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H. LITTLE

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INKING MECHANISM FOR INTAGLIO PRINTING MACHINES

Filed Dec. 31, 1934

3 Sheets-Sheet 1

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3 Sheets-Sheet 2

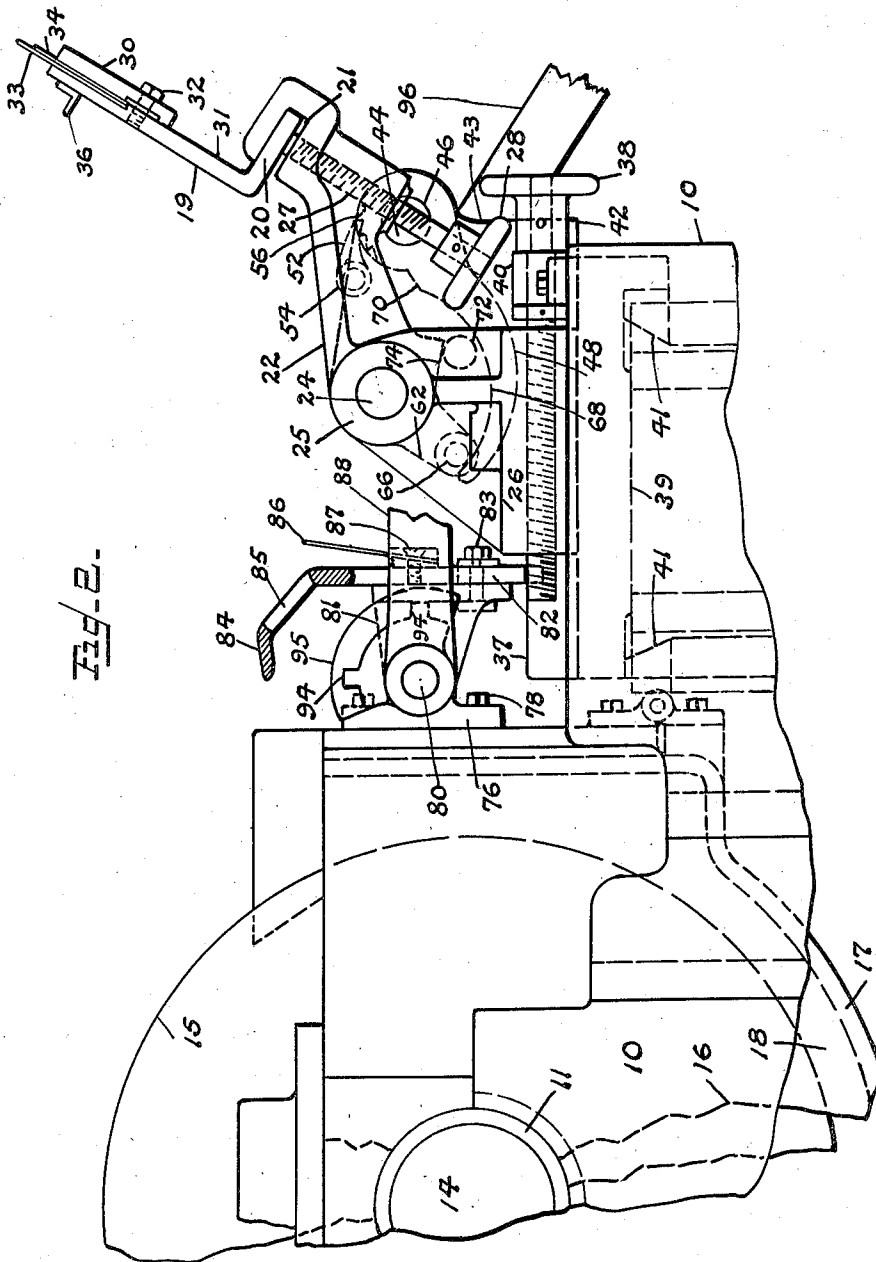


Fig. 2.

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3 Sheets-Sheet 3

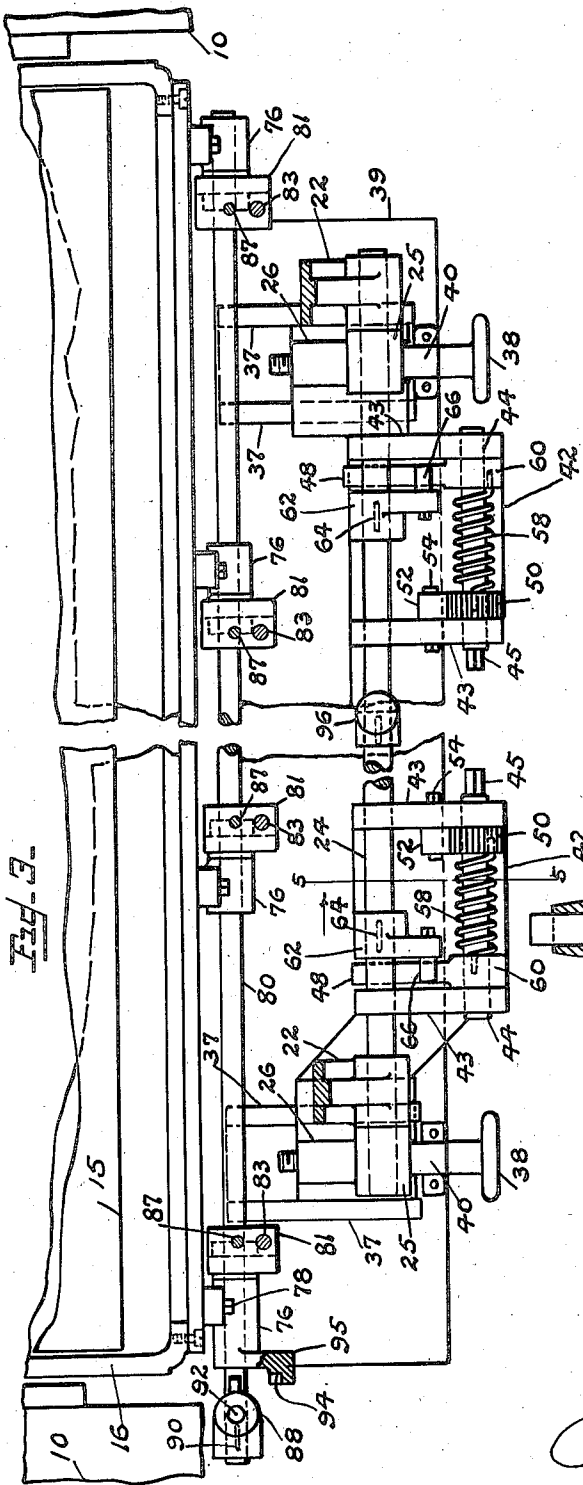


Fig. 5-

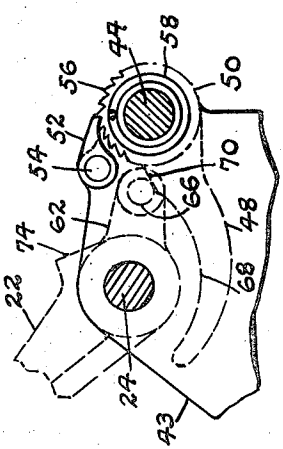
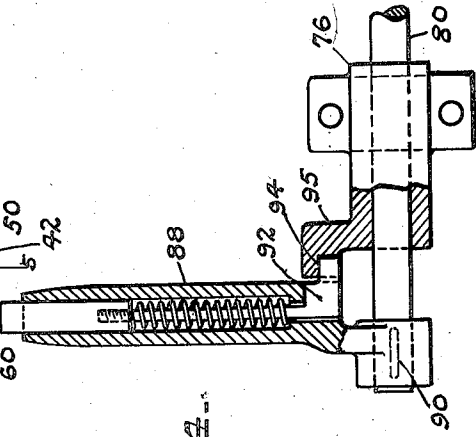


Fig. 4-



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UNITED STATES PATENT OFFICE

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INKING MECHANISM FOR INTAGLIO
PRINTING MACHINES

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18 Claims. (Cl. 101—157)

This invention relates to printing machines and more particularly to an improved inking mechanism for rotary intaglio printing machines.

In rotary intaglio printing machines, ink foun-
tains are provided in the form of receptacles
for the reception of printing ink, and the usual
intaglio printing cylinder is revolved in the
fountain, thereby causing the ink to be deposited
on the periphery of the cylinder in the pits or
wells of the subject or design which has been
produced on the periphery of the cylinder. The
surplus ink is then scraped from the smooth
peripheral portion of the intaglio printing cylinder,
thus leaving the image producing ink in the
pits or wells of the cylinder, and this ink is transferred
to the web or sheet to be printed as it passes
between the peripheral surfaces of the
intaglio printing cylinder and the cooperating
impression cylinder. After the desired number
of impressions are produced, the cylinder is then
removed from the fountain and the peripheral
surface is ground down, polished and a fresh
subject or design is then produced therein. In
order to remove the cylinder from the fountain,
it is first necessary to remove the doctor blade
and baffle before the cylinder can be removed.
The doctor blade is preferably held in yielding
engagement with the periphery of the cylinder
under predetermined tension, and, in existing
mechanisms, it is necessary to disturb the degree
of tension exerted on the doctor blade in removing
it from engagement with the periphery of the
intaglio cylinder.

An object of this invention is to provide
means for holding a doctor blade in yielding
engagement with the periphery of an intaglio
printing cylinder under predetermined or given
tension, and to permit the removal of the doctor
blade from engagement with the cylinder without
changing the tension adjustment of the
doctor blade holding mechanism.

A further object of this invention is to provide
movable means for holding a doctor blade in
yielding engagement with the periphery of an
intaglio printing cylinder under predetermined
or given tension, and for maintaining the doctor
blade in positions in which the blade is removed
from engagement with the cylinder.

A further object of my present invention is to
provide movable means for holding a doctor
blade, and a common instrumentality so cooperating
with the movable doctor blade holder as
to hold the doctor blade in yielding engagement
against the periphery of the intaglio printing
cylinder under given or predetermined tension,

and to hold the doctor blade holder in different
positions in which positions the doctor blade is
removed from engagement with the cylinder.

An additional object of this invention is to
provide a pivotally supported doctor blade holder
and a spring tensioned arm cooperating with
the doctor blade holder to hold the doctor blade
in yielding engagement with the periphery of the
intaglio printing cylinder under desired tension,
and to hold the doctor blade holder in positions
in which the doctor blade is removed from
engagement with the cylinder, and means for
varying the degree of tension imparted to the
arm.

Another object of this invention is to provide
a fountain for intaglio printing presses in which
the fountain is provided with a movable support
for the doctor blade to permit the doctor blade
to move to and from engagement with the
intaglio cylinder, and a movable baffle or deflector
arranged to remove the surplus ink from the
periphery of the cylinder, which baffle is movable
to and from ink removing position, thereby
permitting the removal of the intaglio cylinder
from the ink fountain.

It is also an object of this invention to provide
an ink fountain for intaglio printing presses
having components of generally improved construction
and arrangement, whereby the device will be
simple, durable and inexpensive in construction,
as well as convenient, practical, serviceable and
efficient in its use.

With the foregoing and other objects in view,
which will appear as the description proceeds,
the invention resides in the combination and
arrangement of parts, and in the details of construction
hereinafter described and claimed, it being understood
that various changes in form, proportions and minor
details of construction may be resorted to without
departing from the spirit or sacrificing any advantages
of the invention.

For a complete disclosure of the invention, a
detailed description of a preferred form thereof
will now be given in connection with the accompanying
drawings forming a part of this specification,
wherein:—

Figure 1 is a fragmental side elevation of an
intaglio ink fountain showing my invention applied
thereto, and in a position in which the doctor
blade is held in yielding engagement with the
periphery of the intaglio cylinder, and the baffle
member is depicted in ink removing position;

Figure 2 is a similar view, but showing the

doctor blade holder and baffle member in positions to permit the removal of the intaglio printing cylinder from the ink fountain;

Figure 3 is a fragmental plan view, parts being removed and parts shown in sections;

Figure 4 is a detailed vertical sectional view, parts appearing in elevation, taken on the line 4-4 of Figure 1 and depicting the handle or lever for moving the baffle member to and from operative position; and

Figure 5 is a detailed sectional view taken on the line 5-5 of Figure 3, showing the relationship between the spring pressed arm and a terminal of the baffle plate holder.

Referring to the drawings in which similar reference characters designate corresponding parts, 10 indicates the usual frame of a rotary intaglio printing machine, and the side members or supports of the frame are provided with bearings 11 for rotatably receiving a shaft or trunnions 14 secured to and extending from the intaglio printing cylinder 15. This cylinder 15 is of the usual type employed in rotary intaglio printing machines in which the image or design to be printed is produced in intaglio on the periphery of the cylinder. The peripheral surface may be in the form of the conventional shell, or, if preferred, a metallic plate may be stretched or otherwise secured around the periphery of the cylinder.

The usual or conventional intaglio fountain is provided and includes the housing 16 having an arcuate bottom portion 17 arranged with relation to the printing cylinder 15, and this arcuate bottom portion 17 is spaced a slight distance from the periphery of the cylinder 15 in order to provide an arcuate ink supply space or area 18 between the arcuate bottom 17 and the peripheral surface of the cylinder 15. The cylinder 15 rotates within the fountain housing 16 and conveys a film of ink upwardly from the arcuate bottom portion of the fountain to a baffle plate and a doctor blade which will be hereinafter referred to.

A doctor blade holder is provided and comprises an angular member 19, having a flange 20 received in slot or apertures 21 formed in bracket arms 22 supported by and rigidly secured to a longitudinally extending shaft 24, and the shaft 24, in turn, is rotatably supported in bearings 25 formed in the upper terminals of bracket members 26. Securing screws 27 having manipulating heads 28 engage the flange 20 of the angular member 19, thereby securely locking the angular member 19 to the arms 22. A clamp member 30 is secured to the upper face of the long flanges 31 of the angular member 19 of the doctor blade holder by means of screws or other securing devices 32, and a doctor blade 33 and the usual reenforcing plate or strip 34 are clamped between the clamping member 30 and the upper recessed face of the flange 31, as shown in Figures 1 and 2. The outer or free longitudinal edge of the doctor blade 33 accurately conforms to the periphery of the intaglio printing cylinder 15 and is held in yielding or wiping engagement therewith. A guide or baffle member 36 is secured to the lower face of the flange 31 of the doctor blade holder. The brackets 26, in conformity with the usual practice, are mounted for transverse adjustment on transverse guides or supporting rails 37, and the brackets 26 are transversely operable by means of suitable manipulating screws 38 which are rotatably secured to a slidable frame or plat-

form 39 in suitable bearings 40, and the screws 38 are threaded through the brackets 26, as indicated in Figures 1 and 2. The brackets 26, and platform 39, in conformity with the usual practice, are reciprocated or vibrated longitudinally along guide ways 41 carried by the machine frame 10, as shown in Figures 1 and 2. Inasmuch as the mechanism for reciprocating or vibrating the doctor blade 33 and supporting members is well known and understood by those skilled in the art, the mechanism is not illustrated in this application.

Each bracket 26 has a supporting member or frame 42 secured thereto, and each supporting member is provided with spaced flanges 43 through which the shaft 24 extends. A shaft or arbor 44 is mounted for rotary movement in bearings 46 formed in the flanges 43 of each frame 42. An arm 48 is mounted on each shaft 44, and the arm is free to turn or rotate on the shaft. A ratchet 50 is fixed or secured to each shaft 44, and a pawl 52 is pivotally secured to a flange 43 of each frame 42, as indicated at 54, and the free terminal of the pawl 52 engages the teeth 55 formed in the ratchet 50 to prevent rotation of the shaft 44 in one direction. In order to bias or stress the arms 48 toward movement in one direction, a helical torsion spring 58 surrounds each shaft 44 and is interposed between the bearing portion 60 of each arm 48 and the ratchet on the same shaft 44. One terminal of each spring 58 is secured to a ratchet member 50, and the opposed terminal is secured to the bearing portion 60 of an arm 48, thereby tending to bias or stress the arm in a direction toward the shaft 24, for reasons to be hereinafter disclosed. Lever arms 62 are supported by the shaft 24, and these lever arms are held against rotation relative to the shaft by keys or other securing devices 64. Each lever arm 62 has a pin or stud 66 secured at the free terminal thereof, and each pin 66 extends laterally beyond the lever arm and engages an arm 48, as will be hereinafter more fully disclosed. Each arm 48 is provided with an arcuate surface 68, and a tangentially-disposed rectilinear surface 70 formed thereon for operable engagement with the pin 66. A stop member or stud 72 is supported by a bracket 26, and is positioned to engage a stop shoulder or surfaces 74 formed on an arm 22 to limit the turning movement of the doctor blade supporting members in a direction away from the cylinder 15.

Bearing brackets 76 are secured to the housing 16 of the fountain, as indicated at 78, and these brackets rotatably support a longitudinally extending shaft 80. The shaft 80 has a plurality of supporting brackets 81 suitably secured thereto, and a longitudinally extending baffle plate 82 is supported by the supporting brackets 81, and is secured thereto by suitable screws or other securing means, as indicated at 83. A longitudinal edge of the plate 82 is turned inwardly, as shown in Figures 1 and 2, to cooperate with the peripheral portion of the cylinder 15 to provide a baffle member 84. Apertures 85 are formed in the plate 82 and are positioned to permit surplus ink to return back into the fountain when the plate 82 is in closed position, as depicted in Figure 1. A resilient strip or sealing member 86 is secured to the upper face of the plate 82 by suitable securing means, indicated at 87, and the free terminal of the resilient strip 86 engages the lower face of the flange 31, thereby sealing the fountain against the es-

cape of surplus ink. In order to rotate or oscillate the shaft 80, a suitable manipulating handle 88 is secured to a terminal thereof, as indicated at 90, and a spring pressed manually-releasable 5 detent 92 engages apertures 94 formed in a quadrant or flange 95 carried by one of the bearing brackets 76, and a similar operating handle 96 is secured to the shaft 24, as shown in Figures 1, 2 and 3. By this arrangement the doctor 10 blade 33 and baffle 84 may be moved to and from engagement or operable association with the periphery of the printing cylinder 15 by manually moving the handles 96 and 88.

It is well understood by those skilled in the 15 art that the doctor blade must be pressed against the periphery of the intaglio printing cylinder with uniform and determined tension, and, once the proper tension has been produced, it is highly desirable to maintain this tension. However, in order to remove the cylinder 15 from 20 the ink fountain, it is necessary to remove the doctor blade from engagement with the periphery of the cylinder, and, when this is done by mechanism heretofore employed, it was necessary to release or disturb the tension producing 25 mechanism. In this disclosure after a predetermined tension has been imparted to the doctor blade, the doctor blade may be removed from operable engagement with the periphery of the 30 intaglio printing cylinder without disturbing the degree of tension exerted by the tension producing mechanism, as will be hereinafter made apparent.

In operation, the cylinder 15 is rotated counter 35 clock-wise, as viewed in Figs. 1 and 2 in the fountain housing 16, thereby causing the peripheral portion of the cylinder and the intaglio design cavities to convey ink to the upper portion of the fountain toward the doctor blade. 40 The ink carried upwardly by the periphery of the cylinder engages the baffle member 84, and this baffle member scrapes off or removes the surplus ink and spreads or works the remaining ink in a thin uniform film on the periphery of 45 the cylinder. Further rotation of the cylinder conveys the thin film of ink to the doctor blade 33 which scrapes the ink from the smooth peripheral surface of the intaglio cylinder but leaves the design producing ink in the intaglio 50 cavities of the cylinder, and the surplus ink is directed by the baffle 36 through the openings 35 of the baffle plate 82 back into the fountain, and any ink that may find its way past the baffle 36 is prevented from escaping from the 55 fountain by means of the flexible sealing member 86, as shown in Figure 1. In order to remove the cylinder 15 from the fountain, the operating handle 96 is manipulated to move the doctor blade holding members from the position indicated in Figure 1 to that depicted in Figure 2, 60 and the movement of the doctor blade holder away from the fountain is limited by the engagement of the stop shoulder 74 with the stop stud 72. The handle 88 is then manipulated to move or turn the baffle plate 82 and baffle 84 65 away from the fountain to the position indicated in Figure 2, where the detent 92 snaps into the outermost aperture 94 of the locking quadrant 95 to maintain these components in this position. The baffle 84 and doctor blade 33 may 70 be moved back to operable engagement with the periphery of the printing cylinder 15 by simply manipulating the handles 88 and 96. When the doctor blade holder is in position in 75 which the doctor blade 33 engages the periphery

of the cylinder, the rectilinear surface 70 of each arm 48 engages the pin 66, thereby stressing or biasing the doctor blade, under the influence of the springs 58, into yielding or wiping 5 engagement with the periphery of the intaglio printing cylinder 15. After the doctor blade holder has been moved from a position in which the doctor blade engages the periphery of the cylinder, the pins 66 engage the arcuate portions 68 of the arms 48, thereby holding the 10 doctor blade holder in open position, or in intermediate positions. The springs 58 may be adjusted to impart any desired tension to the doctor blade holder by simply rotating the shafts 44 by applying a suitable wrench or tool 15 to the squared heads 45 of these shafts. After the desired tension has been produced, the doctor blade 33 may be moved to and from engagement with the periphery of the intaglio printing cylinder without changing the tension previously 20 established. During the movement of the bracket arms 22 and doctor blade supporting components away from the cylinder 15, the pins 55 of the arms 62 leave the rectilinear surfaces 70 and engage the arcuate surfaces 68 of the 25 arms 48. When the pin 66 is in engagement with the arcuate surface 68 of each arm 48, this arcuate surface is then in concentric relationship with the shaft 24 so that the stresses imparted by the arm 48 to the pin 66 are radially ex- 30 erted relative to the shaft 24, so that the stresses or forces acting on the doctor blade supporting members are in equilibrium, thus holding the doctor blade in any position in which the pins 66 engage the concentric arcuate 35 surfaces 68 of the spring pressed arms 48.

What I claim is:

1. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the 40 doctor blade, and a biased member while influenced by the bias operably engaging the doctor blade holder to bias the holder toward the cylinder to thereby hold the doctor blade in yielding engagement with the periphery of the 45 cylinder and to also hold the doctor blade holder in positions in which the doctor blade is moved from engagement with the cylinder.

2. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in 50 the fountain, a doctor blade, a holder for the doctor blade, a member biased in one direction and operably engaging the doctor blade holder to bias the holder toward the cylinder to thereby 55 hold the doctor blade in yielding engagement with the periphery of the cylinder and while biased in the same direction to hold the doctor blade holder in positions in which the doctor blade is moved from engagement with the cyl- 60 inder.

3. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the doctor blade, and a biased member while in- 65 fluenced by the bias operably engaging the doctor blade holder so as to bias the holder toward the cylinder to thereby hold the doctor blade in yielding engagement with the periphery of the cylinder and to also hold the doctor blade 70 holder in positions in which the doctor blade is moved from engagement with the cylinder without biasing the doctor blade holder toward movement in any direction.

4. In a printing machine, an ink fountain, an 75

intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the blade, and means constantly biased towards the holder and cooperating with the holder to bias it in a given direction when in certain positions and to also hold the holder when in other positions without biasing it in any direction.

5. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the blade, and common means constantly biased towards the holder and cooperating with the holder to bias it in a given direction when in certain positions and to also hold the holder when in other positions without biasing it in any direction.

6. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a pivotally-supported holder for the doctor blade, and a member constantly biased towards the doctor blade holder and operably engaging it at a point removed from the pivot to thereby bias the holder and doctor blade toward the cylinder when the holder is in certain positions and to also hold the doctor blade holder in other positions without biasing it in any direction.

7. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a pivotally-supported holder for the doctor blade, and a constantly biased arm so engaging the doctor blade holder as to bias the doctor blade holder toward the cylinder when in certain position and to also hold the doctor blade holder in other positions without biasing it in any direction.

8. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a pivotally-supported holder for the doctor blade, a constantly biased arm so engaging the doctor blade holder as to bias the doctor blade holder toward the cylinder when in certain position and to also hold the doctor blade holder in other positions without biasing it in any direction, and means for adjusting the degree of bias imparted to the arm.

9. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a pivotally-supported holder for the doctor blade, and a spring-tensioned arm operably engaging the doctor blade holder to bias the holder toward the cylinder to thereby hold the doctor blade in yielding engagement with the periphery of the cylinder and while under the influence of the spring tension to also hold the doctor blade holder in positions in which the doctor blade is moved from engagement with the cylinder.

10. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a pivotally-supported holder for the doctor blade, a spring-tensioned arm operably engaging the doctor blade holder to bias the holder toward the cylinder to thereby hold the doctor blade in yielding engagement with the periphery of the cylinder and while under the influence of the spring tension to also hold the doctor blade holder in positions in which the doctor blade is moved from engagement with the cylinder, and means for varying the degree of spring tension imparted to the arm.

11. In a printing machine, an ink fountain, an

intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the doctor blade pivotally supported adjacent the cylinder and movable about its pivot to move the doctor blade to and from engagement with the periphery of the cylinder, a suitable stop member for limiting the movement of the doctor blade holder away from the cylinder, and a common constantly spring-biased member cooperating with the doctor blade holder to bias the holder toward the cylinder to thereby hold the doctor blade in yielding engagement with the periphery of the cylinder and to also hold the doctor blade holder when moved to engagement with the stop member.

12. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the doctor blade pivotally supported adjacent the cylinder and movable about its pivot to move the doctor blade to and from engagement with the periphery of the cylinder, and a biased arm having a rectilinear and an arcuate surface, the rectilinear surface engaging the doctor blade holder to bias the doctor blade against the periphery of the cylinder and the arcuate surface engaging the holder to maintain the holder in positions in which the doctor blade is moved from engagement with the cylinder.

13. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the doctor blade pivotally supported adjacent the cylinder and movable about its pivot to move the doctor blade to and from engagement with the periphery of the cylinder, an arm having an arcuate surface and a rectilinear surface, a spring constructed and arranged to exert tension on the arm toward the doctor blade holder, the rectilinear surface of the arm engaging the holder to bias the doctor blade against the periphery of the cylinder and the arcuate surface engaging the holder to maintain it in positions in which the doctor blade is moved from engagement with the cylinder, and means for varying the degree of tension exerted on the arm by the spring.

14. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, a holder for the doctor blade pivotally supported adjacent the cylinder and movable about its pivot to move the doctor blade to and from engagement with the periphery of the cylinder, a stop member for limiting the movement of the doctor blade holder away from the cylinder, and a spring biased arm having a rectilinear surface and an arcuate surface, the rectilinear surface engaging the doctor blade holder to bias the doctor blade against the periphery of the cylinder and the arcuate surface engaging the holder to maintain it in position against the stop member.

15. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain and removable therefrom, a doctor blade, a holder for the doctor blade pivotally supported adjacent the cylinder and movable about its pivot to move the doctor blade to and from engagement with the periphery of the cylinder, a baffle member constructed and arranged to remove surplus ink from the periphery of the cylinder, the baffle member being movable to and from ink removing position, and means for locking the baffle member in ink removing position and in a position remote thereto.

16. In a printing machine, an ink fountain, 75

an intaglio printing cylinder rotatably mounted in the fountain, a doctor blade, means for supporting the doctor blade in engagement with the periphery of the cylinder, a baffle member constructed and arranged to remove surplus ink from the periphery of the cylinder and having drain apertures formed therein, and a sealing member interposed between the baffle member and the doctor blade support to prevent the escape of ink scraped from the periphery of the cylinder by the doctor blade.

17. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted in the fountain and removable therefrom, a doctor blade movable to and from engagement with the periphery of the cylinder, means for holding the doctor blade into yielding engagement with the periphery of the cylinder and in positions removed from the cylinder, a baffle member constructed and arranged to remove surplus ink

from the periphery of the cylinder, the baffle member being movable to and from ink removing position, and manually operable means for locking the baffle member in ink removing position and in a position remote thereto.

18. In a printing machine, an ink fountain, an intaglio printing cylinder rotatably mounted therein and removable therefrom, a doctor blade movable to and from engagement with the periphery of the cylinder, a baffle member pivotally supported adjacent the cylinder and constructed and arranged to remove surplus ink therefrom, a lever secured to the baffle member and movable therewith, a bracket having spaced apertures formed therein, a manually-releasable detent carried by the lever and constructed and arranged to engage the spaced apertures of the bracket to hold the baffle member in ink removing position and in a position remote therefrom.

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