June 24, 1941. C. J. GUTBERLET 2,246,729

INKER FOR PLATE PRINTING PRESSES

Filed Nov. 22, 1940 5 Sheets-Sheet 1

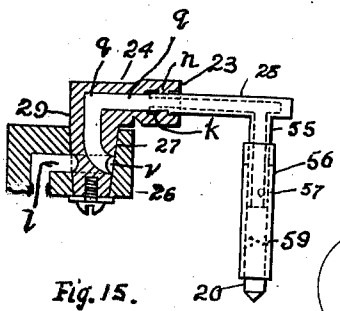


Fig. 15.

Fig. 1.

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INKER FOR PLATE PRINTING PRESSES

Filed Nov. 22, 1940 5 Sheets-Sheet 2

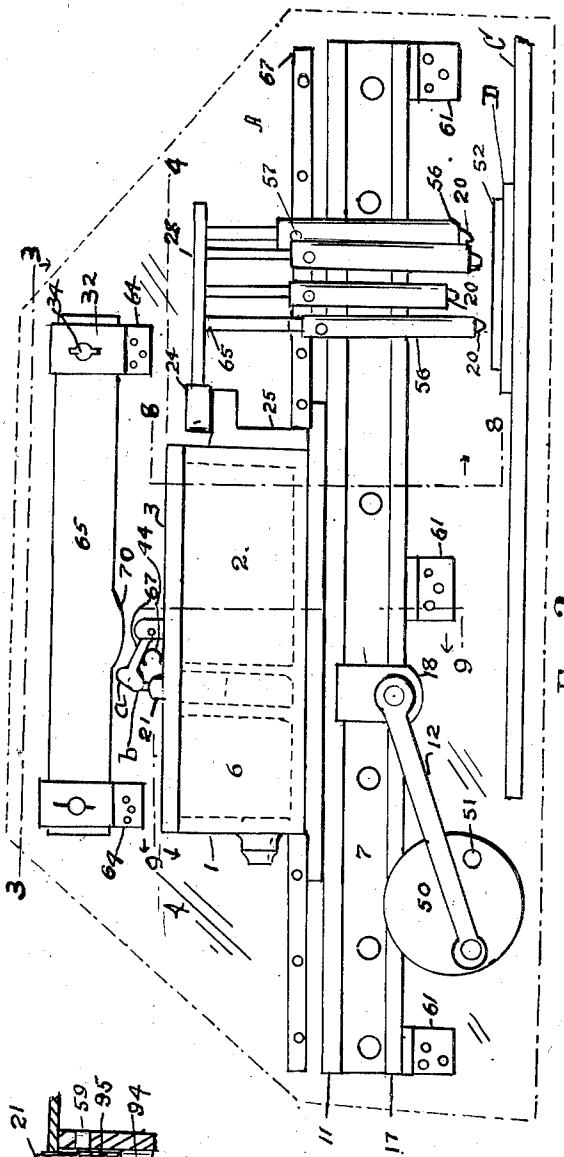


Fig. 2.

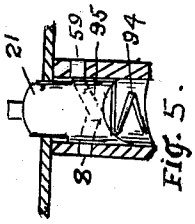


Fig. 5.

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INKER FOR PLATE PRINTING PRESSES

Filed Nov. 22, 1940 5 Sheets-Sheet 3

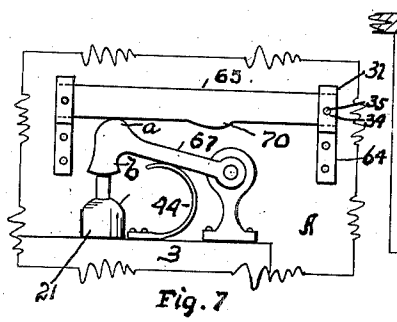


Fig. 7

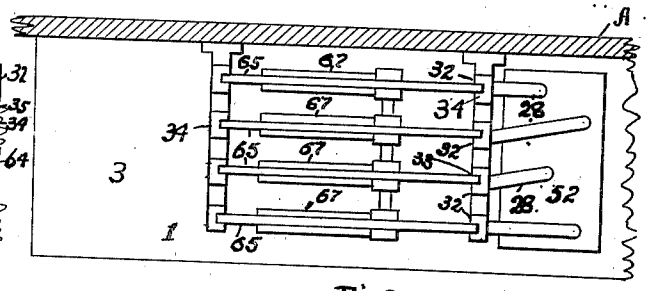


Fig. 3.

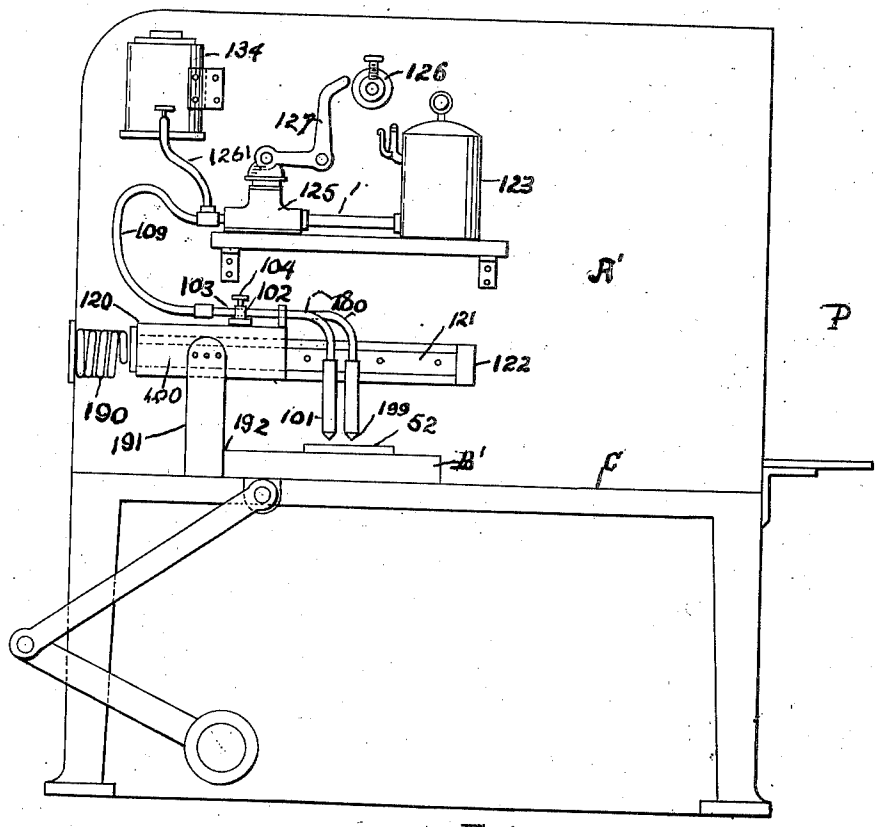


Fig. 10.

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INKER FOR PLATE PRINTING PRESSES

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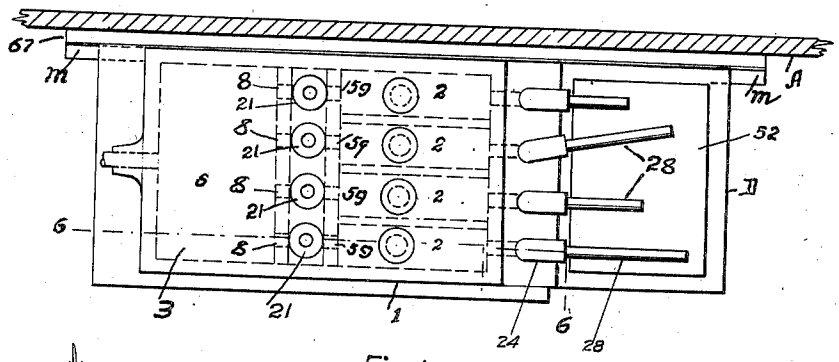


Fig. 4.

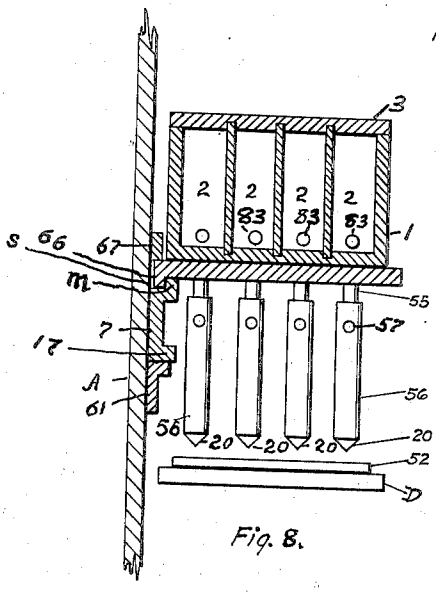


Fig. 8.

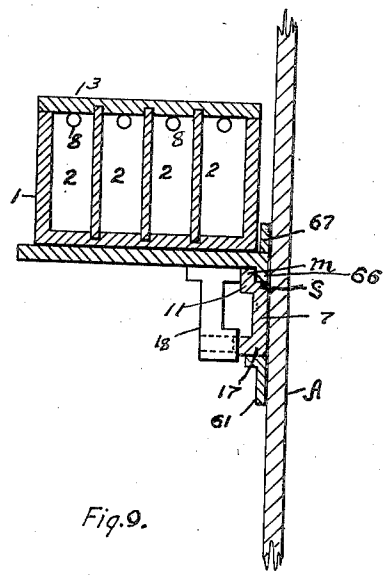


Fig. 9.

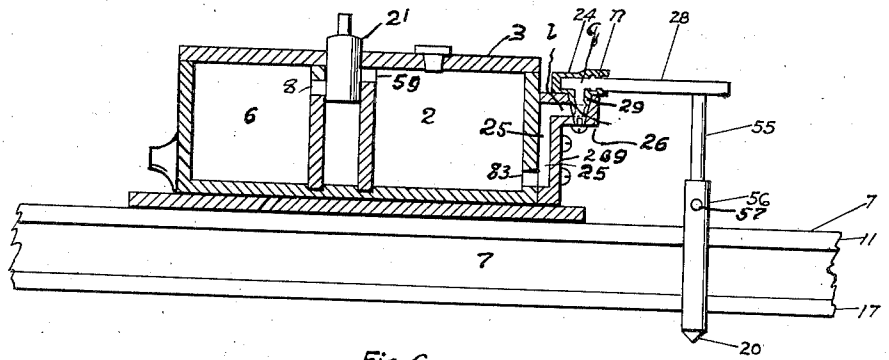


Fig. 6.

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INKER FOR PLATE PRINTING PRESSES

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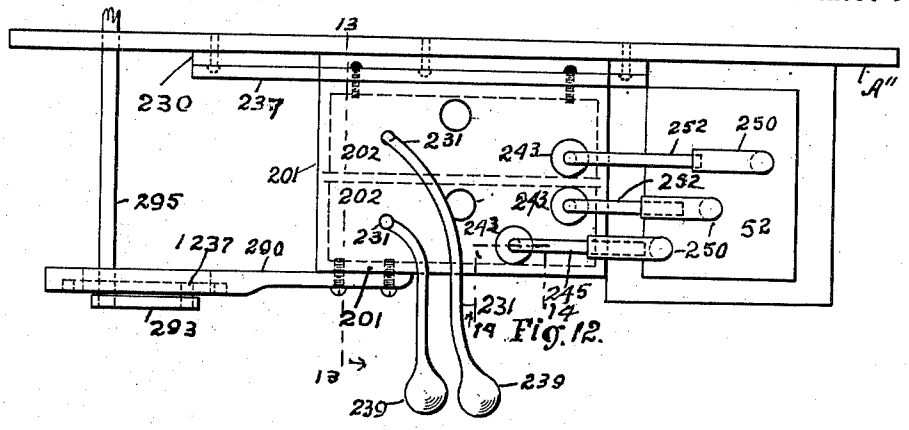


Fig. 12.

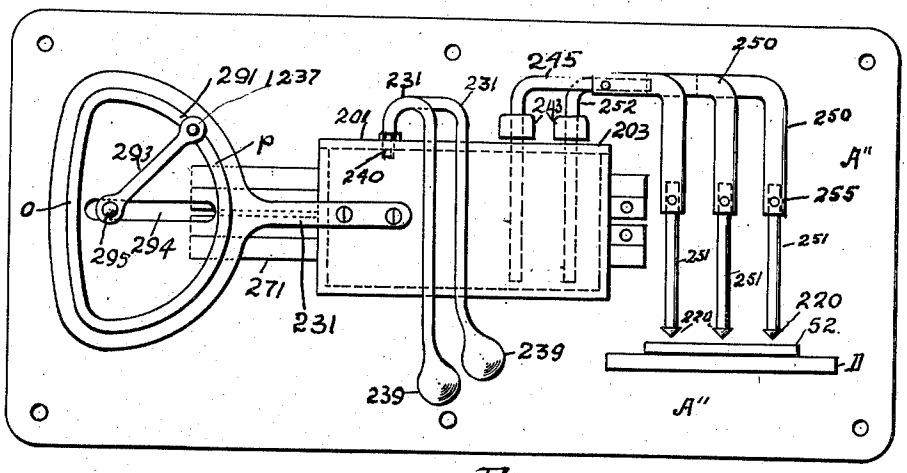


Fig. 11.

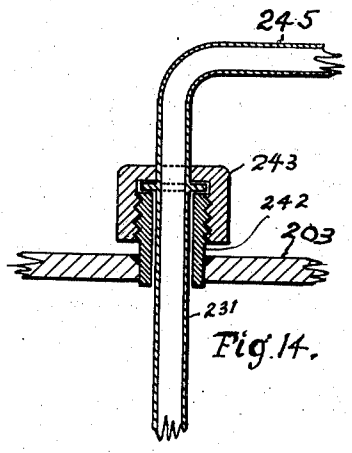


Fig. 14.

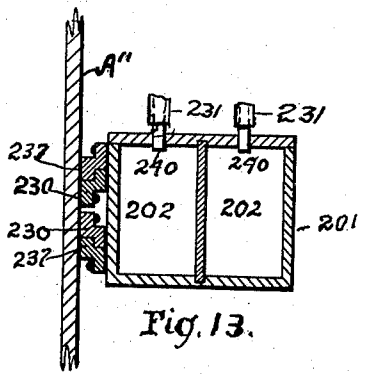


Fig. 13.

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Patented June 24, 1941 2,246,729

UNITED STATES PATENT OFFICE

2,246,729

INKER FOR PLATE PRINTING PRESSES

Charles J. Gutberlet, Philadelphia, Pa.

Application November 22, 1940, Serial No. 366,567

15 Claims. (Cl. 101—163)

My inker enables a plate printing press to print with a single impression, and single inking, an impression in varying colors.

It consists essentially of a series of ink spraying nozzles having a movement that is equalized with the movement of the plate from which the impression is made, during the portion of that plate's travel where the inking occurs. The ink nozzles each spray a different ink, and are each connected to an individual reservoir and may contain the particular ink to be sprayed on a determined area of the plate. The nozzles are adjusted so that each nozzle sprays a predetermined area of the plate, and preferably the quantity of ink sprayed upon each area. By these means, printing from a single plate, with a single inking and at a single impression, is made practicable in commercial production. The best embodiment of my invented inker I shall describe below, but my invention is broadly for the combination of the elements named above, with operating means which may vary to a considerable extent. But in the embodiment described below are also various elements that involve inventive novelty. These also I claim as well as the elements named above.

Plate printing presses are used to take impressions from plates that carry the ink for producing the impression in depressions, or grooves sunk below the surface of the plate, which is wiped clean before the impression is taken. In what is generically termed plate printing is included printing from steel engraving plates, etched plates and other forms of purely artistic work as well as the commercial side to which last this machine is especially applicable.

Plate printing may be done on various forms of printing presses. Primarily a stationary plate was placed on the bed of the press. It was inked by smearing ink over the face and, of course, filling the depressions. This was done manually, care being taken that all depressions were completely filled. The face of the plate was wiped, care being taken not to remove ink from the depressions, and the impression made. This process is used, even to-day, to procure particularly fine impressions, but of course is not applicable to economical production of commercial work. The modern commercial plate printing involves the automatic removal of the plate from the impression environment and its automatic inking and wiping and return to its impression environment. This moving of the plate has prevented hitherto, the inking of different areas of the plate with different inks, so that a varied color print could not be made commercially at a single inking and impression, or from a single plate. The commercial method in such cases hitherto was to restrict the printing grooves on one plate to those used to print a single color, thus requiring the production of a plate for every color, and taking an impression successively from each. The difficulty of securing complete registry at the successive impressions, the delay required between the impressions and doubling or trebling of the time required made commercial plate printing in colors unduly costly.

My inker avoids the multiplication of plates and impressions and the waste of time in drying and in press work. My chief object is to avoid these expenses of plate printing, and the loss of time occasioned in multiple impressions and the uncertainty of registry, and by the inking of the plate simultaneously with different colors to produce a blending, if desired, at the borders of the colors. Other purposes will be clear as my specification is read. I have described below the best form of my inker of which I am at present aware, and two modifications. Other modifications may be made by one skilled in the art, especially to adapt my inker to cylinder and rotary presses, to which it is applicable as well as to the reciprocating plate press in association with which I shall describe it below.

Fig. 1 is a diagram illustrating in elevation my inker in association with a reciprocating bed plate printing press. Fig. 2 is an elevation of my inker, the source of compressed air not being shown. Fig. 3 is a plan view of the parts shown in Fig. 2 looking down as from a horizontal plane containing the line 3—3 of Fig. 2. Fig. 4 is a plan view looking downward as from a horizontal plane containing the line 4—4 of Fig. 2. Fig. 5 is a detail showing valve controlling the air flow into the ink reservoirs. Fig. 6 is a section on the line 6—6 on Fig. 4. Fig. 7 is a detail showing the mechanism of the form of cam control of the air as in the form of device shown in Fig. 2. Fig. 8 is a section on line 8—8 on Fig. 2 through the carriage. Fig. 9 is a section through the ink carriage on line 9—9 of Fig. 2. Fig. 10 is a diagrammatic elevation of a modified form. Fig. 11 is an elevation of another very inexpensive modified form of my device. Fig. 12 is a plan view of same. Fig. 13 is a section on line 13 of Fig. 12. Fig. 14 is a sectional view showing means for clamping the ink conductor to the nozzles in the form shown in Figs. 11–13. Fig. 15 is a detail of the ink distribution.

In these figures the press itself and the general position of the wiping roll have been indicated. The wiper itself has not been shown. These instrumentalities form no part of my invention, and are common to reciprocating bed plate presses.

The form of my inker illustrated is adapted especially to use with the form of presses in which the plate is reciprocated horizontally away from its position where the impression is made to an inking position. The location of the impression portion of the press is indicated by P, the track C, for the carriage D, and supports B, are standard parts. The general position of the wiping strip is indicated by W, but the wiper is not shown and forms no part of my invention, nor bears any particular relation to it.

For convenience in assembling my device, a panel A, on which its parts may be supported, may be secured in any desired way to this portion of the press. 52 is the plate carried by its carriage D.

Adjacent to the track C is a track 7 supported upon the panel A upon which the spray nozzle carrying carriage 1 runs. The movement of this carriage on the track 7, is equalized with the movement of the carriage D on the track C to the extent that the two carriages move equally with each other during the inking period. The track 7 has the rails 11 and 17, on which the carriage 1 runs. The carriage 1 carries the spraying nozzles 20, 20, 20, 20, adjusted each to spray a particular area of the plate when the ink is driven through it. As the movement of the carriage 1 is equalized with the movement given to the plate 52, this area will remain the same substantially during the inking period of the plate, although both the nozzles and the plate are moving. This equality of motion of the nozzles 20, 20, 20, 20, and plate 52 does not extend to the impression period. As the plate 52 passes towards its printing position, the nozzles' motion is retarded or stopped, so that they do not interfere with the movement of the platen.

The movement of the carriage 1 upon its rails 11 and 17, may be produced by the eccentric 50, which is driven by a shaft 51, that is connected to a suitable driving shaft of the press. The link 12 connects the eccentric with the carriage 1. The rotation of the eccentric is timed to equalize the movement of the carriage 1 with the movement of the plate 52 during the inking period. This ordinarily may be done sufficiently accurately by the devices shown in Fig. 1. However, exact equalization may be produced by using a cam or by the means for equalizing the two movements shown in my modification in Fig. 10. But, for practical purposes, the form shown in Fig. 1, where the eccentric forms merely a crank is preferable to either, or to using the eccentric with a strap, in the way eccentrics are usually used. Still another mechanism for reciprocating a carriage is shown in Fig. 10, and is described with reference to the modification shown in that figure. But, any of the mechanisms shown for reciprocating the carriage may be used in any of the modifications shown.

The track 7 is carried from the panel A, by brackets 61, 61, and comprises the two rails 11 and 17. The upper rail 11 has a head *m*, on which the carriage 1 rests, and in the head is the guide *s*, in which a flange 66, attached to or forming part of the carriage 1, slides. This flange prevents the carriage from sliding off from the head *m*, of the rail 11. A horizontally running retainer 67, prevents the flange 66 from jumping out of the guide *s*. The lug 18, to which the link 12 is shown to be attached in Fig. 1, slides against the rail 17, and steadies the carriage.

The carriage 1, has the ink reservoirs 2, 2, 2, 2. In practice, these reservoirs may be made in the body of the carriage. A very convenient form is where the main body of the carriage is hollow, and is divided by partitions to form the reservoirs and contains also a compressed air reservoir 6, similarly formed. The reservoirs are covered air tight, by a cover 3, which may also cover air tight the reservoir 6. The structure may conveniently be a casting forming the sides of the carriage and the partitions in a single block. The air reservoir 6, forms an omnibus compressed air chamber communicating by individual ducts, 8, 8, 8, 8, with the ink reservoirs 2, 2, 2, 2, into which they should enter above the ink level. In each of the ducts 8, 8, 8, 8, is a valve 21 that controls the supply of the air in the ink reservoirs. This valve is automatically operated as will be described below. The pressure of the air on the ink in the reservoirs 2, 2, 2, 2, drives the ink out through the spraying nozzles 20, 20, 20, 20. From each reservoir 2, a duct 83 leads the ink to the appropriate nozzle 20. This level of the ink at some point between the reservoir 2, and the nozzle exceeds the level of the ink in the reservoir to keep the ink from dripping from the nozzle, because the ink should come from the nozzle under the impulse of the compressed air.

I have made a construction that will prevent the dripping of the ink which, while not a serious objection during the inking period would be very objectionable if continued after this period.

A continuation of the duct 83 is furnished by the adjunct 269 fitting closely against the wall of the carriage *l*, a groove 25 carries the ink upwards to above the level of the ink in the reservoir. This adjunct is connected to the head 26 that has the duct *l*, and also a socket 27, into which the tapering plug 29 fits snugly and rotatably. The duct *l* leads into this socket, at a point that is opposite an annular depression *v* in the plug 29. This plug contains a duct *q*, that extends laterally into a socket *n*, in a laterally extending head 24. The socket *n*, receives the end of the tube 28, which is held by a bayonet joint 23. By having tubes 28 of varying length, the nozzle 20 may, in conjunction with the turning of the head, direct the ink on any determined areas of the plate 52. The extent of the area sprayed may be governed by the distance a nozzle 20, lies above the plate 52. The greater this distance, the greater the spread of the ink and the less the distance the more closely the ink is confined. The tube 55 may telescope in the tube 56, that carries the nozzle 20, thus providing for the vertical adjustment of the nozzle 20, and a set screw 57 serves to fix it in the adjusted position. A check valve 59 serves to prevent drip except when the ink is driven out by the compressed air. This detailed description is not intended as a limitation. Other forms of adjustment of the nozzles to the reservoirs are shown in Figs. 9 and 10, and many others may be devised by a mechanic by modifying these adjustments. These forms of connection are in many ways interchangeable.

The ducts 8, 8, 8, 8, are controlled by the valves 21, 21, 21, 21, allowing, when open, the air to enter the closed reservoirs 2, 2, 2, 2, above the

ink level and drive out the ink through the nozzles 20, 20, 20, 20. These valves are operated automatically. In the forms of my device shown in Figs. 1 and 2, the reciprocation of the carriage 1 is utilized for this purpose, for which I have devised the following mechanism. The stem of the valve 21, is depressible by the lever 67, which is normally held upward by the spring 44. The lug *a* carried by it rides against the lower edge of the bar 65. The stem of the valve 21 rests against the lug *b*. The body of the valve 21 slides in a socket 93, and is pressed upward by the spring 94, and has in it an air duct 95, that leads from the bottom of the valve 21, through it to a point where it will register with air passage 59 when the valve 21 is depressed. Through this passage the air passes to enter a chamber 2. The valve 21 is actuated by the bar 65. The mechanism by which this cam operates the valve 21 is shown particularly in Fig. 7. The cam is horizontally placed above the carriage 1, and is formed in practice by the lower edge of the bar 65, that is stationary and may be removable from its holder 32. The holders are supported from the panel A, by a bracket 64. The holders contain slots 33, into which the cams may be placed, and may be secured solidly by the pins 35, passed through holes 34. I have found these cams may consist of wooden slats, that may be shaped at their lower edges, so that a bulge such as 70, may press on the lug *a*, causing the lug *b*, to press down the valve stem of valve 21. The shaping of the lower edges of the slats may be done with an ordinary pocket knife, and may be cut to correspond exactly with the spraying desired. If only two or three of the nozzles are to operate, only that number of cam slats need be inserted in the holders. Each slat is placed in a slot 33, so that it will lie opposite one of the valves 21.

A chamber 63, for containing compressed air may be mounted on the panel A, and air from it carried to the omnibus air chamber in the carriage 1, by a sufficiently flexible tube, or this omnibus air chamber may be connected directly to the source of compressed air 40.

In Fig. 10 I have shown a modified form of my device. The carriage 100, rides on the track 121, similarly to a cross head in its guides. This is secured to a panel A'. This carriage is urged backward by the spring 190, placed between the carriage and an abutment 120, secured to the panel A'. At the end of the track toward the press, I place the abutment 122, that stops the movement of the carriage 100, toward the press. The driver 191, is a bar secured to the carriage 100, and positioned in the path of the carriage B', which carries the plate 52. The movement out of carriage D' will push the driver against the urge of the spring, and, as the carriage B' moves in, the spring 190, will make the carriage 100, follow it, until the carriage 100, is stopped by the abutment 122. This movement will equalize exactly the movement of the nozzles 199, with the movement of the plate 52, during the inking period. The nozzles 199, are carried by tubes 101, 101, that telescope with bent tubes 160, that pass through an aperture in a pedestal 102. These tubes have a horizontal portion 103, allowing a lengthwise adjustment in the pedestal. They are set, by a set screw 104. By making the pedestal 102, rotatable, as complete an adjustment may be made as is made in the form shown in Figs. 1 and 2. Ink reservoirs 134, are placed on the panel A, and connected to each of the tubes 103, by the flexible tubes 109. A valve, 125, connected to a compressed air container 123, also mounted on the panel, allows air pressure to be brought to drive the ink through the several nozzles. A removable, replaceable and adjustable cam 126, actuates the lever 127, that controls the valve 125. This valve 125 may be similar to the valve 21, shown in Figs. 1 and 2. This form of my device has the advantage of absolute equalization of the nozzle movement with the motion of the plate 52, and requires fewer specialized parts.

The press is prepared for printing in the usual way, no change being required in its structure or operation. In the two forms of my device described above the operation is automatic, and after the elements are adjusted no attention by the operator is needed. The form described below where the ink propulsion is not automatic requires attention to the inking.

In Fig. 11, I have illustrated a very simple form of my device where the spraying of the ink is caused by manual compression of the air in the reservoirs from which I desire to spray the ink. It is useful where little work is produced, and economy in first cost is a controlling feature. A carriage 201 travels on a track parallel to that travelled by the plate 52. A convenient way to form this track is the use of hook angle iron strips 230, 230, secured to the panel A'', one set hook up and other hook down, with them work hook angle iron pieces 237, 237, secured to the carriage 201. To enable a good job the inner faces of the hook webs should be machined to slide easily on each other. The carriage 201, has an extension 231, that carries a cam slot 291 in which the pin 1237 works. The reciprocation of the carriage 201, is effected by the pin 1237, that is carried by a crank arm 293 on a shaft 295, that is timed to revolve evenly with a complete reciprocation of the plate 52, and is carried by the shaft 295. The extension, in practice, has a horizontal slot 294 passing completely through it, through which the shaft 295 passes and steadies the carriage. The cam slot 291, has a resting portion *p*, which holds the carriage immovable outside the press after the inking period, and a driving portion o, that equalizes the movement of the carriage 201, and plate 52, during the inking period.

I preferably build the ink reservoirs in the carriage 201, similarly with the form of my device shown in Figs. 1 and 2, a nipple 240 leads into each reservoir over which a rubber tube 234 is stretched. These tubes lead to an air bulb 239, a check valve is introduced similarly to that in an ordinary syringe. The tubes 252, turn in glands 242 and immobilized by the clamps 243, pass down into the reservoir below the ink level. They telescope both vertically and horizontally similarly to those shown in Figs. 1 and 2. I have shown a second tube 245 in the same ink reservoir to take care of two areas of the plate 52, from the same ink. In this form of my device, the expulsion of the ink is caused by the pressure of the bulbs 239 manually. It will be understood that much of the mechanism described can be interchanged between the various forms of my device. Besides this, many changes may be made in my device without departing from my invention, and therefore I declare that I do not limit my right to my invention to less than is defined in my claims.

I claim:

1. An inker for plate presses that have a mov-

ing plate from which impressions are made, comprising in combination movable ink spraying nozzles in position to spray ink upon pre-determined areas of said plate, a moving carriage for said nozzles and equalizing mechanism operating during the inking of said plate, equalizing the movement of said carriage with the movement of said plate, during said inking period, and means for forcing intermittently the ink through the spraying nozzles.

2. The inker defined in claim 1, wherein the means for intermittent forcing of the ink through the nozzles, comprises a source of compressed air, conductors leading the compressed air into a closed vessel above the ink level, and means for regulating the air pressure upon the ink.

3. The inker defined in claim 1, wherein the mechanism for forcing the ink through the nozzles comprises a source of compressed air pressure upon the ink and cam controlled mechanism for regulating automatically the intermittent flow of ink through the nozzles.

4. The inker defined in claim 1, wherein the means for forcing intermittently the ink through the ink nozzles comprises a series of separate closed reservoirs for the ink, conductors leading the air into the reservoirs, separate spray nozzles, separate conductors leading from the ink reservoirs to the individual spraying nozzles, and means for controlling the air pressure upon the ink in said reservoirs.

5. The inker defined in claim 1, wherein the means of forcing and controlling the flow of the ink through the ink spraying nozzles comprises a source of compressed air, closed separate ink reservoirs to separate ink spraying nozzles, separate conductors leading individually from each individual ink reservoir to each individual ink spraying nozzle, separate air conductors leading to said separate ink reservoirs and valves in the said separate air conductors.

6. In association with a plate printing press having a reciprocating movement of the plate to be printed, an inker comprising a reciprocating carriage, spraying nozzles for distributing the ink upon pre-determined areas of the plate carried by said carriage, means for reciprocating said carriage, equalizedably with the reciprocations of said plate during the time the plate is being inked, a source of periodic pressure upon the ink operating to bring pressure on the same at determined intervals.

7. The device as defined in claim 6, with the following limitations, namely, that the means for bringing pressure upon the ink comprises a series of closed ink reservoirs, conductor leading from each reservoir to a spraying nozzle, and means for bringing pressure to bear on the ink in said reservoirs at determined periods.

8. In an inker for inking pre-determined areas of a moving plate of plate printing presses, a series of spraying nozzles, a movable carriage carrying said nozzles, the movement of which is equalized with the plates' movement during its inking period, said nozzles being mounted adjustably on said carriage whereby each nozzle is directed to a pre-determined area of said plate, and means for driving the ink through said nozzles.

9. In an inker for spraying with ink pre-determined areas of a moving plate of plate printing presses, a movable carriage, closed ink reservoirs on said carriage, a source of compressed air, conductors leading air from the source of compressed air to said reservoirs, valves in said reservoirs and stationary cams controlling said valves and the flow of air through said conductors, said cams being made operative by the movement of said carriage.

10. The cooperating elements of the device defined in claim 8, wherein the stationary cams are horizontally placed removable strips having a surface shaped to form a cam.

11. In a spraying inker for plate printing presses that have a moving plate from which the impression is taken, an inker, comprising a moving carriage, mechanism giving the carriage a movement equalized with said moving plate while the inking occurs, reservoirs of different inks, nozzles carried by said carriage, conductors leading from separate reservoirs to separate nozzles, said conductors having one section adjustable longitudinally and rotatably and another section vertically, and means for forcing ink through said conductors to said nozzles.

12. An inker for plate presses that have a horizontally moving reciprocating plate, comprising a travelling carriage, movable horizontally, a series of spraying nozzles carried by said carriage, directed towards pre-determined areas of the plate, means for equalizing the movements of said carriage and said plate during the inking portions of the plate's travel, a series of closed ink reservoirs for different kinds of inks, conductors connecting each ink reservoir to an individual nozzle, and means for interruptedly forcing ink through individual nozzles.

13. The device defined in claim 12, wherein the means for forcing ink through individual nozzles comprises a source of compressed air, conductors leading from the source of compressed air to the individual nozzles timed to operate uniformly with the movement of the nozzles.

14. The inker defined in claim 12, wherein the mechanism equalizing the movement of the spray nozzle carrying carriage with the movement of the plate during the inking period, comprises a plate bearing travelling carriage, tracks on which said carriages run, parallel with each other, a spring urging said nozzle bearing carriage toward the press, an element attached to said nozzle bearing carriage, extending into the path of said plate bearing carriage, disengageable from the said plate bearing carriage and an abutment placed in the path of said nozzle carrying carriage stopping the movement of the nozzle bearing carriage after the end of the inking period.

15. The inker defined in claim 12, wherein the mechanism for equalizing the movement of the nozzle bearing carriage with the movement of the plate, comprises a track on which said carriage travels, a rotating crank, a pin on said crank, an element moving with said carriage containing a cam groove that works in conjunction with said pin, said cam groove having a resting portion holding the carriage back during the non-inking period of the plate's travel, and a portion that equalizes the motion of the said carriage with the movement of the plate during the inking period of said plate's travel.

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