Aug. 31, 1954 A. W. PITNER 2,687,886

REGISTERING APPARATUS FOR PRINTING MACHINES

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FIG. 1

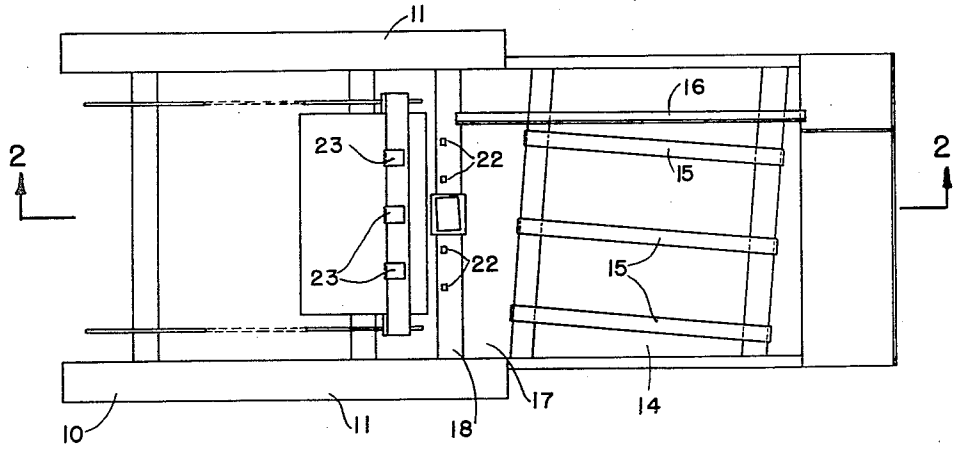
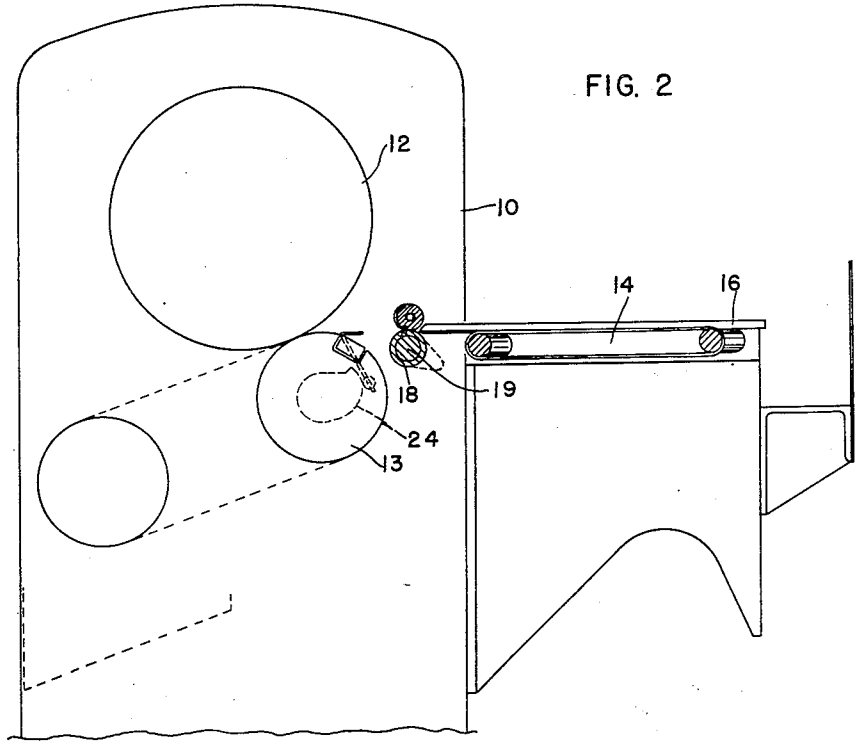



FIG. 2




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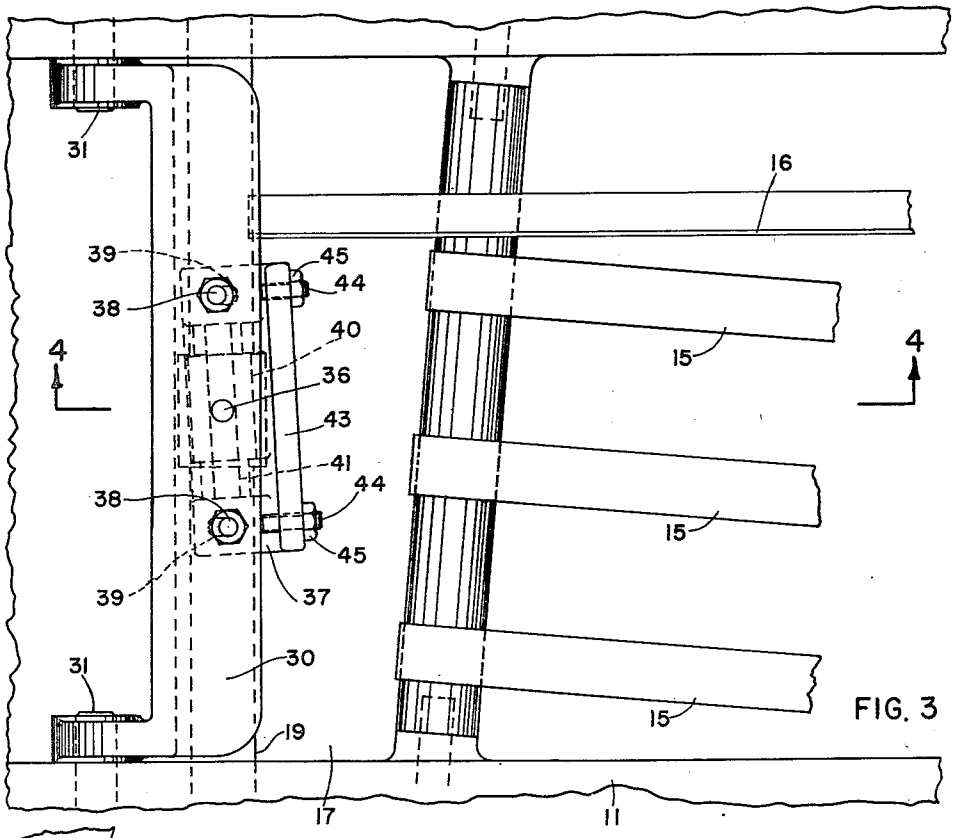



FIG. 3

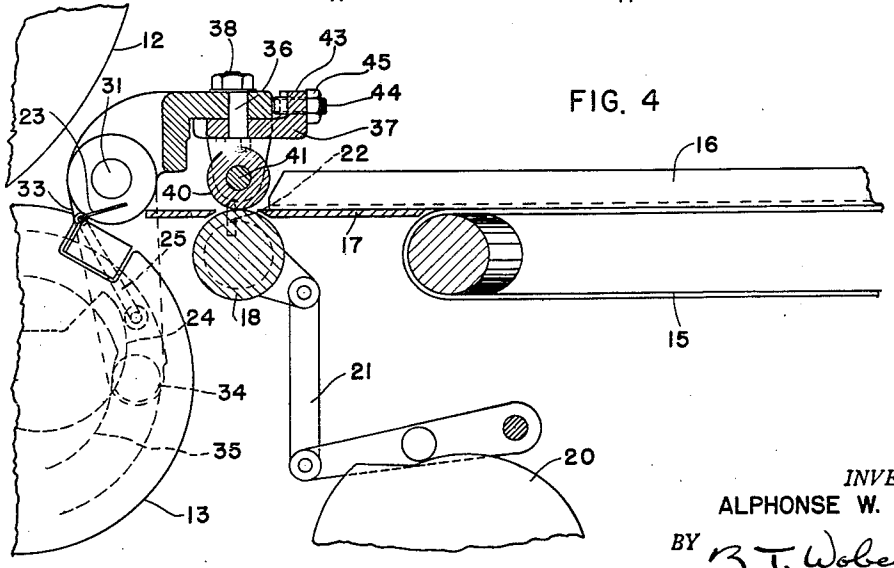



FIG. 4

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# UNITED STATES PATENT OFFICE

2,687,886

## REGISTERING APPARATUS FOR PRINTING MACHINES

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3 Claims. (Cl. 271—53)

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It has heretofore been proposed, in duplicators and other sheet feeding printing presses, to convey the paper from a stack in a straight line down and along a feed table, with a side guide provided along one edge of the conveyor for aiding in alining the paper. The leading edge of the paper is advanced until it hits a stop. Various devices have been proposed to bring the sheet to the proper position while it is in engagement with the stop. At a predetermined time, the stop is retracted to permit the paper to be propelled into the printing cylinders. The propulsion of the paper at this location is usually effected by the action of a feed roller pressing down on the sheet and pushing it forward at a speed in timed relation to the speed of the printing cylinders which will accept the sheet. Gripping members, which may comprise fingers arranged on a bar in one of the printing cylinders receive and grip the sheet before it enters the printing cylinders. The sheet is pulled, by the engagement therewith of the gripping members, into the printing cylinders so that the printing operation may be effected.

The apparatus heretofore available for the purpose of obtaining accurate registry has not proven satisfactory. It has long been recognized that accurate registry is essential in printing press operation, and particularly in multicolor printing where even a small overlapping will spoil the work. Waste of stock is a large cost item in color printing because of misregistering.

Lack of register, in the machines heretofore available, has been attributed to the characteristics of the paper, the atmospheric conditions in the press room, and other causes, and little attention has heretofore been paid to achieving accurate register in less expensive presses. Common adjustments, in an effort to achieve accurate register, included the trimming of the paper so that it is square at the guiding edges, setting of the feeler to the exact size of the sheet, adjustments of the guides, seasoning or maturing of the paper in the press room, variation and reduction of the pressure between the blanket and the impression cylinders, and careful setting of the grippers. Even when the mechanical adjustments are carefully made, misregister still occurs.

I have ascertained that the action resulting in misregister occurs in the interval from the time the sheet is propelled forward from its position at the stop fingers until it enters the printing cylinders and have determined that, by the use of the apparatus hereinafter described, this misregister can be eliminated.

It is the principal object of the present invention, therefore, to provide sheet feeding apparatus for printing presses with which accurate registry will be maintained, and without the necessity for pre-treating of paper or the use of the various attachments heretofore proposed for

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alining the sheet against the stationary side guide on the machine.

It is a further object of the present invention to provide apparatus for obtaining accurate registry, in the feeding of sheets to printing presses, which is simple in construction and which may be readily applied to machines now in commercial use with a minimum of difficulty.

It is a further object of the present invention to provide apparatus for obtaining accurate registry which may be readily adjusted, as desired, to overcome a predetermined tendency of the sheets being fed toward misalinement.

Other objects and advantageous features of the invention will be apparent from the specification and claims.

The nature and characteristic features of the invention will be more readily understood from the following description, taken in connection with the accompanying drawings forming part hereof, of which:

Figure 1 is a fragmentary plan view of a printing press and feed mechanism therefor, and having thereon an attachment in accordance with the present invention, parts being broken away to illustrate the details of construction;

Fig. 2 is a fragmentary vertical sectional view taken approximately on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary elevational view, enlarged, and illustrating certain details of the registering mechanism in accordance with the present invention; and

Fig. 4 is a fragmentary sectional view taken approximately on the line 4—4 of Fig. 3.

It should, of course, be understood that the description and drawings herein are illustrative merely and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

Referring now more particularly to the drawings, a conventional printing press is there shown at 10 which includes vertical side frames 11, in which the upper and lower printing cylinders or rolls 12 and 13 are mounted and driven in timed relation.

In advance of the cylinders 12 and 13, a sheet conveyor 14 of conventional type, is illustrated, the conveyor 14 having a plurality of endless belts 15, driven in any desired manner, for delivering the individual sheets to be printed. The conveyor 14 is provided with the customary side guide rail 16 towards which the delivery ends of the belts 15 are inclined. A feed table 17 is also provided onto which the sheets are successively delivered by the belts 15. At the feed table 17, and projecting upwardly therethrough, a lower feed roller 18 is provided, mounted on a roller

shaft 19, and intermittently driven by a feed roller cam 20, through a linkage 21. The cam 20 and linkage 21 are similar to those now employed but are preferably modified to provide a more rapid feed.

In one form of printing press now available the shaft 19 has mounted thereon, at spaced intervals, a plurality of stop fingers 22 against which a sheet is advanced by the conveyor belts 15. The stop fingers 22 are retracted upon movement of the feed roller 18 to permit the advance of the sheet therebeyond.

The lower printing cylinder 13 is provided with gripping fingers 23 which are moved in predetermined timed relation to gripping position and to retracted position by a gripping finger control cam 24 and actuating linkage 25. The gripping fingers 23, when in gripping position, are adapted to grip the forward edge of the paper and impel the same between the rolls 12 and 13 for printing. The cam 24 and linkage 25 are similar to those now employed but are preferably modified to provide for faster opening and closing of the gripping fingers 23, the more rapid closing of the fingers 23 having the effect of shortening the distance the paper has to travel from the stop fingers 22 to the cylinders 12 and 13.

The cams 20 and 24 are driven in timed relation to the printing rolls 12 and 13 in the conventional manner.

In machines heretofore available, it has been proposed to provide an upper feed roller having its axis disposed parallel to the axis of the lower feed roller 18, the upper feed roller being moved downwardly in timed relation so that the sheet at the stop fingers 22 is gripped between the upper and lower feed rollers and advanced for engagement by the gripping fingers 23.

The structure heretofore described, with the exception of the retiming of the cams 20 and 24, is well known, and the structure hereinafter to be described has been found effective for eliminating misregister and for effecting the desired accurate register.

In accordance with the present invention, and in place of the upper feed roller and its mounting, as heretofore employed, a bracket 30 is provided mounted on pivot pins 31, carried by the frames 11. One of the pivot pins 31 has an arm 33 extending therefrom with a cam follower 34 thereon for actuation by a pressure roller cam 35. The cam 35 is similar to the cams now employed for positioning conventional pressure rollers but is preferably modified to accommodate the increased speed of action of the lower feed roller 18. The bracket 30, intermediate the ends thereof, is provided with a pivot pin 36, on which a roller bracket 37 is mounted and held by means of bolts 38 extending through the elongated slots 39 in the bracket 30. The roller bracket 37 has a pressure roller 40 carried therein on a roller shaft 41, and the roller 40 is adapted to be moved downwardly toward the lower feed roller in timed relation, by the cam 35.

In order to adjust the axis of the roller, the bracket 37 is provided with an upstanding ledge 43 in which adjusting studs 44 are mounted. The studs 44 are adapted to bear against the outer end face of the bracket 30 and to be locked in the desired adjusted position by lock nuts 45.

I have ascertained that a sheet advanced to the stop fingers 2, if out of register, may be brought to a position of register by the angular adjustment of the position of the pressure roller 40 so



that the sheet is, in effect, given a misregister or twist in the opposite direction, that is, towards the guide rail 16. The angle of adjustment of the axis of the roller 40 is varied in accordance with the particular characteristics of the paper stock, and by suitable shifting of the axis of the roller 40, the desired adjustment may be quickly and easily made.

The variation in the angular adjustment of the axis of the roller 40 apparently accommodates the change of direction of the paper from linear movement to movement in a curved direction and, by the appliaction of a force on the paper in a predetermined adjusted direction, controls the extent of the force tending to move the paper in that direction so that the resultant movement of the paper into the printing cylinders is straight, thus achieving perfect register.

It has been ascertained in practice that the effect of imperfectly cut stock, chain stretch due to increased speed, moisture content, static electricity, and warping and curling of the paper are counteracted, and, where desired, original registration on succeeding runs in process color work may be quickly restored, despite saturation of the paper with ink, or the prevailing humidity or moisture content of the paper, or conditions of static electricity.

I claim:

1. In registering apparatus for printing presses having a plurality of printing rolls, a conveyor for advancing a sheet towards said printing rolls, a retractable stop member interposed between said conveyor and said printing rolls to which the forward edge of the sheet is advanced by the conveyor, and separable upper and lower feed rolls interposed between said conveyor and said printing rolls one of which is driven for controlling the advance of the sheet from said stop member to said printing rolls, one of said rolls being mounted on a bracket for retraction, and said feed rolls in sheet engaging position having their rotational axes disposed in spaced horizontal planes, the combination comprising an adjustable mounting member on said bracket for holding the rotational axis of one of said feed rolls when in sheet engaging position at an acute angle with respect to a vertical plane through the rotational axis of the other feed roll, whereby accurate register of the sheet is effected by said feed rolls.

2. The combination as defined in claim 1 in which said mounting member is provided with holding members for holding said roll at a selected position of adjustment of its rotational axis.

3. The combination as defined in claim 1 in which said mounting member includes a pivotal connection to said bracket and clamping screws for holding said roll at a selected position of adjustment of its rotational axis.

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