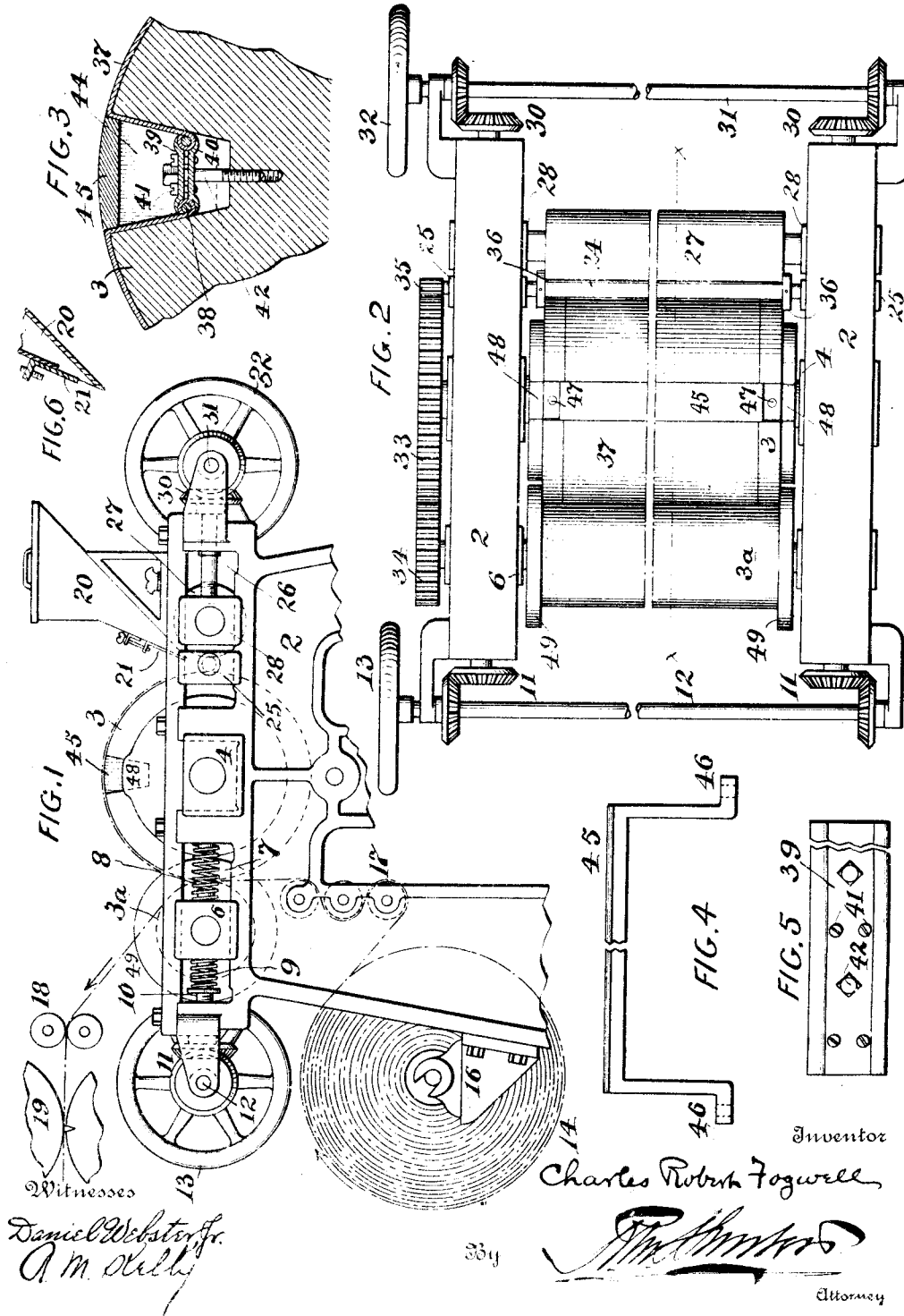


C. R. FOGWELL.
PRINTING PRESS.

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1,107,772.

Patented Aug. 18, 1914.



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PRINTING-PRESS.

1,107,772.

Specification of Letters Patent. Patented Aug. 18, 1914.

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To all whom it may concern:

Be it known that I, CHARLES ROBERT FOGWELL, a subject of the King of England, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Printing-Presses, of which the following is a specification.

My invention has reference to printing presses and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a construction of press suitable for plate printing as in photogravure work in which a more perfect printing results by reason of a more satisfactory application of the ink to the engraved plate and the wiping or cleansing of the surface of the same at one and the same operation and by the same means. By my improvements the most perfect printing possible is attained and at the same time the operation of printing may be conducted at a very high speed.

My invention consists in means for supplying ink to the engraved surface of the plate combined with means for pressing the ink into the depressions or engraved portions of the plate alone and by pressure squeezing back all ink from the unengraved surfaces of the plate.

More specifically my invention consists of an engraved surface combined with means for supplying ink in bulk to the surface of the engraved surface, and a hard metal rotatable roller making a close contact across the surface of the plate for simultaneously pressing the ink into the recesses or engraved portions of the plate and forcing back all ink from the unengraved surfaces, said plate being preferably in cylindrical form and moved in close contact with the rotatable roller.

My invention also comprehends the method of printing from etched or engraved plates which consists in applying the ink to the etched or engraved surface of the plate and simultaneously impressing the ink into the recesses or engraved parts of the plate and squeezing back all ink from the unetched or unengraved portions of the plate by the rolling contact with the plate of a hard roller while maintained in contact with the plate across its face under great and con-

stant pressure, whereby the plate is perfectly clear of ink except in the recesses or engraved portions thereof.

My invention further includes details of construction which, together with the features above set out, will be better understood by reference to the drawings, in which:—

Figure 1 is a side elevation of a plate printing press embodying my invention; Fig. 2 is a plan view of the same; Fig. 3 is a sectional view on a larger scale taken on line *x—x* of Fig. 2; Fig. 4 is an elevation of the gap filling plate for the printing plate cylinder; Fig. 5 is a plan view of one of the clamping plates for holding the engraved plate upon the plate cylinder; and Fig. 6 is a cross section of the ink regulating means.

2 is the main frame and has at its upper end two slotted portions 7 and 26 in substantial alinement.

3 is the type form or plate cylinder and is journaled in fixed bearings 4 between the two slotted guide portions.

3^a is the impression roller and is preferably formed of metal covered with rubber and is journaled in bearings 6 which are guided in the guide portions 7. These bearings 6 are held in position between springs 8 and 9, the latter being adjustable as to tension by means of screws 10, which may be turned by the miter gears 11, transverse shaft 12 and hand wheel 13. By this means, the amount of tension for the impression may be regulated, and at all times, the impression roller is so supported that it may be forcibly moved away from the plate cylinder when necessary, as hereinafter stated.

The roll of paper to be printed is indicated at 14 and is supported upon a mandrel which in turn is sustained by suitable bearings 16 on the main frame. The web of paper passes from the roll alternately around a series of tension rollers 17, thence passes between the plate cylinder and impression roller, thence between feeding rollers 18, and after leaving the feed rollers, the said web may be severed into sheets by cutting cylinders 19. The said feeding and cutting cylinders may be of any suitable construction.

24 is a pressure and cleaning roller of small diameter and is carried at each end in bearings 25 which are guided in the

guide way 26. This roller 24 rests against the surface of the engraved plate 37 which is secured about the periphery of the plate roller 3. The ink-well 20 extends entirely across the machine being supported at each end on the main frame as indicated in Fig. 1, and this ink-well is provided with a transverse opening or slot along its lower edge so as to allow the ink to flow by gravity down upon the roller 24. The opening formed by the slot is regulated by the adjustable gate 21 so that the sheet of ink flowing down upon the roller 24 and to the engraved plate may be in greater or less quantity to suit the particular requirements of the engraving of the plate. It is seen that no disturbing rollers are necessary in the structure of this application. The purpose of the roller 24 is two-fold, namely, to press the ink which is delivered upon it from the ink-well 20, into the depressions in the surface of the engraved plate and at the same time to positively and effectively squeeze off from the unengraved surfaces all of the ink, so that the plate is perfectly clean of ink except at the recessed portions which correspond to the etched or engraved parts into which the ink is pressed and from which it is to be delivered upon the paper web. This roller 24 is preferably of small diameter and should be of exceedingly hard, smooth material, preferably chrome steel and provided with a surface having equivalent to a mirror finish, as such a condition is necessary to secure the proper cleaning of the surface of the etched or engraved plate. The roller 24 is provided with collars 26 which run in contact with the ends of the plate roller 2 and also with a pressure roller 27 bearing against the outer side of the cleaning roller 24 so as to form in effect a pocket between itself and the etched plate into which the ink from the ink-well may be received. The supply of ink is regulated to suit the consumption in the printing operation.

The pressure roller 27 is of large diameter compared to the cleaning roller 24 and is carried in bearings 28 guided in the guide way 26, and its object is to hold the cleaning roller firmly up against the surface of the etched or engraved plate. It is made of considerable diameter so that it will not spring under the application of pressure to its journals and the resistance by its contact with the cleaning roller. This pressure roller may be adjusted to the desired degree of pressure upon the cleaning roller 24 by means of the screws 29, the miter gears 30, the transverse shaft 31, and hand wheel 32. Any other means may be employed for applying the desired pressure. It is important that the cleaning roller 24 shall be of small diameter compared to the diameter of the plate roller, because the smallest possible

line of contact is advantageous in securing a proper cleansing of the surface of the plate without withdrawing the ink from the recesses or engraved portions thereof. A roller of large diameter would not clean properly because of the extent of surface contact between it and the plate and which would produce an objectionable suction during the rolling operation. It is because the roller 24 should be of small diameter that it becomes necessary to employ a pressure device of some kind to hold it up to the engraved plate with the proper degree of pressure. The pressure roller 27 is the preferred form of applying pressure to the cleaning roller 24, but it is evident that any other equivalent device may be employed in lieu thereof.

I prefer to gear the plate cylinder, the impression roller and the cleaning roller together by suitable gears 33, 34 and 35 respectively secured to the shafts of these rollers. Such gearing is shown on one end only, but may be applied to both ends, if so desired. It is not necessary to apply any gears to the pressure roller 27.

It will be understood that while it is desirable that the roller 24 shall be positively rotated, this result does not necessarily require that it shall be geared directly as shown. I have shown the manner of rotating it in the simplest form of my invention, but it is evident that the said roller may be frictionally rotated if so desired.

While the engraved plate may be secured to the surface of the plate cylinder in any suitable manner, such as by forming it as a tube and slipping it in place upon the cylinder, I prefer to employ etched copper plates which are stretched about the periphery of the plate cylinder; and the means or securing such plates in stretched condition which I prefer are herein shown. They consist of a plate 37 of approximately No. 24 gage, the ends of which are preferably beaded or wired, as at 38. These beaded ends are clamped between two plates 39 and 40, which are secured together by screws 41. These plates are then pulled down with the ends of the copper sheet into a recess 44, across the periphery of the plate cylinder 3, by means of screws 42, thereby drawing the copper sheet or plate 37 over the edges 43 of the roller and putting it under the desired tension. The gap formed by the recess 44 may be closed by a plate 45 having feet 46 which are secured to the roller by screws 47. The outer surface of the plate 45 is preferably curved to correspond to the curvature of the engraved plate 37. Any other means of attaching the engraved plate and gap closing plate may be employed, if so desired.

If desired, the impression roller 3^a may be moved out of contact with the plate

roller during the passage of the gap filling plate 45 under it, and this is secured by providing the impression roller with collars 49 at each end and providing the plate cylinder with small cam portions 48 which are arranged in radial alinement with the said gap filling plate 45 and which thereby move the impression roller against its springs 9 and away from the plate cylinder during the passage of the said part 45.

In this application I make no claim to the specific means for stretching the engraved or etched plate about the cylindrical surface of the printing cylinder as that will form subject matter of a separate application.

While I have described my invention in the form in which I prefer to employ it, I do not restrict myself to the details as they may be modified in various ways without departing from the spirit of the invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a plate printing press, the combination of the plate cylinder having thereon an engraved or etched plate, means for rotating the plate cylinder, with means for applying ink to the surface of the said engraved or etched plate, a roller of small diameter and highly polished surface and of exceedingly hard material rolling in close contact with the surface of the engraved or etched plate at a point in rear of the application of the ink thereto and constituting the sole means required for removing the ink from the unengraved portions of the plate, and means for positively rotating the said roller of small diameter at the same surface speed as the etched plate on the plate cylinder, whereby said roller performs a dual function of pressing the ink into the engraved or etched portions and removing the ink from the smooth or unengraved or unetched portions.

2. In a plate printing press, the combination of a rotating plate cylinder having thereon an engraved or etched plate, with means for applying ink to the surface of the said engraved or etched plate, a roller of small diameter and highly polished surface and of exceedingly hard material, rolling in close contact with the surface of the engraved or etched plate at a point in rear of the application of the ink thereto and constituting the sole means required for removing the ink from the unengraved portions of the plate, and means for positively rotating the said roller of small diameter at the same surface speed as the etched plate on the plate cylinder, whereby said roller performs a dual function of pressing the ink into the engraved or etched portions and removing the ink from the smooth or

unengraved or unetched portions, and means for varying the pressure applied to the said cleaning roller.

3. In a plate printing press, the combination of a plate cylinder having thereon an engraved or etched plate with an impression roller for printing from the plate, means for delivering ink to the plate on the plate cylinder, a pressing and cleaning roller of relatively small diameter compared to the diameter of the plate roller and formed of exceedingly hard material with a smooth surface for simultaneously pressing the ink into the recessed or engraved portions of the plate and also for removing the ink from the unengraved portions of the plate, and a supporting roller of relatively large diameter as compared to the pressing and cleaning roller for forcing the said roller toward the plate cylinder and in close contact with the plate thereon.

4. In a plate printing press, the combination of a plate cylinder having thereon an engraved or etched plate, with an impression roller for printing from the plate, means for delivering ink to the plate on the plate cylinder, a pressing and cleaning roller of relatively small diameter compared to the diameter of the plate roller and formed of exceedingly hard material with a smooth surface for pressing the ink into the recessed or engraved portions of the plate and also for removing the ink from the unengraved portions of the plate, a supporting roller of relatively large diameter as compared to the pressing and cleaning roller for forcing the pressing and cleaning roller toward the plate cylinder and in close contact with the plate thereon, and positive means for rotating the pressing roller and plate roller in opposite directions, and means to adjust the supporting roller to regulate the pressure of the pressing roller upon the plate on the plate cylinder.

5. In a plate printing press, the combination of a plate cylinder having thereon an engraved or etched plate, with an impression roller for printing from the plate, means for delivering ink to the plate roller, a pressing and cleaning roller of relatively small diameter compared to the diameter of the plate roller and formed of exceedingly hard material with a smooth surface for pressing the ink into the recessed or engraved portions of the plate and also for removing the ink from the unengraved portions of the plate, a supporting roller of relatively large diameter as compared to the pressing and cleaning roller for forcing the pressing and cleaning roller toward the plate cylinder and in close contact with the plate thereon, positive means for rotating the pressing and cleaning roller and plate cylinder in opposite directions, and means to adjust the supporting roller to regulate the

pressure of the pressing and cleaning roller upon the plate on the plate cylinder, and gears between the pressing and cleaning roller and the plate cylinder to cause the former to rotate at substantially the same surface speed as the latter.

6. In a printing press, the combination of a plate cylinder, a pressing and cleaning roller for pressing the ink into the etched or engraved portions of the plate and removing the ink from the unengraved portions thereof, and a supporting roller of relatively large diameter compared to the pressing and cleaning roller for supporting the pressing and cleaning roller and forcing it into contact with the plate of the plate cylinder, the axes of the cylinder and rollers being arranged in the same plane.

7. In a plate printing press, a plate cylinder consisting of a cylinder having a longitudinal recess across its face, combined with the etched or engraved plate arranged about the circumference of the cylinder and having its opposite ends extended into the recess, means fitting into the recess for providing a bridge over the recess, an inking roller, an impression roller operating in contact with the plate of the plate cylinder, and means for automatically moving the impression roller out of contact with the plate cylinder and its plate during the interval that the recessed portion of the plate cylinder and its bridging means passes under the impression roller.

8. In a plate printing press, a plate cylinder having a longitudinal recess across its face, combined with the etched or engraved plate arranged about the circumference of the roller and having its opposite ends extended into the recess, a pressing and cleaning roller for pressing ink into the engraved portions of the plate and removing the ink from the unengraved portions thereof, a bridging plate arranged within the recess of the plate roller and having its outer surface curved to the curvature of the plate which is arranged about the plate cylinder and arranged as a continuation of the curvature of the plate across the recess of the cylinder for supporting the pressing and cleaning roller during the rotation of the plate cylinder.

9. In a plate printing press, the combination of a plate cylinder having thereon an engraved plate, means for delivering ink for application to the engraved lines of the plate, and unitary means for simultaneously pressing the ink into the engraved parts of the plate and pressing back all ink from the unengraved portions thereof on the same transverse line across the engraved plate at any moment to completely remove all surplus ink and put the inked plate in condition for immediate printing.

10. In a plate printing press, the combination of a plate cylinder having thereon an engraved plate, means for delivering ink for application to the engraved lines of the plate, and unitary means for simultaneously pressing the ink into the engraved parts of the plate and pressing back all ink from the unengraved portions thereof on the same transverse line across the engraved plate at any moment to completely remove all surplus ink and put the inked plate in condition for immediate printing, said means consisting of a hard surface moving in contact with the plate and traveling therewith continually in the same direction.

11. In a plate printing press, the combination of a plate cylinder having thereon an engraved plate, means for delivering ink for application to the engraved lines of the plate, and unitary means for simultaneously pressing the ink into the engraved parts of the plate and pressing back all ink from the unengraved portions thereof on the same transverse line across the engraved plate at any moment to completely remove all surplus ink and put the inked plate in condition for immediate printing, said means consisting solely of a smooth metallic moving surface continuously traveling in the same direction in contact with the engraved plate, and means acting on the ends and intermediate portions for pressing said moving surface into close contact with the moving engraved plate.

12. In a plate printing press, the combination of a plate cylinder having the engraved plate, a hard smooth metal roller making a rolling contact with the plate and acting as the means for pressing the ink into the engraved portions of the plate and as the sole means for removing all of the ink from the unengraved portions of the plate, and an ink supplying means for supplying ink to the roller and plate substantially across the plate whereby the ink is applied to the engraved portions of the plate.

13. In a plate printing press, the combination of a plate cylinder having the engraved plate, a hard smooth metal roller making a rolling contact with the plate and acting as the means for pressing the ink into the engraved portions of the plate and as the sole means for removing all of the ink from the unengraved portions of the plate, means acting along the length of the roller to forcibly press it against the engraved plate, an ink supplying means for supplying ink under the action of gravity to the roller and plate substantially across the plate whereby the ink is applied to the engraved portions of the plate, and a gate for regulating the quantity of ink delivered.

14. The herein described method of printing from intaglio plates which consists in

applying the ink to the surface of the intaglio plate and simultaneously impressing the ink into the intaglio parts of the plate and squeezing back all ink from the smooth or unengraved portions of the plate by the rolling contact of a hard non-compressible roller maintained in contact with the intaglio plate across its face under constant and uniform pressure throughout its length, whereby the intaglio plate is perfectly clean of ink except in the recesses or engraved portions thereof and is at once inked and cleaned ready for printing.

15 15. The herein described method of printing from intaglio plates, which consists in applying ink to the plate and simultaneously impressing the ink into the engraved portions of the plate and squeezing back all ink from the smooth or unengraved portions of the plate by means of a polished hard metal traveling surface pressed in close contact

with the intaglio plate and being the sole means for the purpose.

16. The herein described method of printing from intaglio plates, which consists in applying ink by gravity to the plate throughout the width of its engraved portion and simultaneously impressing the ink into the engraved portions of the plate and squeezing back all ink from the smooth or unengraved portions of the plate by means of a polished hard metal traveling surface pressed in close contact with the intaglio plate and being the sole means for the purpose.

In testimony of which invention, I hereunto set my hand.

CHAS. R. FOGWELL.

Witnesses:

R. M. HUNTER,

R. M. KELLY.