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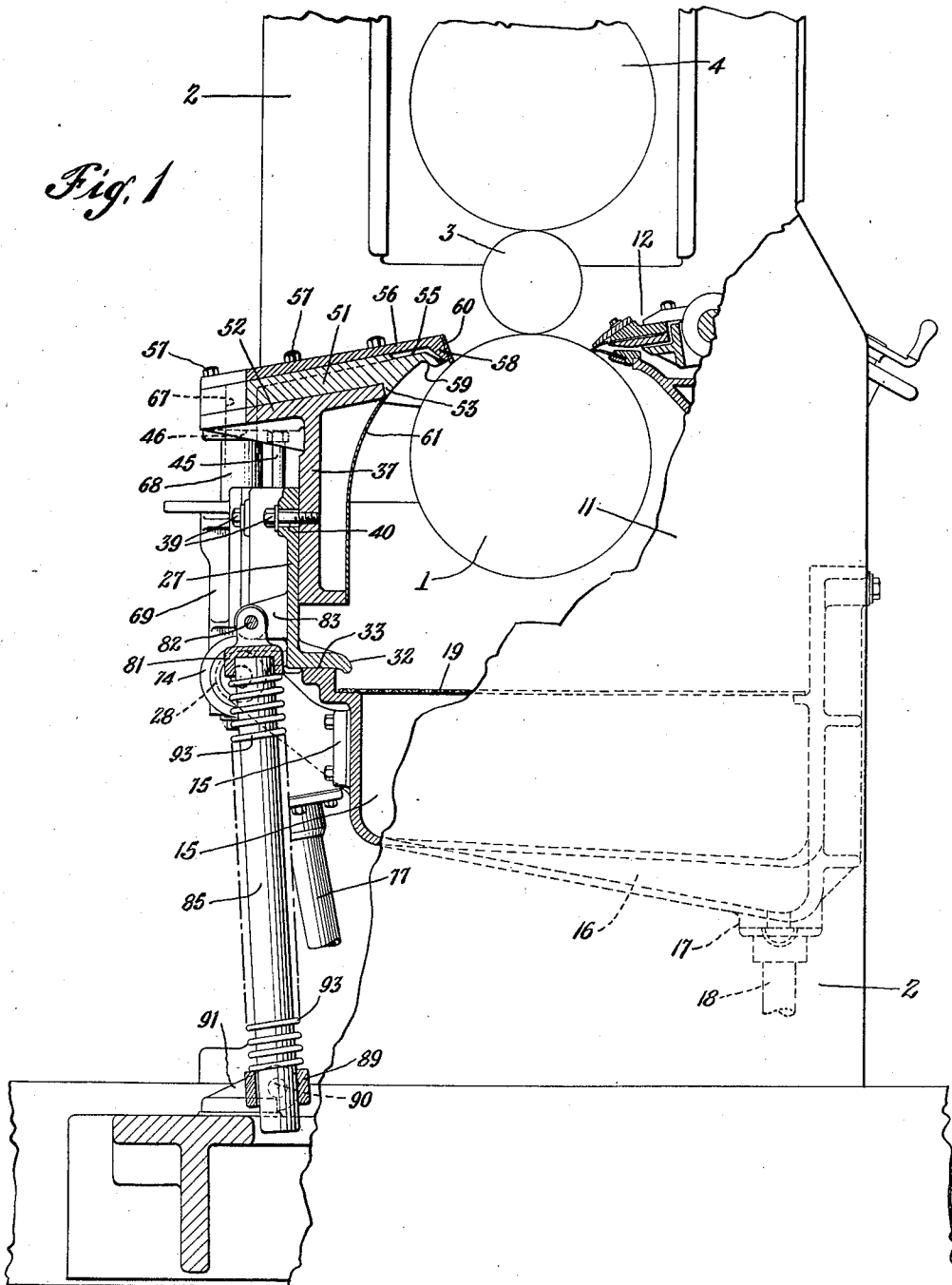
C. S. CRAFTS

2,096,322

PRINTING PRESS

Filed March 9, 1936

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

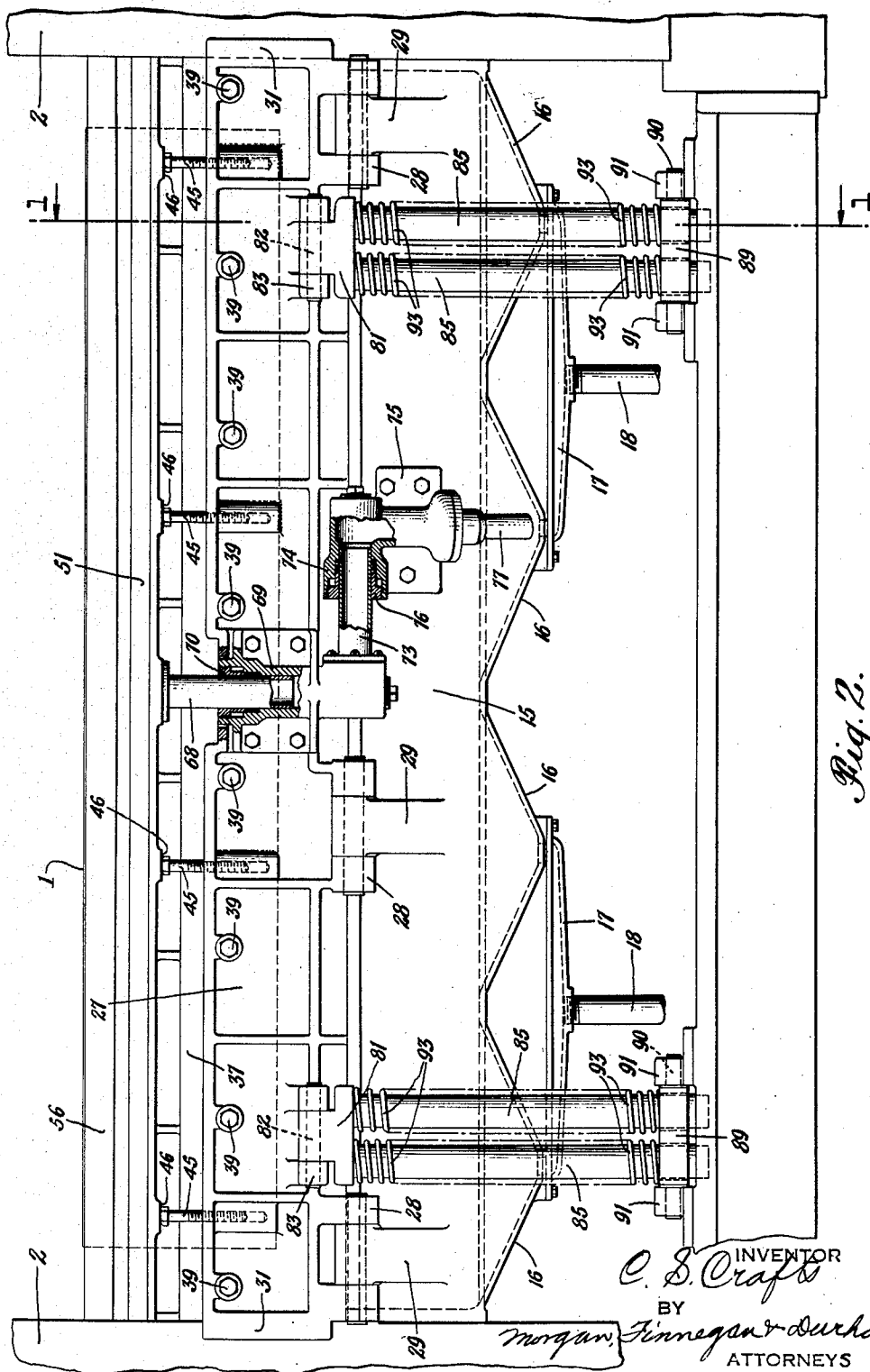


Fig. 2.

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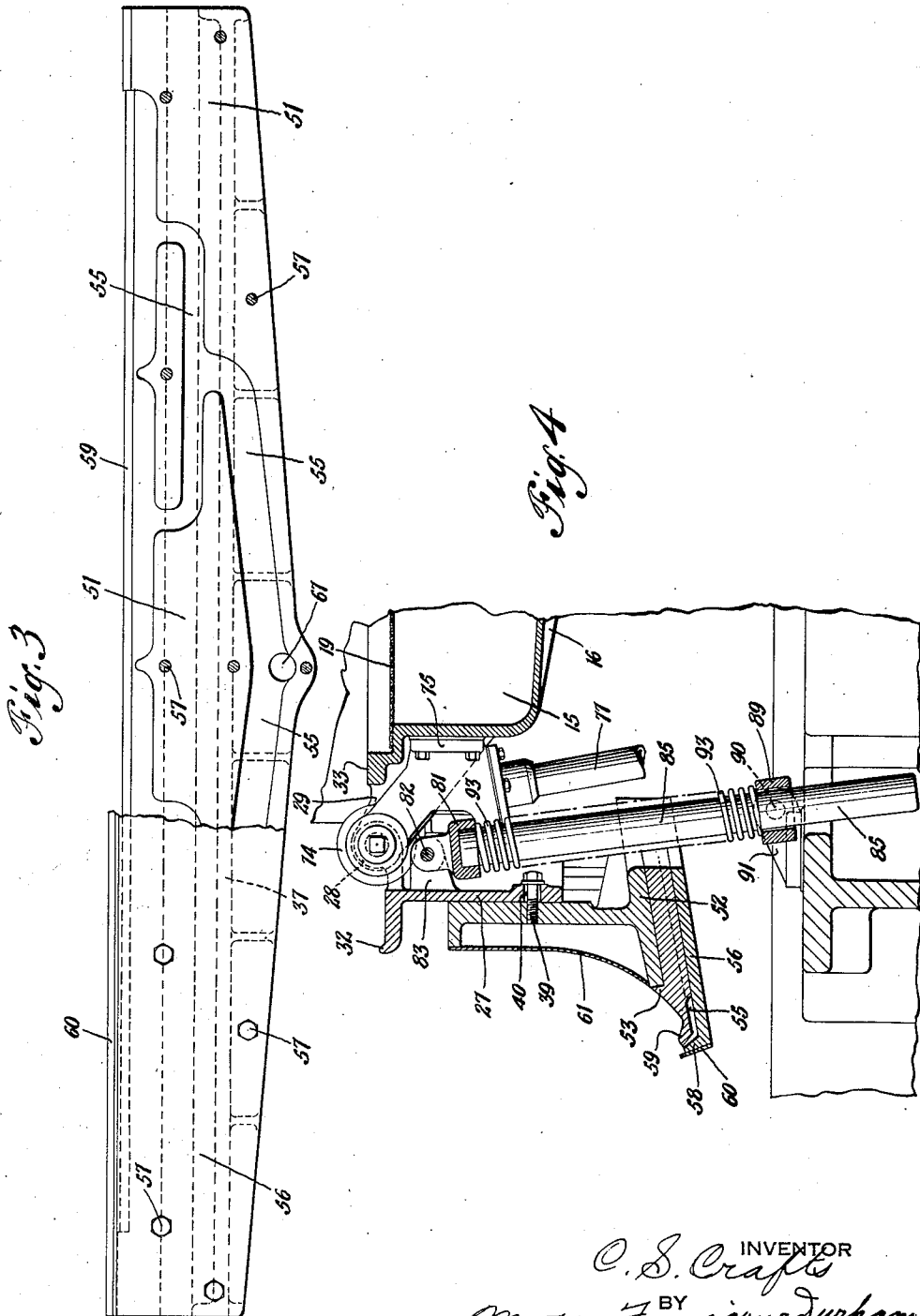
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,096,322

PRINTING PRESS

Curtis S. Crafts, Oak Park, Ill., assignor to The
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corporation of Illinois

Application March 9, 1936, Serial No. 67,837

17 Claims. (Cl. 101—157)

The invention relates to new and useful improvements in inking means for rotary intaglio printing presses, and more especially to such improvements embodied in inking means adapted to project a sheet of ink against the surface of a design cylinder.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:—

Fig. 1 is a vertical section through a press embodying the invention and is taken on line I—I of Fig. 2;

Fig. 2 is a full side elevation looking at Fig. 1 from the left,

Fig. 3 is a top plan, with parts broken away, of the manifold ink nozzle; and

Fig. 4 is a fragmentary section corresponding to the left-hand part of Fig. 1.

Objects of the invention are to provide in a rotary intaglio printing press inking means adapted to project a thin sheet of ink against and along the design cylinder, which inking means is of simple and sturdy structure and has very few parts; to provide such a mechanism which is quickly and easily movable between inking position and a retracted position which affords free access to the design cylinder and the ink fountain; to provide means for moving the inking mechanism between these positions in substantially balanced relation requiring a minimum of lifting or other effort; to provide quick and easy access to the channels of the ink manifold, and also to provide a mechanism having its top part free and unobstructed by ink supply pipes, clamps or other mechanism; to provide for removal of the inking mechanism from operative position with the design cylinder and its return to operating position without disturbing the ink supply mechanism; and to provide accurate and simple means, acting at a plurality of points on the inking means to accurately position it relatively to the design cylinder.

With these and other objects in view, an embodiment of the invention is provided wherein the ink manifold occupies the unobstructed upper part of the device, with a single bolted-on cover plate, upon removal of which all the ink conduits are open and unobstructed. This ink supply head is pivoted on a horizontal axis, and is held in operative relation with respect to the design cylinder by powerful springs, the inking head being swingable away from the design cylinder and in a backward and downward direction against increasing compression of the springs which take the weight of the inking head as it descends and assist in the subsequent lifting and swinging thereof back to operative position. The ink supply is through a pipe from below, which has a rotary joint coaxial with the axis of the inking head itself, whereby the swinging of the inking head is effected without disturbing the ink supply line. A sleeve joint in the ink supply line also permits vertical adjustment of the ink supply nozzle without disturbing the supply pipe, and the supply pipe coming from below leaves the entire top and front of the inking mechanism unobstructed. The resilient pressure of the springs also acts to hold the inking head firmly yet resiliently in operative position with respect to the design cylinder. The entire inking manifold is carried on a plurality of spaced-apart screw bolts by which it is accurately positioned locally throughout its length to insure exact positioning at all points of the ink slot with respect to the design cylinder.

The foregoing general description and the following detailed description as well are illustrative and exemplary but are not restrictive of the invention.

Referring now in detail to the accompanying drawings, illustrating by way of example one embodiment of the invention, a printing cylinder 1 is shown which carries an intaglio design, such as a photogravure design. The cylinder is removably journaled in the press frame 2, in a known manner, by journal mountings of known or other suitable form (not shown). Cooperating with the design cylinder 1 is an impression cylinder 3, which likewise may be of standard or other suitable form, the cylinder 3 also being suitably mounted in the press frame 2. A backing cylinder 4 is also shown in cooperative relation with the cylinder 3, the cylinder 4 likewise being journaled in the press frame.

The inking system is of the type wherein a thin sheet of ink is projected against the design cylinder fairly close to the impression line in

quantities considerably beyond the actual printing requirements, the ink being carried forward on the surface of the cylinder, parts of it leaving the cylinder during its rotation by reason of the gravital and centrifugal action, the final surplus of ink being removed by the doctor blade near the line of impression. In this type of inking mechanism the entire body of ink is continuously in flowage and is continuously intermixed and agitated, and there is a kinetic impact of the ink against the design and flowage of ink relatively to the design acting to keep the design clean and freshly inked.

The invention is shown applied to a press of the closed ink fountain type, such as is used with quick-drying ink in fast rotogravure printing. The enclosing end wall of the ink fountain is indicated by 11 and the doctor blade mechanism by 12. The latter may be of any suitable construction so far as concerns the present invention, and the mechanism shown is that described and claimed in my copending application S. N. 57,683 filed January 6, 1936, which has proved itself in commercial operation to be notably efficient in fast rotogravure printing with quick-drying inks. The inking mechanism comprises a reservoir which receives the ink flowing down from the design cylinder, from which reservoir the ink is returned through the inking system to again ink the design cylinder. As shown, the reservoir 15 is mounted on the press frame beneath the design cylinder and constitutes the bottom part of the closed ink fountain. The bottom 16 of the reservoir 15 is multidirectionally downwardly inclined to constitute a plurality of low drainage points 17, from which a plurality of ink-conveying pipes 18 convey the ink to suitable ink-conveying means, such as a circulating pump (not shown). The top of the reservoir 15 is closed by a cribrate closure 19, which serves to keep any lint, dirt or other particles in the ink from passing into the reservoir.

The inking means of the present invention as embodied comprises an inking head adapted to project a thin sheet of ink against the entire length of the rotating design cylinder at its upper portion and only slightly ahead of the impression line, the ink flowing about the greater part of the circumference of the cylinder, the final surplus being removed by the doctor blade. As embodied, a carrier 27 is pivotally mounted on a horizontal axis by a plurality of hinges 28, which are supported on a plurality of brackets 29 bolted to the outside of the reservoir 15 and projecting upwardly therefrom. The carrier 27 is mainly a vertically disposed plate which extends entirely across between the side frames 2 of the press, and at either side it has internally vertically angled members 31 overlapping the vertical edges of the press side frames, and which contact with finished faces on the frames to bring the carrier to exact position. Along its bottom the carrier 27 has an inwardly and downwardly projecting skirt or flange 32, the bottom face of which seats upon the finished horizontal top edge 33 of the reservoir 15, and the flange also overhangs and projects downwardly over the top edge of 15 and constitutes a tight seal and deflector for the downwardly flowing ink.

The inking head or manifold nozzle is mounted on the swingable carrier 27, and is accurately and firmly positioned relatively thereto at various points; independently, throughout its length and across the press, so as to bring the entire nozzle slot into desired relation with respect to

the design. As embodied, the manifold comprises a horizontally disposed, vertically extending plate 37 and a horizontally disposed, outwardly inclined plate 52. Plate 52 serves as the support for the manifold ink nozzle and plate 37 engages with the inner vertical face of the carrier 27 (Fig. 1) and is vertically movable relatively to carrier 27 and is held thereto by means of a plurality of screw bolts 39, spaced apart across the press. The screw bolts passing through enlarged slotted openings 40 in the carrier 27 are screw-threaded into the vertical plate 37 of the inking head thereby permitting the vertical positioning movement as described and subsequent firm holding of the parts in position. The inking head is supported at a plurality of spaced-apart points upon the carrier 27, and each of these supports is provided with a separate fine and accurate positioning means, which may be independently actuated to effect accurate positioning of the nozzle slot throughout its length with respect to the design. As embodied, a plurality of screw members 45 are threaded into the top surface of the carrier 27, the under face of plate 52 of the inking head resting upon the tops of the screw members 45 for which purpose a plurality of machined pads 46 are formed on the under side of the plate 52. Each of the screw members 45 may be independently actuated to secure the requisite nice adjustment throughout the entire length of the ink slot, and after the positioning is completed the bolts 39 are screwed home to hold the parts firmly in position.

The embodied form of the manifold ink nozzle comprises a channeled plate 51 resting upon the laterally inclined top of plate 52 of the inking head. Plate 51 has along its forward part a horizontally disposed, downwardly extending face 53 which extends over and fits against the front edge of the backwardly and downwardly extending plate 52, thereby firmly seating the plate 51 and accurately positioning the two members. The ink channels 55 are formed in the upper face of the plate 51, and are ramified and disposed to give a uniform and free flow of the ink throughout and terminates in the nozzle opening extending along the front edge of inwardly and downwardly extending lip 59 of plate 51, this slot extending along the entire length of the design cylinder. The closure for the ink channels 55 is preferably a single flat plate 56, which lies flat on top of the plate 51, and bolts 57 pass through plate 56 and are threaded into plate 51, thereby firmly uniting the two parts together. This ink manifold is held firmly on support 52 by suitable bolts. The forward edge 58 of plate 56 is downwardly inclined so as to form the top of the nozzle slot which is formed between it and the downwardly and forwardly projecting lip 59 of the plate 51. A suitable sealing strip 60 is mounted on the inner end of plate 56 to prevent escape of ink between the ink nozzle and the design cylinder. A splash plate 61 is mounted on the inside of the inking head. The entire inking head is of very simple, compact and sturdy construction with exceedingly few parts, and the top is unencumbered by piping, clamps and the like, and the entire ink manifold channelways are made entirely open and accessible simply by removing the plate 56. The multifold, spaced-apart screw-threaded supports for the inking head provide localized and exceedingly accurate positioning of the ink nozzle relatively to the design cylinder.

The ink is supplied to the inking head by means of pipes mounted on the fountain structure and integral with the general design, and the pipes need not be detached or manipulated when the inking mechanism is moved between operative position and inoperative position to give access to the design cylinder and to the fountain, and all loose and extraneous piping is obviated. As embodied, the ink is supplied into the ink manifold 55 through an opening 67, which communicates into a vertically disposed pipe 68. Pipe 68 has a sleeve connection with a pipe 69, formed in a casting which is bolted on to the exterior wall of the carrier 27, and the joint is supplied with a packing gland 70, thereby allowing for vertical movement and positioning of the inking head. The lower end of the vertical pipe 69 communicates with a horizontally disposed pipe 73, which is concentric with the hinges 28, and has a rotating fit into a pipe 74 formed in a bracket 75 which is bolted on to the exterior wall of the reservoir 15. The joint between the two pipes has a packing gland 76. A pipe 77 connects from the pipe 74, and communicates with the circulating pump or other ink supplying means. Means are provided for permitting quick and easy movement of the inking mechanism to and fro between the inking position and the open position, and as embodied spring means are employed to support most of the weight, or a desired proportion of the weight, of the inking mechanism, that is, to supply approximately balanced action as it is moved downwardly to the opening position, shown in Fig. 4, and back again to the operative position, shown in Fig. 1. As embodied, at either side of the mechanism, a plurality of socket members 81 are hinged at 82 to lugs 83, formed on the exterior of the carrier 27. Nesting within each of the sockets 81 are the upper ends of rods 85, the lower ends of the rods projecting through openings in guide blocks 89 and being longitudinally movable with respect to the guide blocks. The guide blocks 89 are pivotally mounted at 90 in ears 91 which are mounted on the press frame. Encircling the rods 85, and in compression between the socket members 81 and the guide blocks 89 are powerful coil springs 93. When the inking mechanism is in operative position the pivots 82 are above and on the inside of the hinge joints 28 on which the inking head is mounted, and the springs 93 therefore exert resilient pressure to support the inking head on its seat. As the inking head is swung outwardly on the hinge joints 28 away from the design cylinder, its movement is chiefly horizontal, and pivot points 82 likewise move out nearly horizontally over and past the hinge joints 28, and there is very little action of the springs 93. As the inking head swings farther outwardly and downwardly, the pivot points 82 swing outwardly and downwardly around and past the hinge joints 28, and springs 93 are powerfully and increasingly compressed and tend to carry much of the weight of the inking head until the position of Fig. 4 is reached, when the springs 93 are under their fullest compression. The increasing compression on the springs tends strongly to counterbalance the weight of the inker head. It will be clear that as the inking head is swung upwardly from the position of Fig. 4 to that of Fig. 1, the springs 93 will assist powerfully in lifting the head about the hinge joints 28.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom

within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a horizontal pivotal mounting for said inking mechanism and means for counterbalancing the weight of the inking mechanism as it moves up and down about its pivotal mounting.

2. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a pivotal mounting about which said inking mechanism is movable into and out of operative relation with the design cylinder and spring means acting to counterbalance the weight thereof as the inking mechanism is moved toward and from inking position.

3. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a pivotal mounting at the bottom of said inking mechanism about which the mechanism is movable into and out of operative relation with the design cylinder and spring means connected to the inking mechanism above said pivotal mounting and supported at a point below said pivotal mounting and acting to counterbalance the weight of the inking mechanism as it is moved toward and from inking position about its pivotal mounting.

4. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a pivotal mounting at the bottom of said inking mechanism about which the mechanism is movable into and out of operative relation with the design cylinder, resilient supporting means for the inking mechanism comprising a rod pivotally connected to the inking mechanism and a compression spring encircling said rod, the compression on the spring increasing as the inking mechanism is swung backwardly and downwardly from the inking position.

5. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a pivotal mounting at the bottom of said inking mechanism about which the mechanism is movable into and out of operative relation with the design cylinder, and resilient means acting on the inking mechanism and including a spring which passes under greater compression as the inking mechanism is moved outwardly and downwardly to counterbalance the weight of the mechanism.

6. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet

of ink against the cylinder, a pivotal mounting at the bottom of said inking cylinder about which the mechanism is movable into and out of operative relation with the design cylinder, a plurality of spaced-apart rods pivotally connected to the inking mechanism above its pivotal point, guide blocks within which said rods are longitudinally movable, and compression springs encircling said rods between their pivot points and their guide blocks.

7. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a carrier for the inking head, and a plurality of supports between the carrier and inking head provided with independently operated screw-threaded means for regulating the position of the inking head.

8. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a carrier for the inking head, and a plurality of spaced-apart screw bolts threaded into the carrier and upon which the inking head is supported.

9. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a carrier for the inking head, a plurality of spaced-apart supports between the carrier and inking head, said supports being independently actuable to regulate the position of the inking head, and means for clamping the inking head in a desired position.

10. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a carrier for the inking head, a pivotal mounting at the bottom of the carrier about which the carrier and head are movable into and out of inking position, and spring means impelling the carrier and head upwardly and toward inking position.

11. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, a pivotally mounted carrier, a plurality of spaced-apart supports extending upwardly from said carrier, the height of said supports being independently variable, an inking head resting upon said supports and having a nozzle adapted to emit a sheet of ink against the cylinder, and means for clamping the head firmly in position while resting upon said supports.

12. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, a pivotally mounted carrier, a plurality of spaced-apart supports extending upwardly from said carrier, the height of said supports being independently variable, an inking head resting upon said supports and having a

nozzle adapted to emit a sheet of ink against the cylinder, the head and carrier having vertical contacting surfaces provided with bolt and slot connections to clamp the head firmly in supported position.

13. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, a pivotally mounted carrier, a plurality of spaced-apart supports extending upwardly from said carrier, the height of said supports being independently variable, an inking head resting upon said supports and having a nozzle adapted to emit a sheet of ink against the cylinder, the head and carrier having vertical contacting surfaces provided with bolt and slot connections to clamp the head firmly in supported position and spring means acting on said carrier to impel it upwardly about its pivotal mounting and toward inking position.

14. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, pivotal supporting means for the inking head, and means for supplying ink to the inking head including a pipe having portions capable of relative rotation concentric with the pivotal mounting for the inking head.

15. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking mechanism comprising an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, pivotal supporting means for the inking head, and means for supplying ink to the inking head including a pipe having a portion concentric with the pivotal mounting for the inking head and a rotary sleeve joint in said concentric portion.

16. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a pivoted support for the inking head, means for vertically positioning the inking head relatively to its support, and means for supplying ink to the inking head including a conduit mounted on said carrier, and having a sliding sleeve joint between the carrier and inking head.

17. A rotary intaglio printing press including in combination a printing couple having an intaglio design cylinder, an inking head having a nozzle extending along the design cylinder and adapted to emit a sheet of ink against the cylinder, a pivoted support for the inking head whereby it is movable toward and away from inking position, means for vertically positioning the inking head relatively to its support, and means for supplying ink to the inking head including a conduit having a portion concentric with the pivotal mounting for said support and having a sliding sleeve joint between the support and inking head.

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