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ROTARY OFFSET SHEET PERFECTING PRESS

Filed July 13, 1945

2 Sheets-Sheet 1

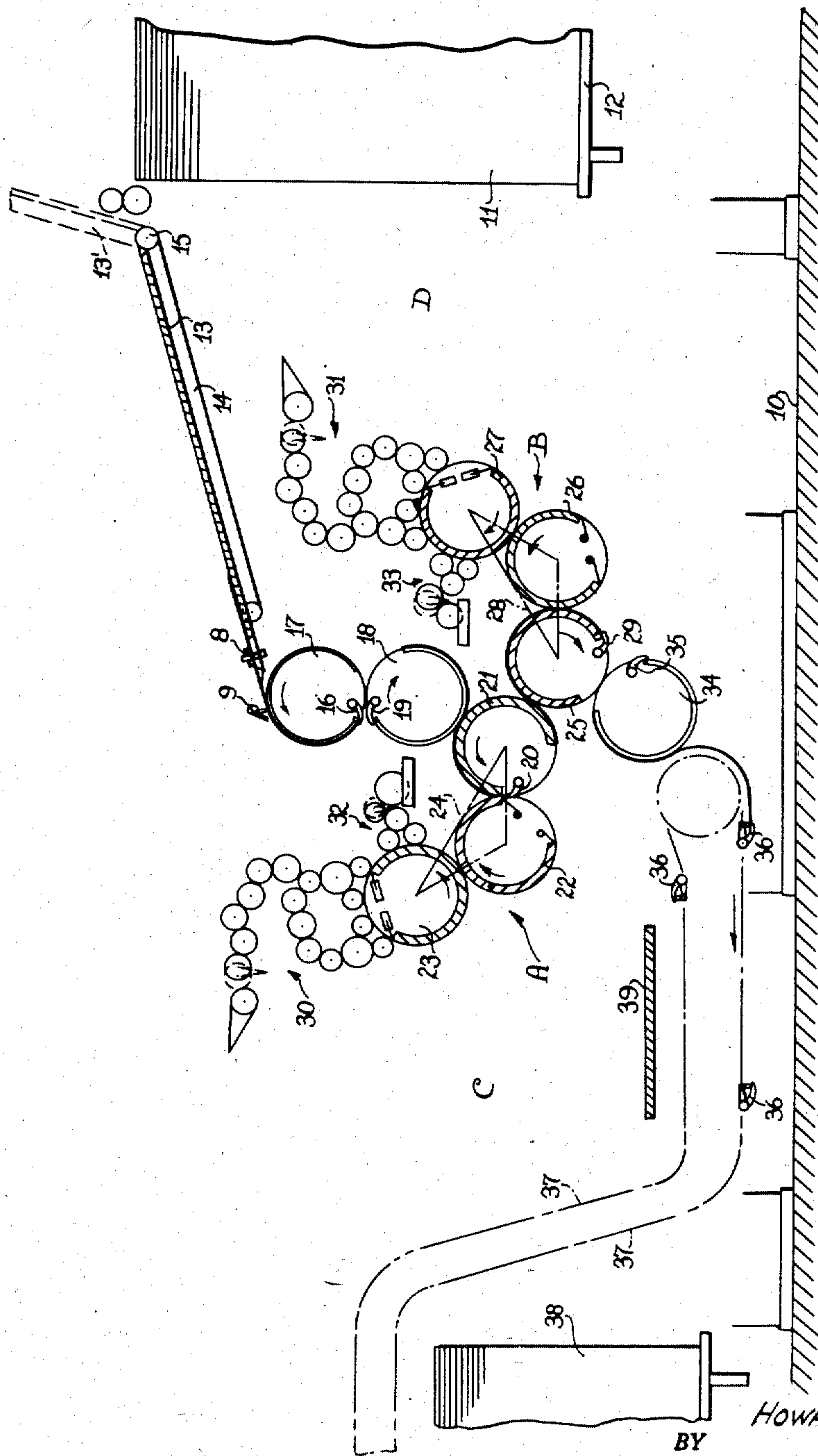


Fig. 1

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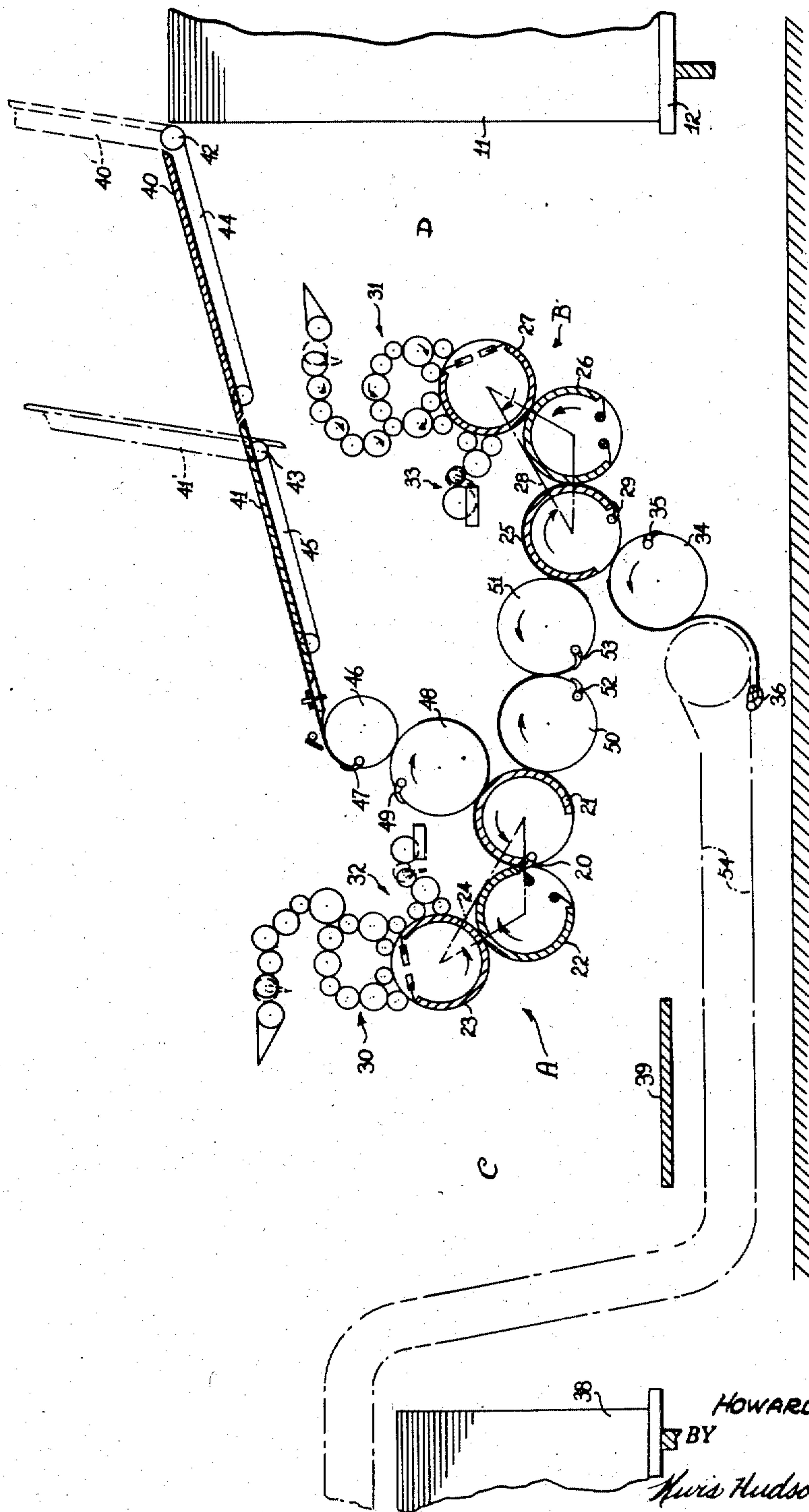


Fig. 2

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## UNITED STATES PATENT OFFICE

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## ROTARY OFFSET SHEET PERFECTING PRESS

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9 Claims. (Cl. 101—142)

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This invention relates to improvements in perfecting offset presses.

One of the objects of the invention is the provision of a perfecting press wherein the arrangement of cylinders is such as to facilitate work upon the press.

Another object is the provision of means for feeding the sheets downwardly into the space between units, thereby bringing the cylinders of the two units to relatively low levels convenient for the press operator or operators.

Another object is the arrangement of cylinders and their driving connections in a manner such that the plate and blanket cylinders of the two units are inrunning relative to working spaces on the remote sides of the units.

A further object is the provision of a press of the character stated in which the inking mechanisms may extend upwardly from the plate cylinders, which is the most advantageous position for inkers.

Other objects and features of novelty will appear as I proceed with the description of those embodiments of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which

Fig. 1 is a diagrammatic side elevational view of a press embodying the invention, and

Fig. 2 is a similar view of a modified form.

Referring to Fig. 1, 10 represents the floor of a press room. A pile of sheets is indicated at 11 supported upon an elevator 12 which is adapted to be raised by conventional mechanism as the sheets are fed off the pile. 13 is a feed board down which the sheets are moved by endless tapes 14 or the like, this board being hinged at 15 in order that it may be swung up out of the way to the position indicated by the broken lines 13', thereby giving access to inking, dampening and other mechanism located beneath it.

As each sheet reaches the forward end of the feed board it is registered in the usual manner, as by front stops 9 and side registering devices 8, and is then taken by sheet grippers 16 on a transfer cylinder 17. A second transfer cylinder 18 below cylinder 17 carries grippers 19 which take the sheet from grippers 16 and carry it around for transfer to grippers 20 on the impression cylinder 21 of a printing unit A, which is the left hand unit as viewed in the drawing. Cylinder 21 turns in the counterclockwise direction, as indicated by the arrow on the drawing.

Unit A comprises a blanket cylinder 22 and a plate cylinder 23, the three cylinders 21, 22 and 23 being geared together, so that cylinder 22 turns in the clockwise direction and cylinder 23 in the counterclockwise direction. Cylinders 22 and 23 are therefore inrunning, that is away from the working space C to the left of the unit, which is an advantageous arrangement in that it facili-

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tates the mounting and dismounting of the plate and blanket.

The axes of the three cylinders 21, 22 and 23 cut the points of an imaginary triangle, shown in the drawing, the base 24 of which is longer than the other sides and joins the plate and impression cylinders of the unit.

The other printing unit B comprises impression, blanket and plate cylinders 25, 26 and 27 respectively, this unit being preferably although not necessarily disposed at a somewhat lower level than unit A. The three cylinders are arranged with respect to each other in the same manner as those of unit A except that they are reversed, the impression cylinders of both units being closest together, that is facing each other, and the plate cylinders being farthest apart. The cylinders 25, 26 and 27 are also disposed with their axes cutting the points of a triangle of substantially the same size and shape as that of unit A, the base 28 of the triangle being longer than the other sides and joining the plate and impression cylinders. Preferably, as shown, the triangles of the two units are arranged in approximate angular symmetry on opposite sides of a vertical plane between them and with their innermost cylinders adjacent each other. Impression cylinder 25 has sheet grippers 29 by means of which sheets are taken directly from the grippers 20 of impression cylinder 21. Hence after a sheet is printed on one side between cylinders 22 and 21, it is immediately reversed and printed on the other side between cylinders 25 and 26. Cylinder 25, being geared to cylinder 21, turns in the clockwise direction as viewed in the drawing, thereby causing the blanket and plate cylinders 26 and 27 to be inrunning with respect to a working space D to the right of the unit. Inasmuch as the bases 24 and 28 of the two triangles are disposed uppermost, the triangles will be referred to hereinafter as inverted.

In both units the inking mechanisms 30 and 31 respectively are disposed generally above the plate cylinder, which is generally recognized in the art to be the most advantageous arrangement, and because of the disposition of the cylinders indicated by the two triangles previously mentioned there is space between the units for the dampening rolls 32 and 33.

Below the lower impression cylinder 25 there is a transfer cylinder 34 having sheet grippers 35 which are adapted to take each printed sheet from grippers 29 and transfer it to gripper means 36 on a sheet delivery which comprises endless chains indicated in the drawing by the broken lines 37, the chains 37 running for a distance close to the floor 10 and then up over a delivery pile 38. An operator's work platform 39 is supported by suitable means above the lower horizontal portions of the chain delivery.



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The inking mechanism 30 is fully accessible, as is also the mechanism 31 when the feed board 13 is swung upwardly to the 13' position. The printing cylinders of both units are disposed at a relatively low level and are accessible to an operator standing on the floor or on the low level platform 39.

The form of the invention illustrated in Fig. 2 is similar to that of Fig. 1, and it is accordingly necessary to describe only the points of difference between the construction of this figure and that of Fig. 1. The feed board in this form of the invention comprises two movable sections 40 and 41 mounted to hinge about axes 42 and 43 respectively, so as to assume the broken line positions 40' and 41'. Each section has its own endless tape conveyors 44 and 45. A sheet transfer member 46 having sheet grippers 47 may be so driven as to take a sheet while stationary and then accelerate to the surface speed of a transfer cylinder 48 having sheet grippers 49, cylinder 48 revolving continuously at constant speed.

Cylinder 48 transfers the sheets to grippers 20 on impression cylinder 21 of unit A, as in the first described form, but in Fig. 2 the transfer of sheets from impression cylinder 21 to impression cylinder 25 is effected through two intermediate cylinders 50 and 51 having sheet grippers 52 and 53. The sheet delivery is the same as that of Fig. 1 except that the low level horizontal portion of the endless chains 54 is longer than the corresponding portion of chains 37 to compensate for the spacing apart of the impression cylinders 21 and 25.

To those skilled in the art the operation of the machine will be obvious from the foregoing description of its parts. The arrangement of cylinders in the two printing units is symmetrical aside from a small difference in elevation, and this difference combines beneficially with the difference in height of the platform 39 on the one hand and the floor on the other, while the fact that inking mechanism 31 is lower than inking mechanism 30 combines with the disposition of the feed board above the inker 31 to make a compact machine. If desired, the two printing units may be arranged at the same level, suitable provision being made in the construction and location of the feed boards 14, 44 and 45 to this end. In this case the gaps of the plate and blanket cylinders of the two units may be brought into exact timing with each other thereby further facilitating the operations performed on these cylinders. In the arrangement illustrated, the gaps, although not exactly in time with each other, are sufficiently closely in time to make for convenient operation.

Having thus described my invention, I claim:

1. In a perfecting offset press, two printing units each having an impression cylinder, an offset cylinder and a plate cylinder, the axes of the cylinders of each unit intersecting the points of an inverted triangle the base of which is longer than the sides thereof and joins the impression and plate cylinders, the offset cylinder of each unit being disposed below the base of its triangle and the plate cylinders being the highest cylinders in their respective units and being disposed at the remote ends of the triangles, inking mechanism disposed above each plate cylinder, sheet conveyor means for feeding sheets downwardly between said units onto one of said impression cylinders, means for transferring each sheet to the other impression cylinder and delivery means for withdrawing each sheet from

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the lower side of said last named impression cylinder.

2. In a perfecting offset press, two printing units each having an impression cylinder, an offset cylinder and a plate cylinder, the axes of the cylinders of each unit intersecting the points of an inverted triangle the base of which is longer than the sides thereof and joins the impression and plate cylinders, the offset cylinder of each unit being disposed below the base of its triangle and the plate cylinders being the highest cylinders in their respective units and being disposed at the remote ends of the triangles, inking mechanism disposed above each plate cylinder, the impression cylinders of the two units being disposed for direct sheet transfer from one to the other, sheet conveyor means for feeding sheets downwardly between said units onto one of said impression cylinders, and delivery means for withdrawing each sheet from the lower side of the other impression cylinder.

3. In a perfecting offset press, two printing units each having an impression cylinder, an offset cylinder and a plate cylinder, the axes of the cylinders of each unit intersecting the points of an inverted triangle the base of which is longer than the sides thereof and joins the impression and plate cylinders, the offset cylinder of each unit being disposed below the base of its triangle and the plate cylinders being the highest cylinders in their respective units and being disposed at the remote ends of the triangles, inking mechanism disposed above each of said plate cylinders, a feed board disposed above one of said inking mechanisms, means at the forward end of said feed board for feeding sheets downwardly between said units onto one of said impression cylinders, means for transferring each sheet to the other of said impression cylinders, and delivery means for withdrawing each sheet from said last named impression cylinder when its front edge is at a low point on the cylinder and moving it at a low level beneath the other inking mechanism on the way to a delivery pile.

4. In a perfecting offset press, two printing units each having an impression cylinder, an offset cylinder and a plate cylinder, the cylinders of each unit being intergeared, the axes of the cylinders of each unit intersecting the points of an inverted triangle, the base of which is longer than the sides thereof and joins the impression and plate cylinders, the offset cylinder of each unit being disposed below the base of its triangle and on the side thereof remote from the other unit and the plate cylinders being the highest cylinders in their respective units and being disposed at the remote ends of the triangles, inking mechanism extending upwardly from each plate cylinder, means for feeding sheets over one of said inking mechanisms and downwardly between said units onto one of said impression cylinders, means for transferring each sheet to the other impression cylinder, and delivery means for withdrawing each sheet from said last named impression cylinder when its front edge is at a low point on the cylinder, the impression cylinder of the left hand unit being driven counter-clockwise and the impression cylinder of the right hand unit being driven clockwise, whereby the plate and blanket cylinders of each unit are inrunning with respect to the working spaces on the remote sides of the units.

5. In a perfecting offset press, two printing units each having an impression cylinder, an offset cylinder and a plate cylinder, the axes



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of the cylinders of each unit intersecting the points of an inverted triangle, the base of which is longer than the sides thereof and joins the impression and plate cylinders, the offset cylinder of each unit being disposed below the base of its triangle and on the side thereof remote from the other unit and the plate cylinders being the highest cylinders in their respective units and being disposed at the remote ends of the triangles, inking mechanism extending upwardly from each plate cylinder, the impression cylinders of the two units rotating in opposite directions, one of said units being disposed at a somewhat higher level than the other, means for feeding sheets over the lower one of said inking mechanisms and downwardly between the units onto the higher one of said impression cylinders, means for transferring sheets from the higher to the lower impression cylinder, and delivery means for withdrawing sheets from the lower side of the lower impression cylinder and transporting them beneath the higher unit.

6. In a perfecting offset press, two printing units each having an impression cylinder, an offset cylinder and a plate cylinder, the axes of the cylinders of each unit intersecting the points of an inverted triangle, the base of which is longer than the sides thereof and joins the impression and plate cylinders, the offset cylinder of each unit being disposed below the base of its triangle and on the side thereof remote from the other unit and the plate cylinders being the highest cylinders in their respective units and being disposed at the remote ends of the triangles, inking mechanism extending upwardly from each plate cylinder, the impression cylinders of the two units rotating in opposite directions, one of said units being disposed at a somewhat higher level than the other, means for feeding sheets over the lower one of said inking mechanisms and downwardly between the units onto the higher one of said impression cylinders, means for transferring sheets from the higher to the lower impression cylinder, and delivery means for withdrawing sheets from the lower side of the lower impression cylinder and transporting them beneath the higher unit, the driving means for the cylinders of the two units being arranged in each case to cause the plate and blanket cylinders to be inrunning with respect to working spaces on the remote sides of the units.

7. In a perfecting offset press, two printing units side by side the corresponding cylinders of which are arranged to rotate in opposite directions, each unit having an impression cylinder, an offset cylinder and a plate cylinder, the impression cylinders of the two units facing each other, the plate cylinders of both units being disposed at a higher level than the offset cylinders thereof inking mechanism for each unit disposed above its plate cylinder, means for moving sheets to a registration point between the inking mechanisms, means including at least one conveyor cylinder in advance of the impression cylinders for grasping the front edges of the sheets at said registration point and conveying them partly around one impression cylinder and then partly around the other impression cylinder and toward a delivery point, said sheet moving and conveying means being arranged to carry the sheets over one unit including its plate cylinder and inker, downwardly between

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the two plate cylinders and under one of the units toward said delivery point.

8. In a perfecting offset press, two printing units side by side the corresponding cylinders of which are arranged to rotate in opposite directions, each unit having an impression cylinder, an offset cylinder and a plate cylinder, the impression cylinders of the two units facing each other, the plate cylinders of both units being disposed at a higher level than the offset cylinders thereof inking mechanism for each unit disposed above its plate cylinder, means for moving sheets to a registration point between the inking mechanisms, means including at least one conveyor cylinder in advance of the impression cylinders for grasping the front edges of the sheets at said registration point and conveying them partly around one impression cylinder, then partly around the other impression cylinder and toward a delivery point, said sheet moving and conveying means being arranged to carry the sheets over one unit including its plate cylinder and inker, downwardly between the two plate cylinders, and under the other of said units toward said delivery point.

9. In a perfecting offset printing press, two printing units disposed at the same level having an equal number of cylinders, the corresponding cylinders of said units being arranged to rotate in opposite directions, the plate cylinders of said units being disposed further apart and at a higher level than the offset cylinders thereof, the innermost cylinder of one unit being adjacent to the corresponding innermost cylinder of the other unit, inking mechanism for each unit disposed above its plate cylinder, means extending above one of said units for moving sheets to a registration point between said inking mechanisms, means comprising at least one conveyor cylinder for grasping the front edges of the sheets at said registration point and conveying them downwardly between the inking mechanisms and plate cylinders of the respective units and thence between the units including passage between said innermost cylinders to perfect the sheets, and means for taking the printed sheets and conveying them beneath one of said units toward a delivery point.

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