

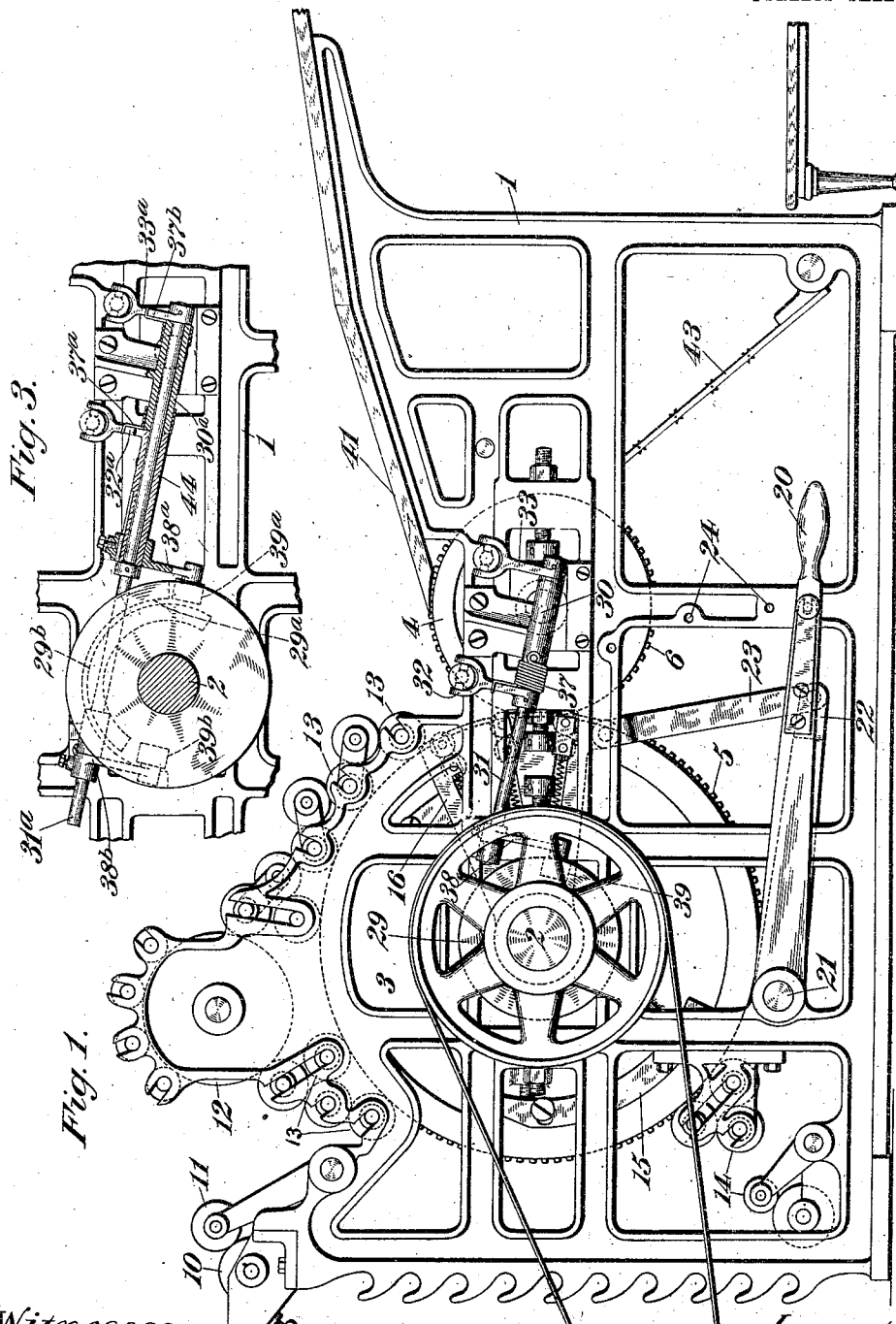
No. 857,331.

PATENTED JUNE 18, 1907.

G. R. CORNWALL.
PRINTING PRESS.

APPLICATION FILED DEC. 21, 1904.

4 SHEETS—SHEET 1.



Witnesses:
August L. Sattzman
Clara Phillips

Inventor,
George R. Cornwall
By
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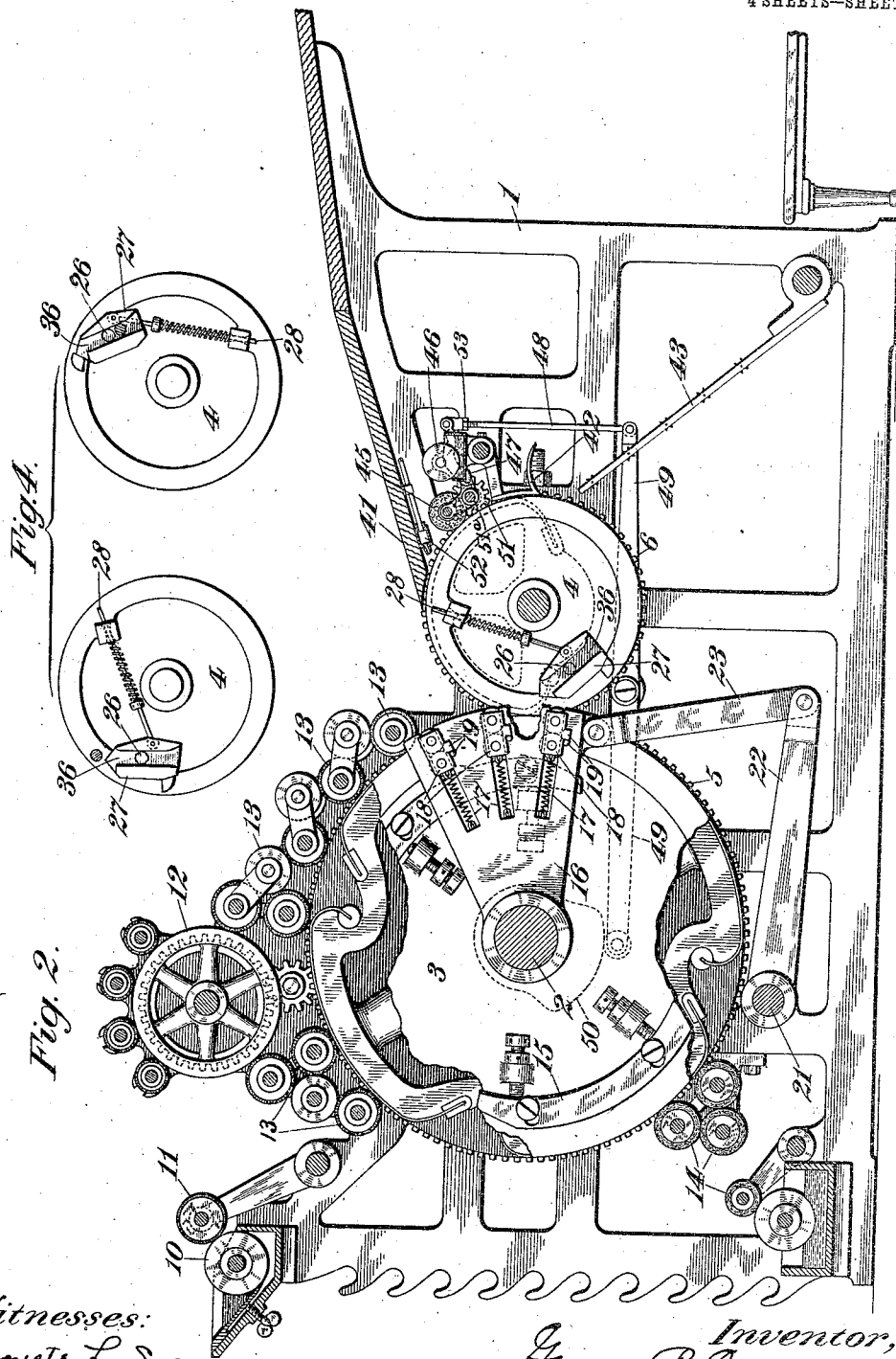
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4 SHEETS--SHEET 2.



Witnesses:
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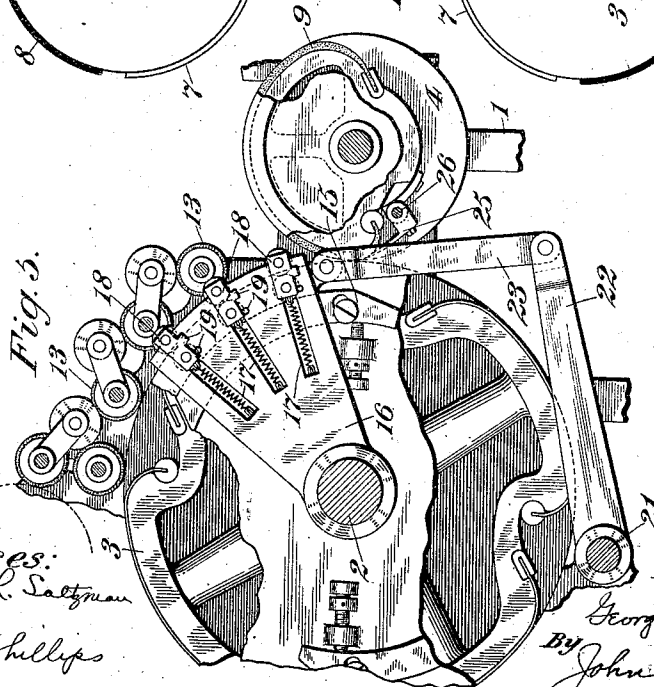
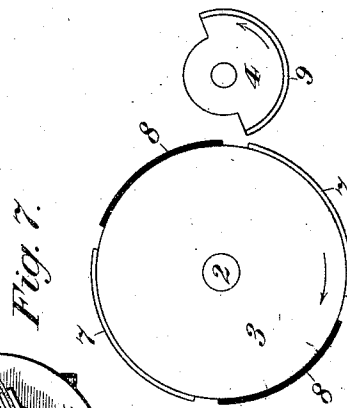
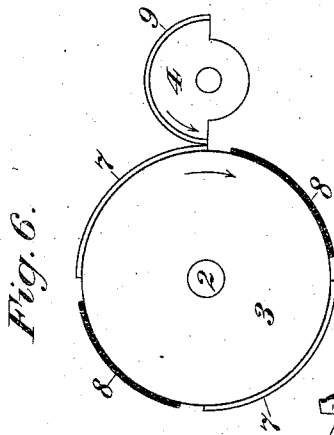
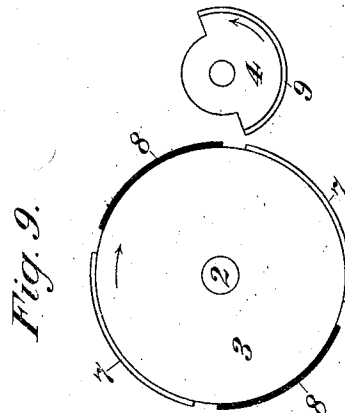
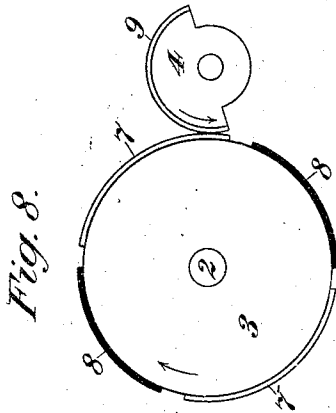
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PRINTING PRESS.

APPLICATION FILED DEC. 21, 1904.

4 SHEETS—SHEET 3



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PRINTING PRESS.

APPLICATION FILED DEC. 21, 1904.

4 SHEETS—SHEET 4.

Fig. 15.

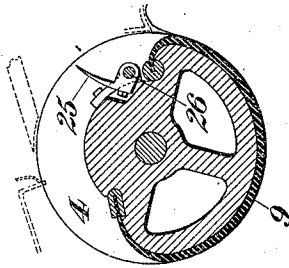


Fig. 16.

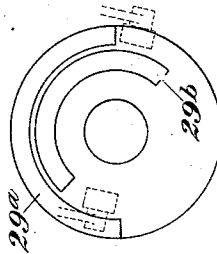


Fig. 12.

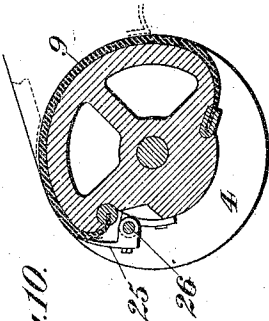


Fig. 13.

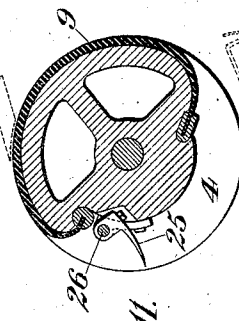


Fig. 14.

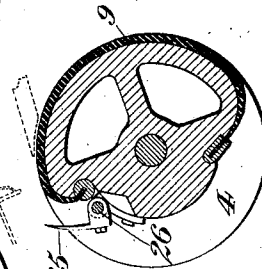
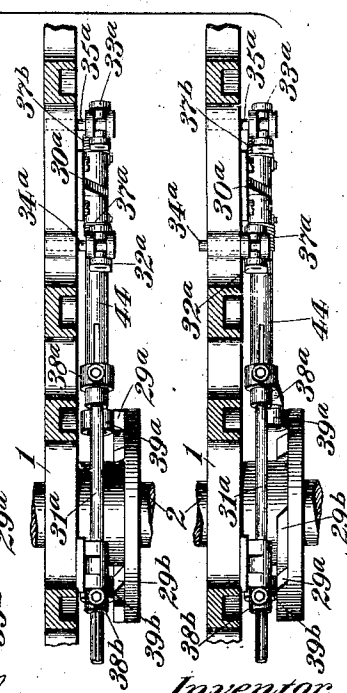
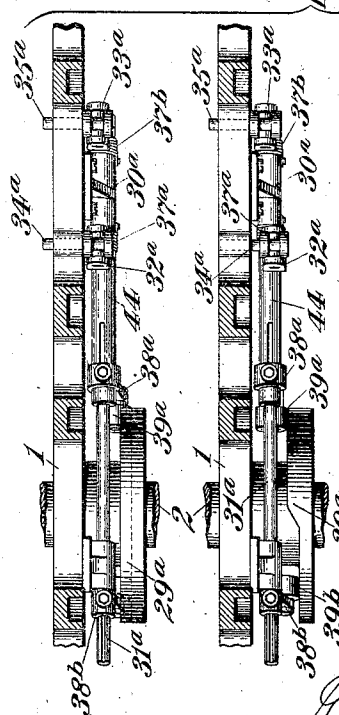
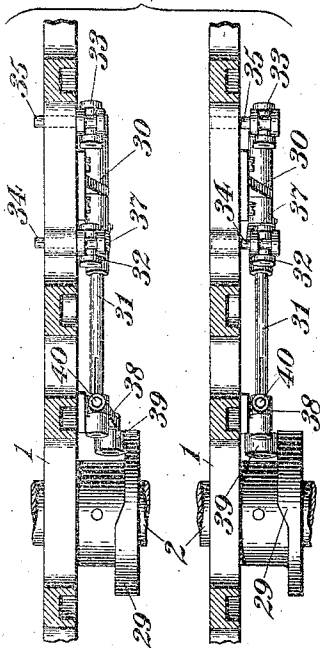


Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE R. CORNWALL, OF RYE, NEW YORK.

PRINTING-PRESS.

No. 857,331.

Specification of Letters Patent.

Patented June 18, 1907.

Application filed December 21, 1904. Serial No. 237,833.

To all whom it may concern:

Be it known that I, GEORGE R. CORNWALL, a citizen of the United States, residing at Rye, in the county of Westchester and State of New York, have invented a new and useful Printing-Press, of which the following is a specification.

The invention relates to printing presses and more particularly to planographic rotary printing presses, although in certain of its features the invention is applicable to rotary presses generally.

Objects of the invention are to provide a printing press of simple, reliable and compact structure; to provide a press adapted to do excellent work on impression-receiving surfaces of various kinds; to provide for perfecting a sheet or for printing it on one side only; to provide for giving an offset impression or a direct impression, or a combination of these in a double impression; to provide for giving a yielding or a non-yielding impression, or a partly yielding impression or "squeeze" during the impression contact as may be desired; to provide for adequate and efficient inking of the printing surfaces; to provide a simple and effective control of the inking mechanism; to provide a single inking system and a single printing couple to perfect a sheet; to provide for feeding sheets to the press in such manner as to secure the product desired. These and other objects of invention will in part be obvious and will in part more fully appear hereinafter.

The invention consists in the novel parts, improvements and combinations herein shown and described. The accompanying drawings, referred to herein and forming a part hereof, illustrate one embodiment of the invention, the same serving in connection with the description herein, to explain the principles of the invention.

Of the drawings: Figure 1 is a side elevation of a printing press constructed in accordance with certain features of the invention. Fig. 2 is a longitudinal section in elevation of the press. Fig. 3 is a detailed view, partly in section, of the gripper controlling mechanism. Fig. 4 is a detailed view of another part of the gripper controlling mechanism shown in two positions. Fig. 5 is a detailed elevation showing the controlling mechanism for the inking rolls. Figs. 6 to 9 are diagrammatic views showing the printing cylinders in different positions. Fig. 10 shows in detail one form of the gripper con-

trolling mechanism in different positions. Fig. 11 shows a modified form of the gripper controlling mechanism in different positions. Figs. 12 to 15 show different positions of the grippers during different parts in the revolution of the gripper carrying cylinder. Fig. 16 is a detail of one arrangement of the cams in the gripper controlling mechanism.

The invention contemplates, as hereinbefore indicated, the providing of a press which is of simple and compact structure, as well as possessing other advantages, and in the embodiment illustrated herein by way of example, a press having a single printing couple and a single inking system is shown which is adapted to perfect or to print one side only of the impression-receiving material, which is adapted to give a direct impression upon one side of the sheet, or to give an offset impression upon one side of the sheet, or to give a direct impression on one side and an offset impression upon the other side simultaneously, thus perfecting the sheet.

According to certain features of the invention it is contemplated to provide means which may be set to automatically cause the printing couple to print in any of the ways specified. So far as concerns these features broadly it is immaterial what special form of mechanism is employed for effecting this but in the said illustrated embodiment the sheet-handling mechanism is utilized for the said purpose.

In the embodiment of the invention shown in the drawings 1 indicates the general frame structure of the press. 2 shows a shaft mounted in the frame and supporting, so that it may rotate therewith, the form carrying cylinder 3; said shaft 2 may receive power from any suitable source. Mounted in proper relation with the cylinder 3 is a cylinder 4 which is caused by suitable means to perform its unit rotations in a given ratio to the unit rotations of the cylinder 3. This may be effected by a spur gearing 5-6 such as is shown in the drawings.

Mounted upon the form cylinder 3 are plate holding or plate clamping devices of any suitable and approved structure and of such number as may be best suited for the particular work which the press is intended to perform. The surfaces or plates carried on the cylinder may consist entirely of printing surfaces, when desired, and for certain purposes they may consist of printing surfaces and impression surfaces. So far as certain

features of the invention are concerned, any suitable form of inking mechanism may be employed. In accordance with one feature of the invention, however, and as illustrated, it is desirable and convenient to provide upon the surface of the said cylinder 3, printing surfaces and ink distributing surfaces, or ink slabs in alternate relation, and in the diagrammatic showings of Figs. 7 to 9 a form cylinder 3 is illustrated having two printing surfaces 7 and two ink distributing surfaces or ink slabs 8 in alternate relation. As the printing surfaces are removably attached, plates or impression surfaces of a yielding or non-yielding character may be used as desired at any time and for any particular purpose.

In the embodiment illustrated the printing surfaces 7 are of a planographic character and the ink distributing surfaces are shown equally radially distant therewith from the axis of the form cylinder 3. It is necessary with this arrangement that means be provided whereby the surface of the impression or offset cylinder 4 shall be kept out of contact with the ink slabs 8. A means of effecting this is shown in Figs. 5 to 8 wherein a portion of the periphery of the cylinder 4 is depressed or cut away. It is found convenient to have the cylinder 4 perform as many unit revolutions for each unit revolution of the form cylinder 3 as there are plates or printing surfaces 7 upon the said cylinder 3. By properly timing the parts the surfaces of the two cylinders will come into the position shown in Fig. 6 while rotating in the directions shown by the arrows in said figure. It will be seen therefrom that the high portion of the surface of the cylinder 4 will come in contact with the surface of the plate 7, but that when the ink slab 8 has rotated to a position nearer the cylinder 4 that the depressed part of said cylinder 4 has come into position over against the ink slab, as in Fig. 7, thereby preventing contact between the ink slab and the surface of the cylinder 4. Figs. 8 and 9 show a duplication of these movements with respect to the remaining printing surface and ink slab illustrated therein.

The high portion of the cylinder 4 is provided with plate holding or clamping means and upon said high portion there is clamped a blanket or plate 9 adapted to receive an impression of a design or printed matter which it is then capable of yielding up, or impressing upon a sheet which may pass through the printing couple.

It will be seen from Fig. 6 that if the surfaces 9 and 7 come in contact as shown with a sheet interposed, the design or characters upon the surface 7 would be impressed upon the sheet, the member 9 serving only to make the impression. In case the plate 7 were of metal and the surface 9 were a yielding surface the impression would be that of

a yielding impression member and a non-yielding form member. In case no sheet were interposed between the surfaces 7 and 9 as shown in Fig. 6 a design carried in reverse on the surface 7 would be transferred or offset in normal position upon the surface 9 and after a complete rotation of the cylinder 4 and a half rotation of the cylinder 3 the surface 9 would come in contact with the second surface 7 carried by the form cylinder 3. If a sheet were interposed between the said surfaces at this time said sheet would receive an imprint of the design from the surface 9. In case plate 7 which would now be coacting with the surface 9 were of a yielding nature and carried no design, the sheet would receive a single or non-perfecting impression between two yielding surfaces; if the surface 7 were of a yielding nature and also carried a design the sheet would receive a perfecting impression between two yielding surfaces; if the surface 7 were of a non-yielding nature and carried no design the sheet would receive a non-perfecting offset impression between a yielding member and a non-yielding member; and if the surface 7 were of a non-yielding nature and carried a design the sheet would receive a perfecting impression between a yielding and a non-yielding member, one side of the sheet receiving an offset imprint. The variations in the nature of the impression are of great value when sheets having surfaces of different characters as regards roughness, hardness, ink-receiving qualities, etc., are fed through the press. It will be also noted that the two cylinders are each adapted to act as form or impression cylinders or as both form and impression cylinders, and to yield either direct or offset imprints or both.

One arrangement of the various surfaces upon the cylinders 3 and 4 which is of great usefulness comprises having an offset surface upon the cylinder 4 and planographic printing plates carried upon the cylinder 3. With the illustrated embodiment and referring especially to Figs. 6 to 9 inclusive and with the arrangement indicated, 9 would be an offset surface and each of the surfaces 7 would be a planographic printing plate. With this arrangement and with a sheet fed to every revolution of the cylinder 4 a direct impression from the printing plate 7 upon one side of the sheet would be obtained; if a sheet were fed at every other revolution of the cylinder 4 the surface 9 would take an offset impression from one of the plates 7 and then co-act with the other plate 7 to perfect the sheet with an offset impression upon one side and a direct impression from the printing plate upon the other side; if no design were carried upon one of the plates 7 the sheet could be fed so that an offset impression would be taken from the other plate 7 upon the surface 9 and then an offset impression

upon one side given to the sheet by the said surface 9, the plate 7 carrying no design acting as an impression surface only.

It will be obvious that variations in the character of the impression both as to the nature of the imprint or of the impression or "squeeze," whether yielding or unyielding, or a combination of both, may be secured through quite a wide range.

Inking devices are provided, and according to certain features of the invention they may be of any desired form, but according to other features of the invention, inking devices are provided adapted to give a very extensive grinding and distribution of the ink, such as is necessary in producing high quality work. According to other features of the invention it is also contemplated to provide means for controlling and varying the action of the inking mechanism so that the supply of ink to a particular printing plate may be exactly regulated, or the supply for one printing plate may be varied from that for another printing plate. In the illustrated embodiment of inking mechanism both of the said features are realized and in the said form 10 indicates an ink fountain, 11 a ductor roll, 12 an ink distributing roll, which may be of any suitable and approved design.

The ink slabs 8 mentioned in a previous connection and the inking rolls 13, together with the parts just described, constitute an effective inking system for giving very thorough grinding and distribution of the ink and for applying it evenly to the printing plates.

For planographic printing a damping mechanism of any suitable and convenient form may be used and such a mechanism is indicated by the reference numeral 14.

It is frequently desirable when one of the plates or surfaces upon the cylinder 3 is used for giving an indirect or offset impression to the surface 9 of the cylinder 4, to give such plate a heavier inking than is required for another plate upon the cylinder 3 which may be used for direct printing, or vice versa. Also when a second surface upon the cylinder 3 is used merely as an impression surface to coact with the surface 9 as a printing surface it is necessary that such impression surface receive no ink. For this purpose mechanism is provided which is adapted to vary the amount of ink received by the different printing surfaces upon the cylinder 3 or to cause any of the surfaces on said cylinder to receive no ink as may be required by the particular work to be performed. In the drawings an embodiment of such a controlling mechanism for the inking mechanism is shown.

15 indicates a cam member which is radially adjustable upon the form cylinder, and when desired such a member may be provided contiguous to each part of the surface of the cylinder where it is desired either to

vary or cut off the ink supply. Coacting with the member 15 is a plate 16 which may be mounted upon the shaft 2. This plate is slotted radially as at 17 and in said slots are mounted sliding blocks 18 which are spring-impelled inwardly with respect to the cylinder 3, each carrying suitable friction rolls, their inward movement being limited by a pin and lug 19. Mounted on the press structure is a hand-lever 20 connected with a rock-shaft 21 and connecting by means of arm 22 and link 23 with the plate 16 so that movement of the hand-lever 20 communicates a corresponding movement to the plate 16. The hand-lever is provided with a spring pin which coacts with holes 24 in the press frame to retain it in any desired adjusted position. The plate 16 may be moved into any desired position with respect to the inking rolls 13 and the radial sliding blocks 18 may be positioned beneath the pintles or shafts of one or more of the inking rolls respectively. The blocks 18 being normally held in their innermost position by the spring and by the lug and pin construction 19 are not in contact with, although beneath, the shafts of the inking rolls. During the rotation of the cylinder 3 as the cam 15 comes in contact with the blocks 18 they ride upon the sloping portion of the cam and are pushed outwardly, thereby coming in contact with the shafts of the inking rolls 13 and thereby lifting them away from the surface of the cylinder 3.

It will thus be seen that means are provided for determining at what portion of the surface of the cylinder 3 variations in the quantity of ink supplied shall occur and means are further provided whereby the amount of such variation shall be determined, the location and amount of the variation being dependent upon the relative positions of the coacting members. These members may be so positioned as to throw off the inking mechanism from entire portions of the printing surface or they may be thrown out of action so that the ink will be uniform over the entire printing surface or surfaces.

It will be understood also that the mechanism just described is a single inking system which is adapted to provide ink for two members of a single printing couple which imprints simultaneously both sides of a sheet.

So far as certain features of the invention are concerned, any suitable form of sheet handling mechanism may be employed. In accordance with other features of the invention, it is contemplated to provide sheet-handling mechanism which may be automatically set to co-operate with the other parts of the press so as to control and vary the nature of the impression so that the printing couple may be caused to give an impression direct from the printing plate upon a sheet, or to give an impression from the printing plate upon the offset surface and then from

the offset surface to the sheet, or to give a perfecting impression to the sheet, one side thereof being printed directly from the printing plate and the other side being printed from the offset surface. A form of sheet-handling mechanism embodying the said features is accordingly shown herein, said form comprising a suitable gripper mechanism in connection with cylinder 4. Mounted upon said cylinder is shown a gripper 25 fixed on a gripper shaft 26. At the end of said shaft is a tumbler block 27 which, by means of a spring-pressed rod 28, remains in either of two positions into which it may be thrown, in one of which said positions the grippers are open and in the other closed (see Figs. 4, 12-15). Suitable controlling and actuating mechanism for these grippers is provided and such mechanism is conveniently connected with and controlled and actuated from the shaft 2. Upon the shaft 2, accordingly, is fixed a cam 29 so shaped as to provide for the proper periodic actuation of the gripper mechanism. In the present instance the cam is shown so shaped as to actuate the gripper mechanism once for every revolution of the form cylinder which as heretofore explained occurs during every two revolutions of the impression or offset cylinder.

Mounted on the frame of the press is a bracket member 30, within which is journaled a shaft 31 carrying arms 32, 33 in the ends of which are mounted pins 34, 35 which work in holes in the press frame and are adapted in one position to enter the cam groove 36 in the tumbler block 27. The shaft is impelled by the spring 37 to rotate in a direction so as to keep the pins 34, 35 pressed inward and protruding into the path of the said cam groove 36. Splined upon the shaft 31 is an arm 38 having a friction wheel 39 at its end adapted to ride upon the face of the cam 29. It will thus be seen that when the friction wheel 39 is in contact with the proud part of the cam disk 29 the shaft 31 will be rotated against its spring and the pins 34 and 35 will be withdrawn from the path of the cam groove 36 of the tumbler block 27. The arm 39 is provided with a set screw 40 so that the arm may be moved backward into position where it will cease to coact with the cam 29. The spring 37 in such case would keep the pins in their inward or protruding position.

Any suitable means for feeding sheets of material to the press may be provided such as the hand feed board 41. The pin 34 is in such position that by coacting with tumbler block 27 it will cause the gripper to close upon a suitably fed sheet. The sheet will then be carried through the printing couple, and the pin 35 coacting with the tumbler block 27 at the proper time will act to open the gripper to release the sheet. Stripper mechanism and delivery mechanism 43 of any suitable

and approved form may be provided to take the sheets. From an inspection of Fig. 10 it will be seen that in the present embodiment the cam 29 actuates the arm 38 and withdraws the pins once for every revolution of the cylinder 3 or once for every two revolutions of the cylinder 4 so that the grippers will take a sheet for every second revolution of the impression or offset cylinder 4. This is desirable whenever offset printing is desired or whenever a sheet is to be perfected.

If it is desired to have the grippers take a sheet at every revolution of cylinder 4 it is only necessary to slide the arm 38 back into an inoperative position with regard to the cam 29 which may be done by the means heretofore described and pointed out. It will also be understood that the sheet-handling mechanism described will likewise constitute a form of means for automatically giving a yielding or non-yielding impression as may be desired in different cases, as herein previously set forth, it being understood that the various surfaces upon the cylinders constituting a printing couple will in such case be arranged in harmony with the adjustment or setting of the sheet-handling mechanism.

In Figs. 3 and 11 is shown a modification of the gripper mechanism which is particularly adapted for high speed work and wherein each pin is withdrawn independently of the other, and being so withdrawn it has obviously a longer time in which to pass through its cycle of movements. In this form a sleeve 44 is shown journaled in a bracket 30^a said sleeve being rigidly connected with an arm 32^a which is spring-pressed by a spring 37^a so as to keep its pin 34^a in the inwardly protruding position. This sleeve 44 has connected therewith an arm 38^a which is positioned to coact with a cam 29^a fixed upon the shaft 2. Journaled within said sleeve 44 is a shaft 31^a which has fixed thereto an arm 33^a in which is mounted a pin 35^a which is spring-pressed by a spring 37^b into its inwardly protruding position. At the other end of said shaft 31^a is fixed an arm 38^b positioned to coact with a cam 29^b. Each of said arms 38^a and 38^b are slidably secured upon their respective carriers so that by manipulation of their set screws they may be moved into a position where they will not be actuated by the cams 29^a and 29^b. In this position the pins 34^a and 35^a will engage and actuate the grippers at every revolution of the cylinder 4.

It will be seen from the foregoing that the sheet taking mechanism may be set to take a sheet at every revolution of the impression or offset cylinder or at every second revolution thereof and that thereby the functions performed by the cylinders 3 and 4 are materially changed and modified and the nature of the product of the press both as to the char-

acter of the impression, and the character of the printing surface are varied as desired and direct or offset printing or both direct and offset printing are secured as may be desired.

5 When the cylinder 4 is used as an offset cylinder it may be desirable to clean the surface thereof after each printing impression is made and before the design is again transferred to the offset printing surface from the
10 cylinder 3. A means for effecting this is shown, consisting of a reversely rotating wiping or cleaning roll 45 which is pivoted upon a shaft 51^a so as to periodically move alternately into contact with the surface of the
15 cylinder 4 and into contact with a fountain roller 46 which dips into a suitable cleaning solution. An idle pinion 51 communicates rotary motion to the roll 45 from the cylinder 4. The roll 45 is actuated by a suitable
20 connection such as the link 48 connecting an arm of the bell-crank lever upon which the roll 45 is mounted with a lever 49 which is acted upon by an adjustable cam 50 which may be carried upon a shaft 2 to rotate there-
25 with. An adjustment 53 is shown in the link 48 for the purpose of adjusting the pressure with which the roll 45 contacts with the surface of the cylinder 4. For the purpose
30 of drying thoroughly the surface 9 of the cylinder 4 an air-blast is shown at 52. When the wiping or cleaning action of the roll 45 is not desired it may be thrown out of action by means of the connection 53 or by slipping the
35 cam 50 or by any other desired means. From all the foregoing it will be seen that, among other advantages, a press has been provided which, while of great simplicity as regards structure, possesses great flexibility
40 as to the functions performed by the various members and a wide and varied range of usefulness as to the materials upon which it is adapted to act and as to the nature and character of the impression and product. The
45 construction illustrated by reason of its simplicity conduces to low cost of manufacture, strength and durability of parts, ease and convenience of control and accessibility of all parts for adjustment and cleaning. The
50 operation of the press and the manner of controlling the various parts so as to secure desired changes in the manner of operating and in the product of the press will be apparent from the foregoing description.

The invention, in its broader aspects, is
55 not limited to the particular constructions shown, nor to any particular constructions by which it has been or may be carried into effect, as many changes may be made in the construction without departing from the
60 main principles of the invention and without sacrificing its chief advantages.

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

65 1. A printing press including in combination a cylinder carrying a printing plate, a

cylinder carrying an offset surface, said cylinders constituting a printing couple, inking means for the plate-carrying cylinder, and automatic means constructed and arranged for causing the printing couple to give an impres- 70 sion direct from the printing plate upon a sheet, or to give an impression from the printing plate upon the offset surface and then from the offset surface to the sheet.

2. A printing press including in combina- 75 tion a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking means for the plate-carrying cylinder, and automatic means for causing said couple to 80 perfect a sheet at one impression, one side of the sheet being printed directly from the printing plate and the other side being printed from the said printing plate by means of the offset surface. 85

3. A printing press including in combination a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking 90 means for the plate-carrying cylinder, and means constructed and arranged to cause the printing couple to print a sheet on both sides at one impression, one side being printed directly from the printing plate and the other 95 from the offset surface, or to print either a direct impression from the printing plate, or an offset impression from the offset surface, on one side of the sheet only.

4. A printing press including in combination a cylinder carrying a printing plate, a 100 cylinder carrying an offset surface, said cylinders constituting a printing couple, inking means for the plate-carrying cylinder, and sheet-handling means adapted to be set to take sheets at such time and in such manner 105 as to cause the printing couple to give an impression direct from the printing plate upon a sheet, or to give an impression from the printing plate upon the offset surface and then to the sheet, as desired. 110

5. A printing press including in combination a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking 115 means for the plate-carrying cylinder, and sheet-handling means adapted to be set to take sheets at such time and in such manner as to cause the printing couple to perfect a sheet at one impression, one side of the sheet being printed directly and the other by offset. 120

6. A printing press including in combination a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking 125 means for the plate-carrying cylinder, and sheet-handling means adapted to be set to take sheets at such time and in such manner as to cause the printing couple to print a sheet on both sides at one impression, one side being printed directly from the printing 130

plate and the other from the offset surface, or to print either a direct or an offset impression on one side only of the sheet, as desired.

5 7. A printing press including in combination a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking means for the plate-carrying cylinder, and
10 means which may be set to automatically cause the printing couple to give an impression direct from the printing plate upon a sheet, or to give an impression from the printing plate upon the offset surface and thence to the sheet, as desired.

15 8. A printing press including in combination a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking means for the plate-carrying cylinder, and
20 means which may be set to automatically cause the printing couple to perfect a sheet at one impression, one side of the sheet being printed directly from the printing plate and the other by offset.

25 9. A printing press including in combination a cylinder carrying a printing plate, a cylinder carrying an offset surface, said cylinders constituting a printing couple, inking means for the plate-carrying cylinder, and
30 means which may be set to automatically cause the printing couple to print a sheet on both sides at one impression, one side being printed directly from the printing plate and the other by offset from the offset surface, or
35 to print either a direct impression from the plate or an impression from the offset surface on one side only of the sheet, as desired.

40 10. A printing press including in combination a printing couple, means carried by the members of said couple for detachably holding printing or impression surfaces, and means for causing said couple to present to
45 an interposed sheet a yielding impression surface to co-act with an unyielding printing surface, or an unyielding impression surface to co-act with a yielding printing surface, or a yielding impression surface to co-act with a yielding printing surface.

50 11. A printing press including in combination a rotary member adapted to carry surfaces of a yielding and surfaces of a non-yielding nature, and a second member having an off-set surface, and forming a printing
55 couple with said rotary member, said second member being adapted to receive a design from one of said non-yielding surfaces and to co-act with one of said yielding surfaces to impress a sheet.

60 12. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, inking means for the said cylinder, an offset cylinder, said cylinders constituting a printing couple, said off-

set cylinder being arranged to rotate a plurality of times for each rotation of the plate-carrying cylinder, and means which may be set to automatically cause the said printing couple to print upon one side of the sheet directly from a planographic printing plate, or
70 from the plate to the offset surface and thence to the sheet, as desired.

13. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, inking means for the
75 said cylinder, an offset cylinder, said cylinders constituting a printing couple, said offset cylinder being arranged to rotate a plurality of times for each rotation of the plate-carrying cylinder, and means which may be set to automatically cause the printing couple to print a sheet on both sides at one impression, one side being printed directly from the plate and the other by offset from the offset surface, or to print either a direct impression
85 from the plate, or an offset impression from the offset surface, on one side of the sheet only, as desired.

14. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, inking means for the
90 said cylinder, an offset cylinder, said cylinders constituting a printing couple, said offset cylinder being arranged to rotate a plurality of times for each rotation of the plate-carrying cylinder, sheet-handling means adapted to be set to take sheets at such time and in such manner as to cause the printing couple to give an impression direct from the printing plate upon a sheet, or to give an impression from the printing plate upon the offset surface and then to the sheet, as desired.

15. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, inking means for the
105 said cylinder, an offset surface, said cylinders constituting a printing couple, said offset cylinder being arranged to rotate a plurality of times for each rotation of the plate-carrying cylinder, sheet-handling means adapted to be set to take sheets at such time and in such manner as to cause the printing couple to print a sheet on both sides at one impression, one side being printed directly from the plate and the other by offset from the offset surface, or to print either a direct impression from the plate, or an offset impression from the offset surface, on one side of the sheet, as desired.

16. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, a cylinder carrying an offset surface, said cylinders comprising a printing couple, damping means for the plate-carrying cylinder, inking means for the plate-carrying cylinder, gripper mechanism carried by one of said cylinders, and means which may be set to automatically cause the grip-

per mechanism to take a sheet after every revolution of its cylinder or to take a sheet after a plurality of revolutions of its cylinder.

17. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, a cylinder carrying an offset surface, said cylinders constituting a printing couple, said offset cylinder being adapted to make a revolution for each plate carried by the plate-carrying cylinder, damping means for the plate-carrying cylinder, inking means for the plate-carrying cylinder, gripper mechanism carried by the offset cylinder, and means which may be set to automatically cause the grippers to take a sheet after each revolution of the offset cylinder or to take a sheet after a plurality of revolutions of the offset cylinder.

18. A printing press including in combination a cylinder carrying a plurality of planographic printing plates and ink slabs in alternate relation, damping means for the said cylinder, inking means for the said cylinder, a cylinder carrying an offset surface, said cylinders constituting a printing couple, said offset cylinder being adapted to make a revolution for each printing plate carried by the plate-carrying cylinder, gripper mechanism carried by said offset cylinder, and means which may be set to automatically cause the grippers to take a sheet after each revolution of the offset cylinder or to take a sheet after a plurality of revolutions of the offset cylinder.

19. A printing press including in combination a form cylinder carrying a plurality of planographic printing plates, an inking system for inking the plates upon the said cylinder, damping means for damping the plates upon the said cylinder, a cylinder carrying an offset surface and constituting with the said form cylinder a printing couple, automatic sheet-feeding means for feeding sheets, and settable controlling means for the sheet-feeding means to regulate the feeding of sheets to the printing couple relatively to the rotation of its members.

20. A printing press including in combination a cylinder carrying a planographic printing plate, means for damping the said plate, a series of inking rolls adapted to contact with said plate to ink the plate, and means for moving any desired number of said rolls out of contact with said plate.

21. A printing press including in combination a cylinder carrying a planographic printing plate, means for damping the said plate, a series of inking rolls adapted to contact with said plate to ink the plate, and means carried by the said cylinder which may be set to move away any desired number of the said rolls while the printing plate is passing underneath.

22. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, means for damping the said plates, a series of inking rolls adapted to contact with the plates as they pass beneath the rolls, a cam carried upon the cylinder in a definite relation to a

planographic printing plates, means for damping the said plates, a series of inking rolls adapted to ink the plates as they pass underneath the rolls, and means which may be set to automatically cause a greater number of rolls to act on one plate than on another.

23. A printing press including in combination a cylinder carrying a planographic printing plate and an ink slab, means for damping the said plate, a series of ink rolls adapted to contact with said printing plate and with said ink slab, and means for moving any desired number of said ink rolls out of contact with the printing plate.

24. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, means for damping the said plates, a plurality of ink slabs, a series of ink rolls adapted to contact with the said printing plates and said ink slabs, and means settable with respect to each printing plate for determining the number of ink rolls that shall contact with such printing plate.

25. A printing press including in combination a cylinder carrying a planographic printing plate, means for damping the said plate, a series of movable ink rolls normally in contact with the printing plate as it passes beneath the rolls, a member settable with reference to any desired number of the ink rolls in the said series, and a member carried by the printing cylinder for rendering the said settable member operative to move away such ink rolls out of contact with the printing plate as it passes underneath.

26. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, means for damping the said plates, a series of movable inking rolls adapted to contact with the plates as they pass beneath the rolls, means which may be set to permit the inking rolls to contact with a plate or to move the rolls away so as to prevent their contact with the plate, and means which may be set to determine the number of rolls to be acted upon by the said moving means.

27. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, means for damping the said plates, a series of movable inking rolls adapted to contact with the plates as they pass beneath the rolls, a cam carried upon the cylinder in a definite relation to a printing plate, and movable means carried on the frame of the press which may be interposed between the said cam and the said rolls to move the rolls out of contact with the plate.

28. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, means for damping the said plates, a series of movable inking rolls adapted to contact with the plates as they pass beneath the rolls, a cam carried upon the cylinder in a definite relation to a

printing plate, and means which may be set so as to cause the said cam to move any desired number of the inking rolls away so as to prevent their contact with the plate.

5 29. A printing press including in combination a printing cylinder carrying a planographic printing plate, means for damping the said plate, a series of movable ink rolls normally in contact with the printing plate as
10 it passes beneath the rolls, a member settable with reference to one or more of the ink rolls in the said series, and a member carried by the printing cylinder which may be set to render operative or inoperative the said settable member to move away the ink rolls out
15 of contact with the printing plate as it passes underneath.

30. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, damping means for
20 the said cylinder, inking means for the said cylinder, a cylinder carrying an offset surface, said cylinders constituting a printing couple, said offset cylinder being adapted to
25 make a plurality of revolutions for each revolution of the plate-carrying cylinder, grippers carried upon the said offset cylinder, means for actuating said grippers at every rotation of the offset cylinder, and means
30 which may be set to automatically throw said actuating means out of operative relation to the said grippers.

31. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, damping means for
35 the said cylinder, inking means for the said cylinder, a cylinder carrying an offset sur-

face, said cylinders constituting a printing couple, said offset cylinder being adapted to make a plurality of revolutions for each revolution of the plate-carrying cylinder, grippers carried upon the said offset cylinder, means for actuating said grippers to cause them to take a sheet, a cam for moving said
40 actuating means, and means for putting the actuating means out of operative relation with the cam.
45

32. A printing press including in combination a cylinder carrying a plurality of planographic printing plates, damping means for
50 the said cylinder, inking means for the said cylinder, a cylinder carrying an offset surface, said cylinders constituting a printing couple, said offset cylinder being adapted to make a plurality of revolutions for each revolution of the plate-carrying cylinder, grippers carried upon the said offset cylinder, means normally in position to actuate said grippers at each revolution of the offset cylinder to cause them to take a sheet, a cam
55 for moving said actuating means out of operative relation to said grippers, and a member which may be moved into position to connect said cam and said actuating means or to disconnect the said cam from the said actuating means.
60 65

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

GEORGE R. CORNWALL.

Witnesses:

JOHN D. MORGAN,
CLARA PHILLIPS.