ink from a roller J, having the same circumferential velocity as cylinder C. The conductor G transfers the ink from the well by means of roller H in the ordinary way upon the roller J, and the small rollers K are provided for the purpose of smoothing out the ink on said roller J, so that it passes from the same in a uniform manner upon the ink-rollers L L' and upon the printing-plate. The part of the cylinder C not carrying the printing-plate is set back and therefore cannot take any ink or water.

As already stated, the printing-cylinder and platen-cylinder are in the proportion of two to three—that is to say, the printing-cylinder B is two-thirds of the size of the platen-cylinder C. This proportion has been chosen in order to render it possible that in one impression the platens of the cylinder C are twice moistened and inked, this double inking being necessary for obtaining a clear and sharp impression.

From Figs. 4, 5, and 6 it will be seen that the printing-surfaces of the cylinders C and B change their relative positions in every revolution of the cylinder B.

In Fig. 4 the printing-surfaces of B and C are opposite each other, so that an impression takes place in the further rotation. After the completion of the first revolution of the cylinder B the platen-cylinder C has only made two-thirds of a revolution, Fig. 5. Opposite the printing-surface of the cylinder B is in the further movement a blank portion of the periphery of C, while the platen-surface of C will be opposite to the blank portion of the periphery of the printing-cylinder B. After the completion of the second revolution the cylinders are as shown in Fig. 6. In the following third revolution of B the entire periphery of the same is developed upon the blank peripheral surface of the cylinder C, and the two cylinders on the termination of the third revolution pass again to the position indicated in Fig. 4, wherein a fresh impression will commence. Accordingly by the proportion of the cylinders of two to three it is rendered possible that only after every third revolution of the printing-cylinder B the two printing-surfaces come into contact, so that only then an impression will take place.

It will be seen that as the printing-surface of the cylinder B corresponds in the turning movement several times with the blank surface not surrounded by the metallic plate of the cylinder C, and vice versa, the platen-surface of the cylinder C with the peripheral surface not serving as a printing-surface of B, it is necessary to cause these unused blank surfaces of the platen and printing surfaces proper to spring back, so that in the revolutions neither the printing-surfaces nor the platen-surface come in contact with the surfaces not used and are not thereby injured. If the unused surfaces were not set back it would not be possible to cause the printing-

surfaces of the metallic plates to be twice inked, because the printing-cylinder B would take off with its unused surface the ink put on, and the unused surface of C, if not set back, would likewise be moistened and inked, whereby, as the printing-surface of B would come in contact with the unused surface of C, the cover of the cylinder B, and consequently the back of the sheet to be printed, would become dirty.

Figs. 8 and 9 show the laying apparatus and the double-catch mechanism carried out on a large scale in order to enable the mode of motion of the two mechanisms to be shown. Upon the shaft *a*, on which the marks *b* are laterally adjustable, is loosely arranged a lever 3, to which a rod 6 is attached. This rod 6 receives upward and downward movements through the intervention of the double lever 13 and rod 14 by means of an eccentric placed on any desired shaft of the machine; but this shaft must have half the number of revolutions of the cylinder C—that is to say, when C makes two revolutions the shaft will make only one revolution. On the lever 3 is arranged a screw 23, which strikes against a tappet 24 of the arm *g*, fixed upon the shaft *a*. The arm *g*, and with it the shaft *a* and stops *b*, are held by a spring 25, attached to the lever *l* in a position limited by the adjusting-screw *f*. A small projection 9 on the rod 6 draws down a lever 8, which is arranged upon the shaft 26, carrying the curved fingers *c*. When a sheet is placed against the marks *b*, the rod 6 is in its highest position, the spring 25 has drawn the shaft *a* with the stops *b* and the arm *g* against the adjusting-screw *f*, the projection 9 by the lever 8 has raised the finger *c*, and in like manner the lever 10 and roller 11 are in a raised position. The tube *w* is turned by the lever 4 through the medium of the rod 5 by the arm *g*, so that the holes *v* are closed. If the catches *i* begin to close, the rod 6 is lowered, the lever 8 as the rod 6 descends moves downward, and the fingers *c* bear upon the sheet laid on. Now the screw 23 strikes against the catch 24 and turns the arm *g* with the shaft *a* and the stops *b* backward. At the same time the tube *w* is turned by the lever 4 so far that the holes *v* coincide. The current of air passing out forces the sheet upon the edge of the cylinder B. At the same moment when the catches *i* are closed the roller 11 of the lever 10 passes on to the curved path 12 and is raised a little by the latter, the finger *c* following this movement and allowing the passage of the sheet seized by the catches *i*. When the sheet has passed through, the rod 6 is raised, the fingers *c* are completely raised by the projection 9, the shaft *a* with the stops *b*, pulled by the spring 25, swings forward, and the arm *g* bears against the adjusting-screw *f*. A fresh sheet is now put on. The double lever 13 has its pivot on an arm 37, firmly connected with the table-carrier 15, which is pivotally supported at 36, in order

that when the table A is laid back to the position shown in dotted lines at Fig. 7 the rod 6 may follow the movement. The screw 23 has for its object to enable the backward movement of the stops *b* to be adjusted exactly according to the movement of the fingers *c*. In order to permit of a lateral movement or displacement of the disk 31 with the curved paths *s s' n*, the disk is supported by two guides 16 in the frame 30 of the machine. The guides 16 extend through the frame 30 and are on the outside connected by the bridge-piece 17. This bridge-piece 17 carries a bolt 18, to which is attached a fork 19, secured between supports 20 on a bolt to which is also secured a lever 21, which receives by the rod 22 its motion from an eccentric provided upon the same shaft which carries the mark eccentric, which, as before stated, may be on any shaft having half the number of revolutions of the cylinder C. When the catch *i* seizes the sheet laid on, the roller *r'* of the lever *r* runs onto *s'*, and *m'* runs onto the path *n*, Fig. 3, whereby the catches are closed through the segment *o* and gearing *k* and lever *m*. When the catches *i* have been opened for transferring the printed sheet to the drum D, the rod 22 is raised and the disk 31, with the paths *s, s'*, and *n*, is drawn outward by the fork 19 to such an extent that the roller *r'* of the lever *r* passes behind the path *s'*, the catches thus remaining open. When the next sheet laid on is to be seized, the fork 19, moved by the rod 22, the disk 31 shifts inward at the moment when the roller *r'* passes

to the same position which it occupied when the eccentric 31 was moved outward, then the roller *r'* runs onto *s' m'* onto the path *n*, and the catches *i* are closed to seize the next sheet.

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

1. The combination in a rotary press for lithographic printing, of a plate-cylinder and a press-roller of dimensions in proportions of three to two, the said cylinder and roller adapted to have an equal circumferential velocity and having respectively one-third, and one-half of their circumferential surfaces arranged to coöperate, and the remainder of the said surfaces set back, substantially as and for the purpose set forth.

2. In combination with the press-roller B provided with grippers *i* gripper-bar *l*, and pinion *k*; the toothed sector *o* having an arm *r* and a roller *r'* at the end thereof the gripper-bar lever *m*, having a roller *m'* at its free end, as described, with the cam *s'* and cam-surface *n*, in which the rollers *r'* and *m'* are respectively adapted to operate, substantially as and for the purpose set forth.

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

JOSEPH KRAYER.

Witnesses:

ALVESTO S. HOGUE,
JEAN GRUND.