Nov. 30, 1937. A. G. JACOBSON 2,100,852

PRINTING PRESS

Filed April 20, 1935 2 Sheets-Sheet 1

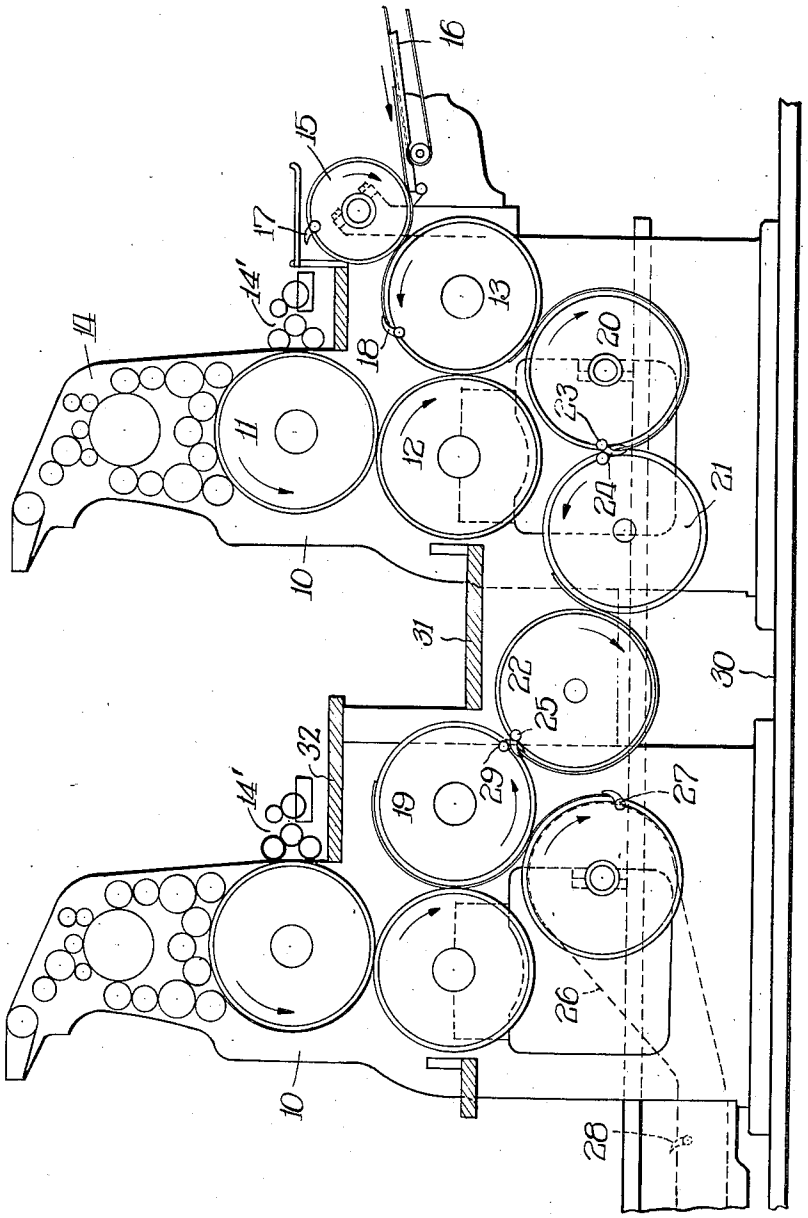


Fig. 1.

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Nov. 30, 1937. A. G. JACOBSON 2,100,852

PRINTING PRESS

Filed April 20, 1935 2 Sheets-Sheet 2

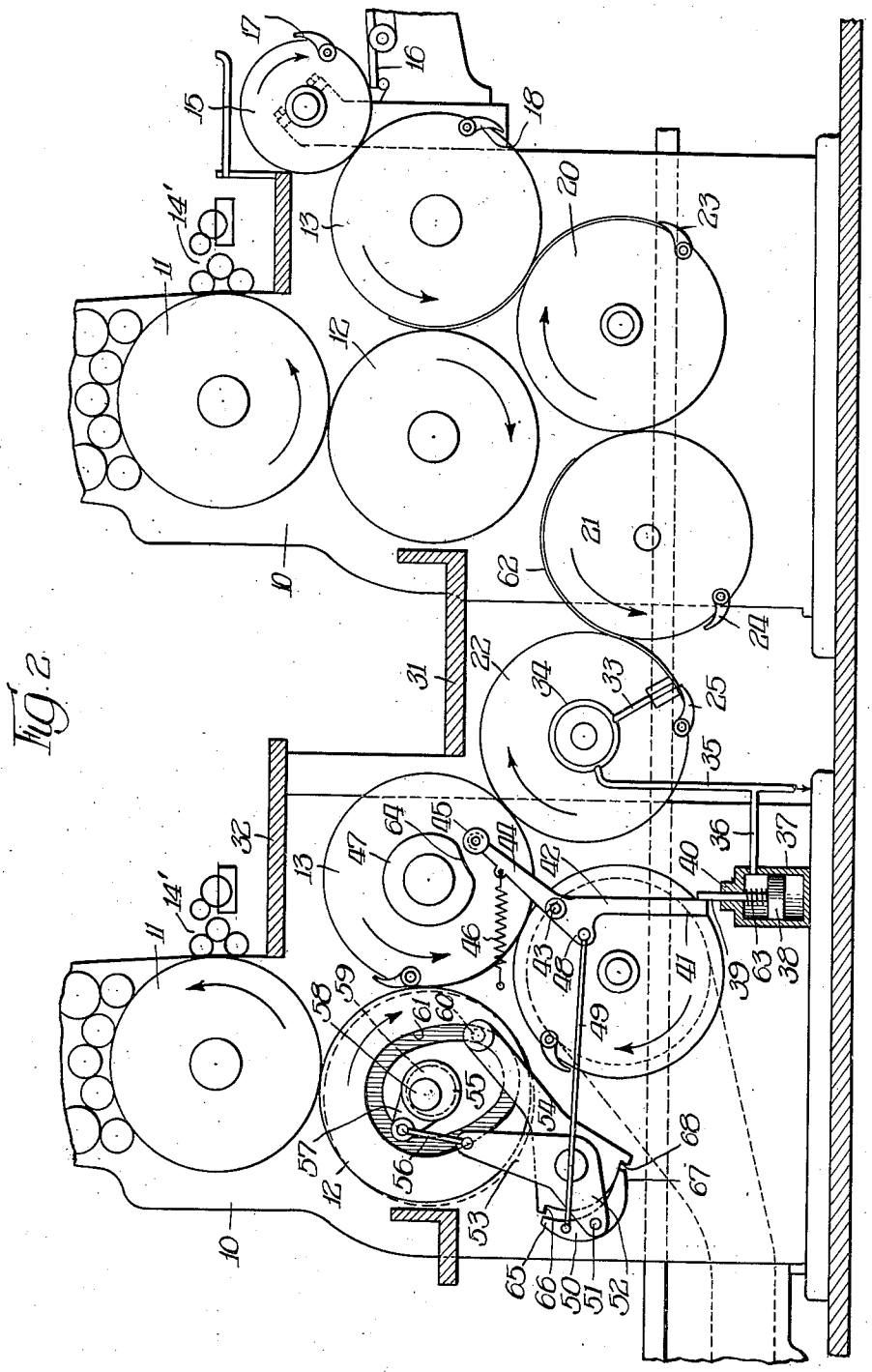


Fig. 2.

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Patented Nov. 30, 1937 2,100,852

UNITED STATES PATENT OFFICE

2,100,852

PRINTING PRESS

Arthur G. Jacobson, Chicago, Ill., assignor to The Miehle Printing Press and Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application April 20, 1935, Serial No. 17,383

26 Claims. (Cl. 101—137)

This invention relates to sheet fed printing presses in which two or more substantially identical printing couples are arranged as a unit for multicolor printing.

The principle of the features which constitute my invention is more particularly intended for use in planographic printing presses, such as lithographic offset presses of the rotary type, although it could be readily applied to other types of printing presses.

The problem of designing sheet fed multicolor printing presses, where several printing couples are arranged for unit operation, brings a number of difficulties which must be overcome in order to produce a press that is acceptable to the printer. Perhaps one of the most common of these difficulties is that of rendering each individual printing couple or color unit accessible to the pressman, and in order to accomplish this, it is primarily essential to provide maximum space between adjacent units.

Another important factor is that of rendering the press as low as possible so that the adjustments of the various operating parts may be accomplished with ease from the floor or from low platforms.

It is also essential to maintain perfect register of the impressions from each printing couple as the sheets pass through the press; moreover, in presses of this class it is desirable to provide maximum time for the ink to set between each impression so that the various color impressions do not flow together.

Furthermore, in order to provide a multicolor press that will meet all practical requirements, it is highly desirable that means be embodied whereby any successive printing couple will be independently and effectively tripped in the event that a sheet fails to reach the sheet transfer means associated with the respective couple.

Heretofore, in order to provide operating space between adjacent printing couples of multicolor presses, it has been suggested to use an impression cylinder, the diameter of which is a multiple of that of the cooperating printing cylinders, or to transfer the sheets from one couple to another by means of a transfer cylinder or reel, the diameter of which is a multiple of that of the printing cylinders of the printing couples. With such arrangements it is necessary of course to provide more than one set of sheet engaging elements, either on the large impression cylinder or on the sheet transfer cylinder as the case may be, and consequently the successive sheets are engaged and transferred from one printing couple to another by different sets of sheet engaging elements.

It has been found that such arrangements create exceedingly undesirable conditions, for instance it is practically impossible to maintain accurate register of the successive impressions because of the fact that no matter how accurate the adjustments might be, each set of sheet engaging elements will act somewhat differently on the sheets which they carry. This will result in what may be termed an "on and off" condition of register, that is to say, the register of the subsequent impression on the sheets that are conveyed from one couple to another by one set of elements might be "on", i. e. in register with the previous impression or impressions, while the register of the subsequent impression on the sheets conveyed by another set of sheet engaging elements might be "off". This fact has been proven in actual practice and many, but unsuccessful attempts were made to correct this condition by the best possible adjustments of the parts involved.

Printing presses in which the cylinders are dimensioned as explained above present other disadvantages, for instance, the accessibility of such presses is limited. Furthermore, due to the large diameter of the impression cylinders, or of the transfer members, the height of a press correspondingly increases, which necessitates the provision of platforms at comparatively high and inconvenient levels, in order to gain access to the inking mechanism and other operating parts, which might require attention during the operation of the press.

One of the primary objects of my invention therefore is to arrange the printing units and cooperating parts so that they are accessible and that perfect register of the successive impressions during a printing cycle of a multi-couple press, such as a multicolor press, will be assured.

Another important object resides in keeping the height of a press at a minimum.

A further object is to so convey the sheets from one couple to another that the ink of one impression will have sufficient time to set before the sheets receive the next impression.

A still further object of the invention is to arrange each individual printing couple in such a manner that it will form an independent printing unit which shall be effectively tripped by the absence of a sheet at the sheet transfer means and which is so adapted that any desired number of printing units may be readily combined to constitute a multicolor press unit.

These and other objects, which will become ap-

parent from the following description, I accomplish by the arrangement of the printing units and cooperating parts illustrated in the accompanying drawings, in which:

Figure 1 shows in diagrammatic side elevation the general arrangement of the printing members and associated parts in a two-color planographic offset press; and

Figure 2 is a similar view of the same arrangement but illustrating diagrammatically the embodiment of means whereby a printing couple may be tripped in the event that a sheet fails to reach the transfer means associated with the respective couple.

Presses of the class which I have used to exemplify my invention comprise a main frame **10**, preferably made up of two side members and suitable cross members, which frame supports the printing couple including a plate or form cylinder **11**, a blanket cylinder **12**, and an impression cylinder **13**, all of which cylinders are intergeared so that they will rotate at the same peripheral speed.

The printing plate, which is attached to the form cylinder by any suitable mechanism, is inked by means of an inking mechanism **14**, which may include the usual ink fountain and roller, distributing roller unit, ductor roller for conveying ink from said fountain to said roller unit, and a form roller unit whereby the ink is applied to the printing plate.

For dampening the non-design portions of the printing plate, such as is required in lithographic printing, any desired system or mechanism, such as is indicated at **14'**, may be used.

The cylinder **12** is provided with a resilient surface such as a rubber blanket or the like, which receives impressions from the inked plate on the cylinder **11**, and then transfers the ink impressions to the sheets of material as they pass between the blanket cylinder **12** and the impression cylinder **13**.

The sheets to be printed may of course be fed to the impression cylinder **13** in any desired manner. In the preferred form illustrated, I have included in the sheet feeding means a stop gripper mechanism **15**, which functions to take a sheet while at rest and transfer it from the registering table **16** to the impression cylinder **13**, as will be evident from the drawings, which shows said mechanism in a position shortly after its grippers **17** have transferred a sheet to the grippers **18** of the impression cylinder **13**.

After a sheet has received its impression from the first printing unit, it is transferred to the impression cylinder **19** of the succeeding printing unit by means of transfer cylinders or reels **20**, **21** and **22**, which reels are provided with grippers **23**, **24** and **25** respectively. Upon having received its second impression, the sheet is then delivered, preferably by an endless chain delivery **26**, which carries a number of delivery grippers, **27**, **28**, etc., which grippers take over the printed sheets from the grippers **29** of the impression cylinder **19**, and convey them to a delivery table, not shown. Said transfer reels are of the same diameter as the plate, blanket and impression cylinders of each unit and are intergeared so that all cylinders and reels will travel at the same peripheral speed.

By providing a plurality of transfer reels of the same diameter as the printing members of the press units, and by arranging the printing couples and reels in the manner illustrated, the height of each unit will be a minimum so that the pressman can attend to the adjustment of most operating parts while standing on the floor of the pressroom or on platforms at low levels.

As shown on the drawings, see Figure 1, I prefer to arrange the printing couple i. e. the plate, blanket and impression cylinders of each unit at substantially right angles, with the blanket and impression cylinders substantially in the horizontal plane or in a plane slightly inclined thereto.

The first one of the transfer reels, namely **20**, is located beneath the impression cylinder **13**, so that it will take a sheet from the latter at a point ahead of the blanket cylinder **12**, i. e. adjacent the feeder end of the press. The second reel **21**, I preferably arrange beneath the blanket cylinder **12** in substantially the same plane as the reel **20**.

In this manner the sheets during their travel from one unit to the adjacent unit will be conveyed past the blanket cylinder of the first or preceding unit, and the distance of travel of the sheets from one unit to another will be a maximum, thereby providing ample time for the ink of a preceding impression to set sufficiently before the sheets receive their next impression.

While in the preferred form illustrated, I have provided three sheet transfer cylinders or members, it will be readily understood that any desired plurality of such cylinders or members may be arranged for the purpose of transferring sheets from one unit to another, it being evident, however, that whatever number of transfer cylinders are used, they should be of the same diameter as the printing cylinders of each unit, and should be provided with only one set of grippers so that the sheets as they pass from one unit to another are always engaged by the same set of grippers on the transfer reels. Therefore, I do not wish to restrict the invention to any specific number of transfer members.

It is also evident that any desired number of single color units may be combined into a multicolor unit press, each of the single units being identical in construction and operation, and all mounted on a suitable base **30**.

With the relative arrangement of the printing and transfer members as described above, considerable space is made available between adjacent printing units so that wide platforms such as **31** and **32** may be provided for convenient access to the operating parts of the press.

As indicated herein, it is exceedingly important in multicolor printing presses of this class to provide tripping mechanism which will effectively trip the printing units in the event that a sheet is misfed or fails to reach the means whereby the sheets are transferred to the respective units.

In Figure 2 a preferred arrangement is illustrated which has proven very effective in practice and which includes pneumatically controlled means which operate to automatically trip the blanket cylinder **12** of the second unit from its cooperating plate cylinder **11** and preferably also from the impression cylinder **13** immediately a sheet fails to reach the transfer cylinder or reel **22**.

In order to accomplish this the sheet transfer cylinder **22** is provided with air ducts **33** and **34** which communicate with an air line **35** connected with any desirable source of fluid pressure such as a vacuum pump, not shown. A branch line **36** establishes communication between the line **35** and the inner end of an air cylinder **37** within which is provided a spring actuated plunger **38**. The stem **39** of the latter projects through a bore in the cylinder head **40**

and is adapted to move into and out of the path of the lower arm 41 which extends from a lever 42, which lever is fulcrumed at 43 in the frame of the press. The upper arm 44 of said lever carries a roller 45 which, by means of the tension spring 46, anchored in the press frame, may be brought into cooperative engagement with a cam 47 provided on the impression cylinder 13 of the second printing unit.

On the arm 48 of lever 42 is arranged a connecting rod 49 which transmits the swinging motion of the arm 42 to the tripping pawl 50 which is pivoted at 51 to the arm 52 of the tripping lever 53.

This pawl 50, depending on the position of the lever 42, in turn transmits the swinging motion of the cam arm 54 to the tripping lever 53 and consequently to the eccentric 55 through the intermediary of the link 56 and the operating lever 57 provided on said eccentric. The latter, as is well known in the art, is fulcrumed on the cylinder shaft or stud 58 and engages an eccentric bearing 59 so that, depending on the position of the eccentric 55, the cylinder 12 may be moved into and out of its operative relationship with the plate cylinder 11 and preferably also with the impression cylinder 13. As will be readily understood, the cam arm 54 derives its motion from the engagement of its roller 60 operating in the cam groove 61 provided on the cylinder 12.

The above described mechanism, whereby succeeding printing couples may be tripped in the absence of a sheet at the transfer means associated therewith, operates as follows:

As illustrated in Figure 2, it is assumed that the air ducts 33, of which there may be any desirable number and which preferably pass through gripper pads which cooperate with the grippers 25, are covered by a sheet 62. Therefore, upon withdrawal of air from the air line 35, vacuum will be established within the cylinder 37 and consequently the piston will be drawn upwardly against the pressure of the expansion spring 63 and into the position shown in Figure 2 in which the stem 39 projects into the path of the arm 41. In this position of the lever 42, the roller 45 on the arm 44 will be prevented from entering the low portion 64 of the cam 47, and since therefore no movement will be imparted to said lever, the pawl 50 also will remain stationary in the position shown.

As illustrated, the cam lever 54 has just commenced its downward movement and it will be seen that the tooth 65 of the pawl 50 will clear the abutment 66 of the lever 54. This will permit the cam arm 54 to exercise its full reciprocatory movement without, however, actuating the tripping lever 53 and associated parts, thus the blanket cylinder 12 will remain in its operative position with relation to the plate cylinder 11 and the impression cylinder 13 of the respective printing couple.

In the event that a sheet is misfed so that it will not properly cover the opening or openings of the duct or ducts 33, or if a sheet fails to reach the grippers 25 of the transfer cylinder 22, then air will freely pass through the ducts 33, 34 and line 35 so that no vacuum will be established in the cylinder 37, and consequently the stem 39 will remain out of the path of the arm 41 because, due to the expansion spring 63, the piston 38 will be held in its lowermost position of its reciprocal movement.

Therefore the tension spring 46 will move the lever 42 in an anti-clockwise direction and hold the roller 45 against the cam 47 so that the roller may enter the low part 64 of said cam when it becomes aligned with it.

It will be understood that the motion of lever 42 in the anti-clockwise direction will be transmitted to the pawl 50 by means of the connecting rod 49, thereby pivoting said pawl into its position where its tooth 67 will clear the abutment 68 of the cam arm 54, whereas its tooth 65 will assume a position where it will be engaged by the abutment 66 during the swinging of the lever 54 in the anti-clockwise direction. It should be explained, however, that the pawl 50 can assume this position not until the arm 54 has reached the end of its reciprocating stroke in the clockwise direction during which time the inner, curved surface of the pawl 50 will ride over the abutment 66 against which it is held by virtue of the tension spring 46.

With the pawl 50 in the position described, namely opposite to that shown in Figure 2, the cam arm 54, during its movement in the anti-clockwise direction and due to the engagement of the tooth 65 with the abutment 66, will move the tripping arm 53 in an anti-clockwise direction, pull down the lever 57 and consequently rotate the eccentric 55 in an anti-clockwise direction to thereby move the blanket cylinder 12 out of engagement with the plate cylinder 11 and preferably also with the impression cylinder 13 and into a position indicated in broken lines.

So long as the duct or ducts 33 remain unsealed and therefore the stem or plunger 39 withdrawn from its position shown in Figure 2, the cylinder 12 will be maintained in its tripped position because no movement will be imparted to the tripping arm 53 during the continued reciprocation of the cam arm 54 and the lever 42.

The relative timing of the cam 47 and the cam groove 61 is such that during the movement of the arm 54 in the clockwise direction the tooth 67 of the pawl 50 will be held clear of the abutment 68 of said arm, while during the stroke of said arm in the anticlockwise direction, the tooth 65 will be raised above the abutment 66. Consequently the tripping arm 53 remains stationary. However, as soon as the ducts 33 are again covered by a sheet, the piston 38, due to the vacuum established in the cylinder 37, will be drawn upward, thereby projecting the stem 39 into the path of the lever 42 and holding the latter stationary. The pawl 50 will then be maintained in its position shown in Figure 2 so that the abutment 68, during the movement of the arm 54 in the clockwise direction, will engage the tooth 67 of said pawl and thereby move the tripping arm 53 and lever 57 in the clockwise direction, whereupon the blanket cylinder will assume its operative relation with the plate cylinder 11 and impression cylinder 13, as shown in full lines in Figure 2, and the printing condition of the respective printing couple will be restored.

It will be readily understood that while I have elected to illustrate and describe pneumatically controlled means for the tripping mechanism, any other suitable controlling device could be adopted in order to accomplish the objects of my invention. Moreover, the control means for the tripping mechanism could be associated with any one of the sheet transfer members, or with all of them if condition demands it.

Furthermore, while I have described above the approximate angular arrangement of the printing members and sheet transfer reels and a preferred form of tripping mechanism, it might be

desirable to vary the arrangements somewhat from those shown on the drawings, without, however, defeating the objects of my invention and without departing from the scope of the appended claims.

I claim:

1. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, and a plurality of rotary sheet transfer members between adjacent printing couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to take a sheet from one couple and carry it past the printing member of said couple to the impression member of the succeeding couple.

2. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, and a plurality of rotary sheet transfer members between adjacent printing couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to transfer a sheet from one printing couple to another in a path which extends below the printing members of said couples and which path assumes different angular relation to adjacent couples.

3. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation and each having a separate frame to thereby form an independent printing unit, and a plurality of rotary sheet transfer members between adjacent printing couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to take a sheet from one couple and carry it past the printing member of said couple to the impression member of the succeeding couple.

4. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation and each including a plate cylinder, a blanket cylinder and an impression cylinder, and a plurality of rotary sheet transfer members between adjacent printing couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to carry sheets past the blanket cylinder of a printing couple and convey them to the impression cylinder of a succeeding couple.

5. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples geared together in tandem for unit operation, and a plurality of rotary sheet transfer members between adjacent printing couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to take a sheet from one couple and carry it past the printing member of said couple to the impression member of the succeeding couple.

6. In a sheet fed rotary planographic printing press, the combination of two or more substantially identical printing couples geared together in tandem for unit operation and each including a plate cylinder, a blanket cylinder and an impression cylinder, and a plurality of rotary sheet transfer members between each adjacent pair of printing couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to carry sheets past the blanket cylinder of a printing couple and convey it to the impression cylinder of a succeeding couple.

7. In a sheet fed rotary planographic printing press, the combination of two or more substantially identical printing couples, each including a plate cylinder, a blanket cylinder arranged in a plane below said plate cylinder, an impression cylinder also arranged in a plane below said plate cylinder, and a plurality of rotary sheet transfer members between adjacent printing couples, one of said members being located in a plane below the blanket cylinder of one couple, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to take a sheet from the impression cylinder of one couple and convey it past the blanket cylinder thereof to the impression cylinder of the adjacent couple.

8. In a sheet fed rotary planographic printing press, the combination of two or more substantially identical printing couples, each including a plate cylinder, a blanket cylinder arranged in a plane below said plate cylinder, an impression cylinder also arranged in a plane below said plate cylinder, and a plurality of rotary sheet transfer members between adjacent printing couples, all of said members being located in a plane below the blanket cylinders of said couples, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples, and being provided with sheet engaging elements to take a sheet from the impression cylinder of one couple and convey it past the blanket cylinder thereof to the impression cylinder of the adjacent couple.

9. In a sheet fed rotary planographic printing press, the combination of two or more substantially identical printing couples arranged for unit operation and each including a plate cylinder, a blanket cylinder and an impression cylinder, and a plurality of rotary sheet transfer members between adjacent printing couples and having an operative diameter substantially equal to that of the members constituting said printing couples, the sheet transfer point between the impression cylinder of a couple and the first one of said transfer members lying in a vertical plane that is closer to the feeder end of said couple than the vertical plane in which lies the printing zone between said impression cylinder and its cooperating blanket cylinder, so that a sheet will be taken from the impression cylinder of one couple and conveyed by said transfer members past the blanket cylinder of the same couple to the impression cylinder of the adjacent couple.

10. In a sheet fed printing press, the combination of a plurality of printing couples mounted for unit operation, sheet transfer means arranged to transfer sheets from one of said couples to another couple, tripping mechanism, and control means for said mechanism associated with said sheet transfer means.

11. In a sheet fed rotary printing press, the

combination of a plurality of printing couples mounted for unit operation, sheet transfer means arranged to transfer sheets from one of said couples to a succeeding couple, tripping mechanism, and control means for said mechanism associated with said sheet transfer means.

12. In a sheet fed rotary printing press, the combination of a plurality of printing couples mounted for unit operation, sheet transfer means arranged to transfer sheets from one of said couples to a succeeding couple, tripping mechanism, and control means for said mechanism associated with said sheet transfer means, the actuation of said control means being responsive to the presence or absence of a sheet at the transfer means.

13. In a sheet fed rotary printing press, the combination of a plurality of rotary printing couples mounted for unit operation, rotary sheet transfer means arranged to transfer sheets from one of said couples to a succeeding couple, tripping mechanism, and control means for said mechanism associated with said sheet transfer means.

14. In a sheet fed rotary printing press, the combination of a plurality of rotary printing couples mounted for unit operation, rotary sheet transfer means arranged to transfer sheets from one of said couples to a succeeding couple, tripping mechanism, and control means for said mechanism associated with said sheet transfer means, the actuation of said control means being responsive to the presence or absence of a sheet at the transfer means.

15. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, a plurality of rotary sheet transfer members between adjacent printing couples, tripping mechanism for each succeeding printing couple, and control means for said mechanism associated with said sheet transfer members and responsive to the presence or absence of a sheet at the transfer means.

16. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, a plurality of rotary sheet transfer members between adjacent printing couples, tripping mechanism for each succeeding printing couple, and pneumatic control means for said mechanism associated with said sheet transfer members and responsive to the presence or absence of a sheet at the transfer means.—

17. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, a plurality of rotary sheet transfer members between adjacent printing couples, control mechanism associated with said members and responsive to the presence or absence of a sheet at a transfer point of said members for affecting the operation of the press.

18. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, a plurality of transfer members between adjacent printing couples, tripping mechanism for each succeeding printing couple, and control means for said tripping mechanism associated with said sheet transfer members and responsive to the presence or absence of material at the transfer means, said sheet transfer members being arranged to take a sheet from one couple and carry it past the printing member of said couple to the impression member of the succeeding couple.

19. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, a plurality of rotary sheet transfer members between adjacent printing couples, tripping mechanism for each succeeding printing couple, and control means for said tripping mechanism associated with said sheet transfer members and responsive to the presence or absence of material to be printed, said sheet transfer members being arranged to take a sheet from one couple and carry it past the printing member of said couple to the impression member of the succeeding couple.

20. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, a plurality of rotary sheet transfer members between adjacent printing couples, control mechanism associated with said members and responsive to the presence or absence of a sheet at a transfer point of said members for affecting the operation of the press, said transfer members being arranged to take a sheet from one couple and carry it past the printing member of said couple to the impression member of the succeeding couple.

21. In a sheet fed rotary printing press, the combination of a plurality of printing couples mounted for unit operation, each couple having a plate cylinder, a blanket cylinder and an impression cylinder, tripping mechanism associated with the blanket cylinder of each succeeding couple, a plurality of transfer members arranged between adjacent couples for transferring sheets from one couple to a succeeding couple, and means associated with one of said transfer members for actuating the tripping mechanism of a succeeding couple in the event that a sheet does not reach the transfer means associated therewith.

22. In a sheet fed rotary planographic printing press, the combination of two or more substantially identical printing couples, each including a plate cylinder, a blanket cylinder arranged in a plane below said plate cylinder, an impression cylinder also arranged in a plane below said plate cylinder, and at least three rotary sheet transfer members between adjacent printing couples and arranged in succession with the points of contact of adjacent members located in substantially the same plane, one of said members being located in a plane below the impression cylinder of one couple, said transfer members being adapted to take a sheet from the impression cylinder of one couple and convey it past the blanket cylinder thereof to the impression cylinder of the adjacent couple.

23. In a sheet fed rotary planographic printing press, the combination of two or more substantially identical printing couples, each including a plate cylinder, a blanket cylinder arranged in a plane below said plate cylinder, an impression cylinder also arranged in a plane below said plate cylinder, and at least three rotary sheet transfer members between adjacent printing couples and arranged in succession with the points of contact of adjacent members located in substantially the same plane, all of said members being located in a plane below the impression cylinders of said couples, said members being adapted to take a sheet from the impression cylinder of one couple and convey it past the blanket

cylinder thereof to the impression cylinder of the adjacent couple.

24. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, and at least three rotary sheet transfer members between adjacent printing couples and arranged in succession with the points of contact of adjacent transfer members being located in substantially the same plane.

25. In a sheet fed rotary printing press, the combination of two or more substantially identical printing couples arranged for unit operation, and at least three rotary sheet transfer members between adjacent printing couples and arranged in succession with the points of contact of adjacent transfer members being located in substantially the same plane, each of said transfer members having an operative diameter substantially equal to that of the members constituting said printing couples.

26. In a sheet fed printing press, the combination of a plurality of printing couples mounted for unit operation, sheet transfer means including at least three sheet transfer members for conveying sheets from one of said couples to another couple, said members being arranged in succession with the points of contact of adjacent transfer members being located in substantially the same plane, tripping mechanism, and control means for said mechanism associated with said sheet transfer means.

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