

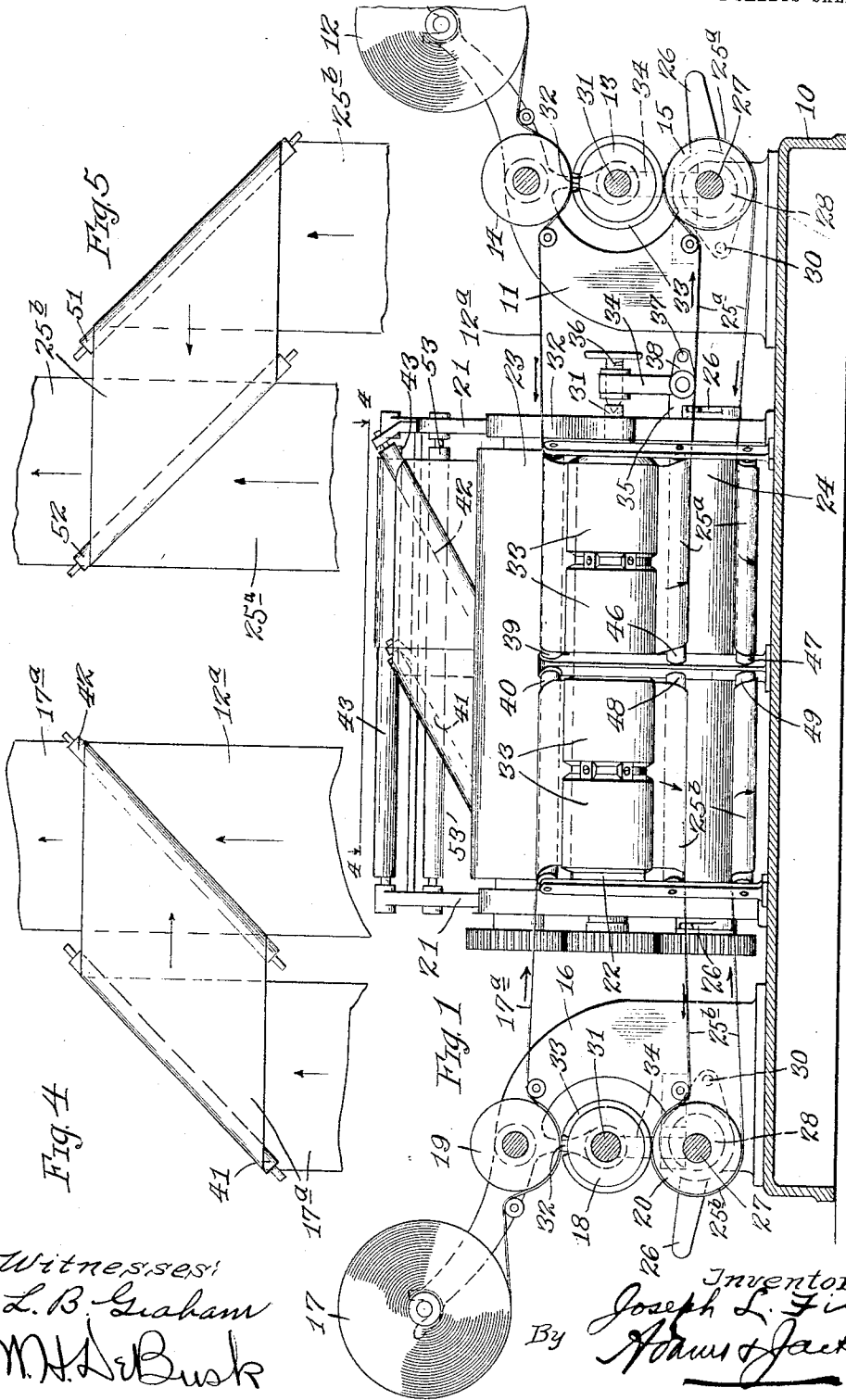
J. L. FIRM.
PRINTING PRESS.

APPLICATION FILED AUG. 18, 1913.

1,108,162.

Patented Aug. 25, 1914.

2 SHEETS-SHEET 1.



Witnesses:
L. B. Graham
M. H. DeBusk

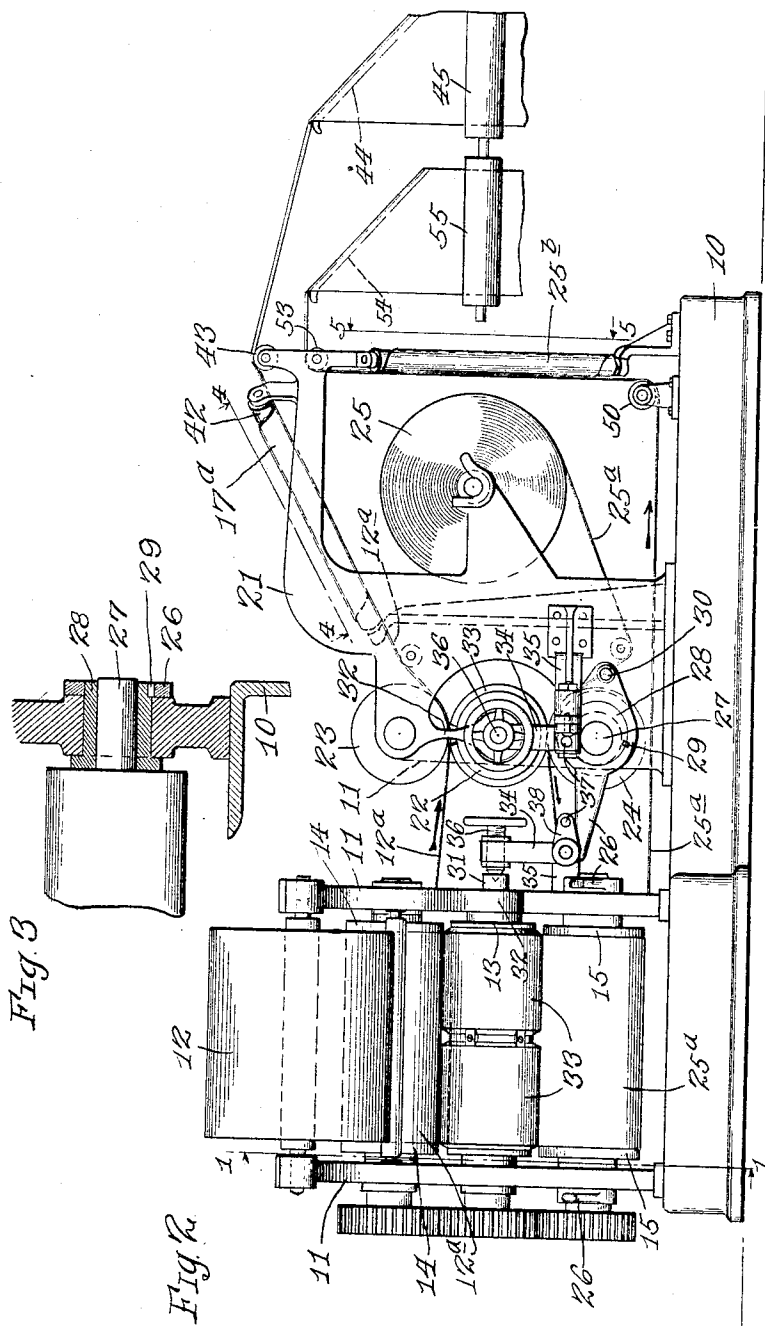
Inventor:
Joseph L. Firm
By Adams & Jackson

Attys

1,108,162.

Patented Aug. 25, 1914.

2 SHEETS-SHEET 2.



Witnesses:
L. B. Graham
M. H. DeBuck

Inventor:
Joseph L. Firm
By Adams & Jackson
Attys

UNITED STATES PATENT OFFICE.

JOSEPH L. FIRM, OF BERWYN, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PRINTING-PRESS.

1,108,162.

Specification of Letters Patent.

Patented Aug. 25, 1914.

Application filed August 18, 1913. Serial No. 785,395.

To all whom it may concern:

Be it known that I, JOSEPH L. FIRM, a citizen of the United States, residing at Berwyn, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to printing presses and has for one of its objects the provision of mechanism by the use of which the maximum product may be produced with a given number of printing plates.

15 More specifically, it is one of the objects of my invention to provide a construction and arrangement by which tubular plates may be used upon the form cylinder in connection with two impression cylinders, whereby
20 each single page printing plate is utilized for producing two separate printed pages at each complete rotation of such printing plate.

25 It is another object of my invention to provide new and improved means for the support of a form cylinder provided with tubular plates.

30 It is another object of my invention to improve the construction and arrangement of presses of this type in sundry details hereinafter pointed out.

35 The means by which I have accomplished these objects are illustrated in the drawings and are hereinafter specifically described. That which I believe to be new is set forth in the claims.

40 In the drawings,—Figure 1 is an end view of my improved press, taken substantially on line 1—1 of Fig. 2; Fig. 2 is a side view, as seen from the right in Fig. 1; Fig. 3 is an enlarged detail, partly in section, of the eccentric means for supporting the lower impression cylinders; Fig. 4 is a diagrammatic view showing the manner of associating two
45 webs, as seen substantially on line 4—4 of Fig. 1; and Fig. 5 is a diagrammatic view showing the manner of associating the other two webs, as seen substantially on line 5—5 of Fig. 2.

Referring to the several figures of the 50 drawings in which corresponding parts are indicated by the same reference characters,—10 indicates a base, rising from which are two standards 11, between which are mounted a roll of paper 12, a form cylinder 13, and
55 impression cylinders 14—15.

16 indicates two oppositely-disposed standards rising from the base 10, between which two standards are mounted a roll of paper 17, a form cylinder 18, and impres-
60 sion cylinders 19—20.

21 indicates standards, between which are mounted the form cylinder 22, impression cylinders 23—24, and two rolls of paper 25. As will be seen from an inspection of the
65 drawings, the form cylinders 13 and 18 are located in parallel positions with the form cylinder 22 between them substantially at right angles thereto, the form cylinder 22 being approximately twice as long as the
70 form cylinders 13—18.

Each of the impression cylinders 15—20—24 is movable up and down in its supporting frame away from the coacting form cylinder by a stroke of the levers 26, as hereinafter
75 described. As best shown in Fig. 3, each of the shafts 27, by means of which said impression cylinders are journaled in the frame work, are eccentrically mounted in
80 bushings 28 which are journaled in the frame work. The levers 26 are non-rotatably secured upon said bushings by means of keys 29, which levers 26 are held against rotation relative to the frame by means of pins 30,
85 which pass through suitable openings in said levers and in the frame work. As will be readily understood, when the pins 30 are withdrawn and the levers 26 are moved
90 downward at each end of one of the impression cylinders, such impression cylinder will be moved bodily downward out of operative position relative to the form cylinder with which it coacts.

Each of the form cylinders 13—18—22 has its shaft 31 supported at one end by the
95 standard rising directly from the base 10, while at the other end said shaft 31 is supported by a comparatively thin arm 32 de-

pending from the upper part of the stand-
ard whereby the tubular printing plate 33
is adapted to be slipped upon the end of the
form cylinder with the longitudinal slot of
the tubular plate passing over said arm 32.
By reason of the slot in the tubular plate be-
ing adjacent to the upper impression cylin-
der, as the tubular plate is slipped upon the
form cylinder the plate is free to move easily
without scraping upon the impression cylin-
der. It will be understood, however, that
the tubular plate could not well be placed
upon the form cylinder with the slot of said
plate uppermost without having the lower
impression cylinder first moved out of oper-
ative position by means of the levers 26 or
in some other suitable way, as will be readily
understood.

As an auxiliary support for the end of
the shaft 31 of each form cylinder that is
supported by the arm 32, I provide an arm
34 pivotally mounted upon a bracket 35
supported by the frame work, in such posi-
tion as to be swung entirely out of line with
the form cylinder. With the arm 34 swung
in this way out of alinement with the form
cylinder and with the framework 11 cut
away opposite the end of the form cylinder,
except for the arm 32 of such framework,
it will be understood that suitable clearance
is provided to enable the plate to be posi-
tioned in alinement with the form cylinder
at one end preparatory to being slipped
longitudinally between the form cylinder
and the impression cylinder into position
upon the form cylinder. In the upper end
of the arm 34 is mounted a screw-threaded
pin 36, the inner end of which engages a
suitable socket in the end of the shaft 31,
serving to hold said shaft firmly during
the operation of the machine. The arm 34
is held in operative position by means of
a pin 37 passing through suitable openings
in the bracket 35 and an arm 38 carried
by the arm 34.

The operation of the machine will be
readily understood by those skilled in the
art. With a full complement of eight print-
ing plates mounted upon the form cylinders,
with the lower impression cylinders locked
in operative position and with the support-
ing pins 36 properly locked in position and
adjusted, the press will be ready for the
printing operation, the parts being driven
by any suitable means not shown. The web
12^a from the roll of paper 12 is passed be-
tween the impression cylinder 14 and the
form cylinder 13 being printed upon its
lower surface, passes thence over an angle-
bar 39 between the impression cylinder 23
and the form cylinder 22, being printed on
the reverse side. The web 17^a from the
roll of paper 17 is passed between the form
cylinder 18 and the impression cylinder 19

being printed upon its lower side, passing
thence over the angle-bar 40 and between
the form cylinder 22 and the impression
cylinder 23, being printed upon its reverse
side. The web 17^a then passes over op-
positely-disposed angle-bars 41—42 into
register with the web 12^a, said two asso-
ciated webs passing thence over a roller 43
to the former 44 and between fold laying
rollers 45, whence they are passed to any
suitable transverse folder.

The webs 25^a and 25^b pass from the rolls
of paper 25 between the form cylinder 22
and the impression cylinder 27, where they
are printed upon their upper faces. The
web 25^a then passes over the angle-bar 46
between the impression cylinder 15 and the
form cylinder 13, where it is printed upon
its opposite side, and thence over the angle-
bar 47. The web 25^b passes from the form
cylinder 22 over an angle-bar 48, thence be-
tween form cylinder 18 and impression
cylinder 20, and thence over an angle-bar
49. The webs 25^a—25^b pass from the angle-
bars 47—49 parallel with each other to the
roller 50, after which the web 25^b passes
over oppositely-disposed angle-bars 51—52
by which it is brought into registry with
the web 25^a. The webs 25^a—25^b pass then
over the roller 53, and are folded longitu-
dinally by means of a former 54 and fold
laying rollers 55, whence they pass to any
suitable folder.

It will be understood that the associated
webs 12^a and 17^a may be directed to one
folder and the associated webs 25^a and 25^b
may be directed to another folder, if de-
sired. I do not restrict myself, however,
to that form of device, inasmuch as both
sets of associated webs may be directed to
a single folder, if desired, of the type
adapted to deliver two separate complete
products.

It will be understood that in practice
suitable inking mechanism and other aux-
iliary mechanisms will be used in connection
with the apparatus shown, in the manner
well known in the printing press art, but
inasmuch as such well known mechanism
forms no part of my present invention, it
is believed to be unnecessary to show such
parts herein.

While I have shown the form cylinders
13 and 18 as adapted each to support only
two plates abreast as compared to the four
plates supported abreast upon the cylinder
22, it will be understood that I do not re-
strict myself to this particular form of con-
struction, except as hereinafter specifically
claimed.

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

1. The combination of a form cylinder, an
impression cylinder coacting therewith, and

means for moving said cylinders slightly toward and from each other whereby a printing plate may readily be slipped longitudinally between said cylinders into position upon said form cylinder suitable clearance being provided to enable the plate to be positioned in alinement with the form cylinder at one end preparatory to being slipped into position thereon between said two cylinders.

2. The combination of a frame, a form cylinder revolubly mounted therein, and an impression cylinder revolubly mounted in said frame and movable toward and from said form cylinder whereby a printing plate may readily be slipped longitudinally between said cylinders into position upon said form cylinder suitable clearance being provided to enable the plate to be positioned in alinement with the form cylinder at one end preparatory to being slipped into position thereon between said two cylinders.

3. The combination of a form cylinder, two impression cylinders coacting therewith, and means for supporting said cylinders adapted to permit of a longitudinally-slotted tubular printing plate being slipped longitudinally upon said form cylinder with its slot engaging said form cylinder and one of said impression cylinders at their point of contact, the body of said plate being passed between the form cylinder and the other of said impression cylinders.

4. The combination of a form cylinder, two impression cylinders coacting therewith, and means for moving said form cylinder and one of said impression cylinders slightly from each other whereby a longitudinally-slotted printing plate may readily be slipped longitudinally between said last-mentioned cylinders into position upon said form cylinder with its slot between said form cylinder and the other of said impression cylinders.

5. The combination of a frame, a form cylinder revolubly mounted therein, an impression cylinder revolubly mounted in said frame in position to coact with said form cylinder, and a second impression cylinder revolubly mounted in said frame and movable toward and from said form cylinder to permit of a longitudinally-slotted tubular printing plate being slipped longitudinally between said last-mentioned cylinders into position upon said form cylinder with its slot between said form cylinder and the other of said impression cylinders.

6. The combination of a frame, an impression cylinder revolubly mounted therein, a form cylinder revolubly mounted in said frame in position to coact with said impression cylinder, the frame support for one end of said form cylinder comprising a comparatively thin arm positioned on the line

joining the axes of said cylinders, and a second impression cylinder revolubly mounted in said frame and movable toward and from said form cylinder to permit of a tubular printing plate being slipped longitudinally between said last-mentioned cylinders into position upon said form cylinder with the longitudinal slot therein passing over said arm.

7. The combination of a frame, a form cylinder revolubly mounted therein, and an impression cylinder mounted in said frame in position to coact with said form cylinder, the bearings for said impression cylinder being movable slightly toward and from said form cylinder whereby a printing plate may readily be slipped longitudinally between said cylinders into position upon said form cylinder, suitable clearance being provided to enable the plate to be positioned in alinement with the form cylinder at one end preparatory to being slipped into position thereon between said two cylinders.

8. The combination of a frame, a form cylinder revolubly mounted therein, and an impression cylinder mounted in said frame in position to coact with said form cylinder, means for moving said impression cylinder away from the form cylinder and returning it positively to operative position to permit a tubular printing plate being readily slipped longitudinally between said cylinders when separated, into position upon the form cylinder, suitable clearance being provided to enable the plate to be positioned in alinement with the form cylinder at one end preparatory to being slipped into position thereon between said two cylinders.

9. The combination of a form cylinder, an impression cylinder coacting therewith, means for moving said cylinders slightly toward and from each other, and a bearing for supporting one end of said form cylinder carried by a narrow fixed support in such manner that substantially the entire end of said form cylinder will be exposed at all times to permit a printing plate to be slipped into position thereon between said two cylinders.

10. The combination of a form cylinder, an impression cylinder coacting therewith, means for positively moving one of said cylinders a determined distance from the other and back into operative position, and a bearing for supporting one end of said form cylinder carried by a narrow fixed support in such manner that substantially the entire end of said form cylinder will be exposed at all times to permit a printing plate to be slipped into position thereon between said two cylinders.

11. The combination of a frame, a form cylinder revolubly mounted therein, said frame being cut away at one side of said

form cylinder to expose substantially the entire end thereof, an impression cylinder also mounted in said frame in position to coact with said form cylinder, rotatable bearings carried by said frame in which said impression cylinder is eccentrically mounted, and means for turning said bearings to separate said cylinders that a printing plate may be readily slipped longitudinally between said cylinders into position upon said form cylinder.

12. The combination of a frame, a form cylinder revolubly mounted therein, said frame being cut away at one side except for a narrow standard to support the cylinder bearing whereby substantially the entire end of the form cylinder is left clear to permit a printing plate being slipped longitudinally upon the form cylinder, bushings rotatably mounted in said frame, an impression cylinder eccentrically mounted in said bushings coacting with said form cylinder, means for quickly turning said bushings to shift said impression cylinder out of and into operative position relative to said form cylinder to permit the ready insertion of a printing plate between said two cylinders upon the form cylinder.

13. The combination of a frame, a form cylinder revolubly mounted therein, the frame at one side of said cylinder being cut away to expose substantially the entire end of said cylinder, bushings revolubly mounted in said frame, an impression cylinder eccentrically mounted in said bushings coöperating with said form cylinder, means for turning said bushings to carry said impression cylinder from and to the form cylinder, and means for locking said bushings when in operative position against rotation, the arrangement and construction being such that a printing plate may be readily slipped longitudinally between said cylinders into position on said form cylinder.

14. The combination of a form cylinder, a second form cylinder positioned substantially parallel therewith, a third form cylinder opposite the space between said first-named two form cylinders substantially at right angles thereto and of an effective length equal to the aggregate lengths thereof, impression cylinders co-acting with said form cylinders respectively, means for turning webs of paper printed by said first-named and said second form cylinders for printing upon their reverse sides by said third form cylinders, and means for interposing one of said printed webs upon the other for folding into a completed product.

15. The combination of a form cylinder, a second form cylinder of equal length positioned substantially parallel therewith, a third form cylinder of double length positioned opposite the space between said first-named and said second form cylinders sub-

stantially at right angles thereto, impression cylinders coacting with said form cylinders respectively, means for turning webs of paper printed by said first-named and said second form cylinders for printing upon their reverse sides by said third form cylinder, and turning means for interposing one of said printed webs upon the other for folding into a completed product.

16. The combination of a form cylinder, a second form cylinder of equal length positioned substantially parallel therewith, a third form cylinder of double length positioned opposite the space between said first-named and said second form cylinders substantially at right angles thereto, impression cylinders coacting with said form cylinders respectively, means for turning webs of paper printed by said first-named and said second form cylinders for printing upon their reverse sides by said third form cylinder, turning means for interposing one of said printed webs upon the other for folding into a completed product, additional impression cylinders coacting with said form cylinders respectively, means for turning webs of paper printed by said third form cylinder coacting with one of said last-named impression cylinders for printing upon their reverse sides by said first-named and said second form cylinders respectively coacting with their respective last-named impression cylinders, and means for interposing one of said last-named printed webs upon the other for folding into a completed product similar to the first-named completed product.

17. The combination of a form cylinder, a second form cylinder positioned substantially parallel thereto, a third form cylinder positioned substantially at right angles to said two form cylinders and of an effective length equal to the aggregate lengths thereof, each of said form cylinders being provided with two impression cylinders adapted to coact therewith, turning means located in the angle between said first-named and said third form cylinders, other turning means located in the angle between said second and said third form cylinders, means for supporting a roll of paper adjacent to said first-named form cylinder on the side thereof opposite that on which said first-named turning means are located, means for supporting a second roll of paper adjacent to said second form cylinder on the side thereof opposite that on which said second-named turning means are located, and means for supporting a third roll of paper adjacent to said third form cylinder on the side thereof opposite that on which said turning means are located, said first-named turning means being adapted to turn at right angles and to invert the webs from said first-named and said third rolls of pa-

per after being printed by their adjacent form cylinders respectively and to direct said webs each to the other of said form cylinders, and said second-named turning
5 means being adapted to turn at right angles and to invert the webs from said second and said third rolls of paper after being printed

by their adjacent form cylinders respectively and to direct said webs each to the other of said form cylinders.

JOSEPH L. FIRM.

Witnesses:

W. H. DE BUSK,
ROPHENE FREEMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."