

Oct. 15, 1963

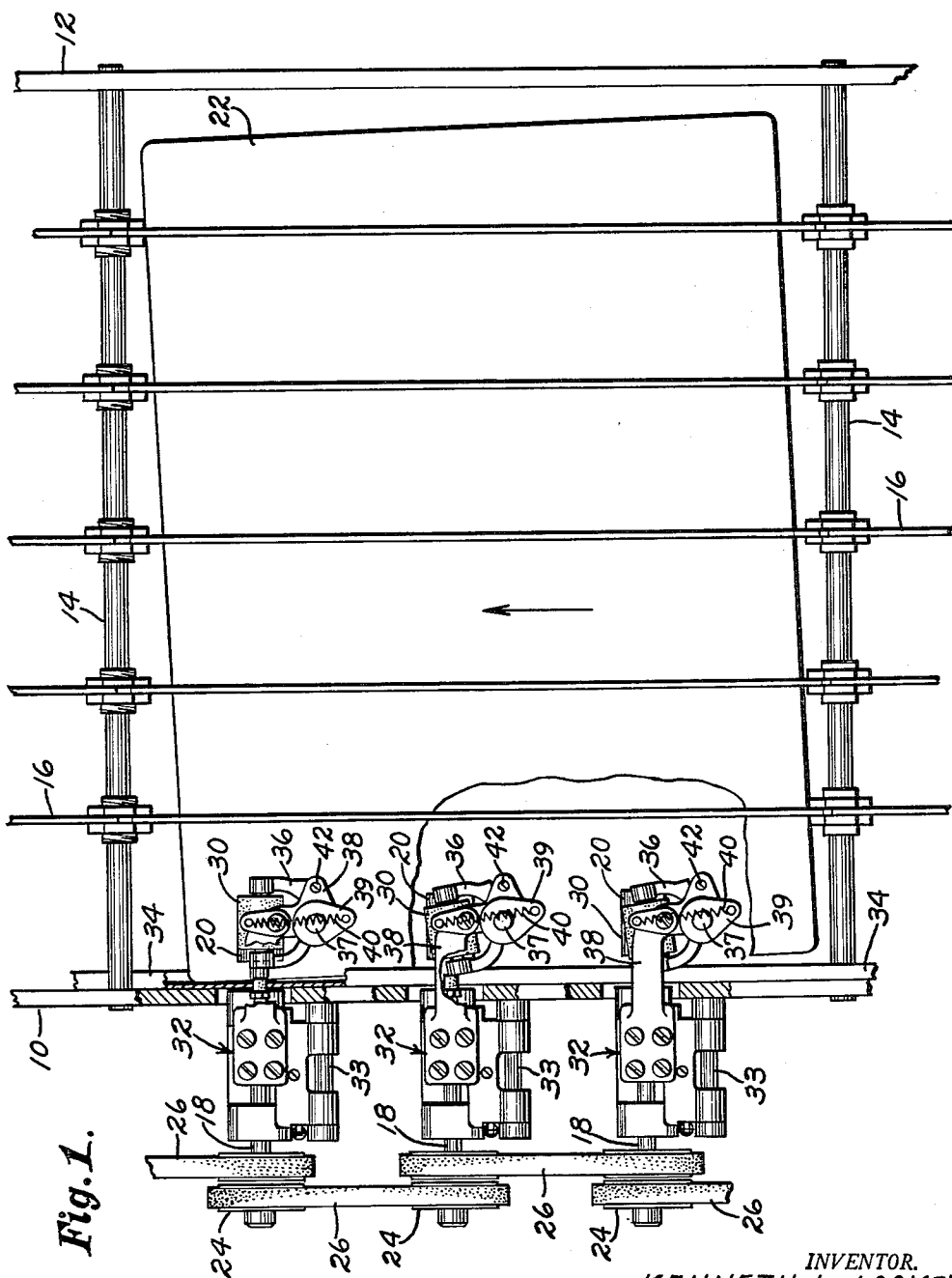
K. L. LOCKEY

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SHEET SIDE REGISTRATION APPARATUS

Filed Feb. 27, 1961

3 Sheets-Sheet 1



INVENTOR.
KENNETH L. LOCKEY.
BY

Harry R. Jumont
ATTORNEY.

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K. L. LOCKEY

3,107,089

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3 Sheets-Sheet 2

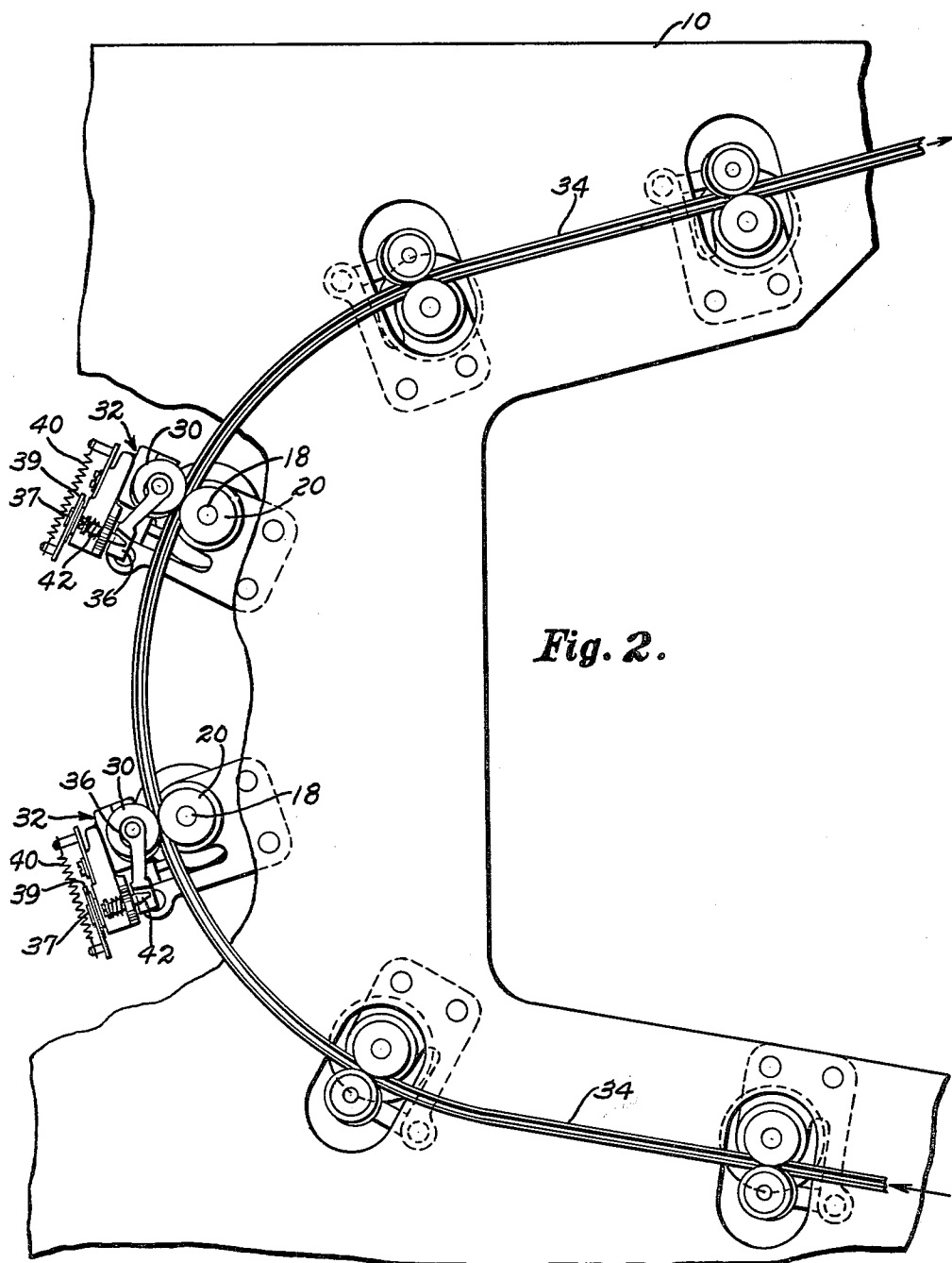


Fig. 2.

INVENTOR.
KENNETH L. LOCKEY.
BY
Harry R. Dumont
ATTORNEY.

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K. L. LOCKEY

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3 Sheets-Sheet 3

Fig. 3.

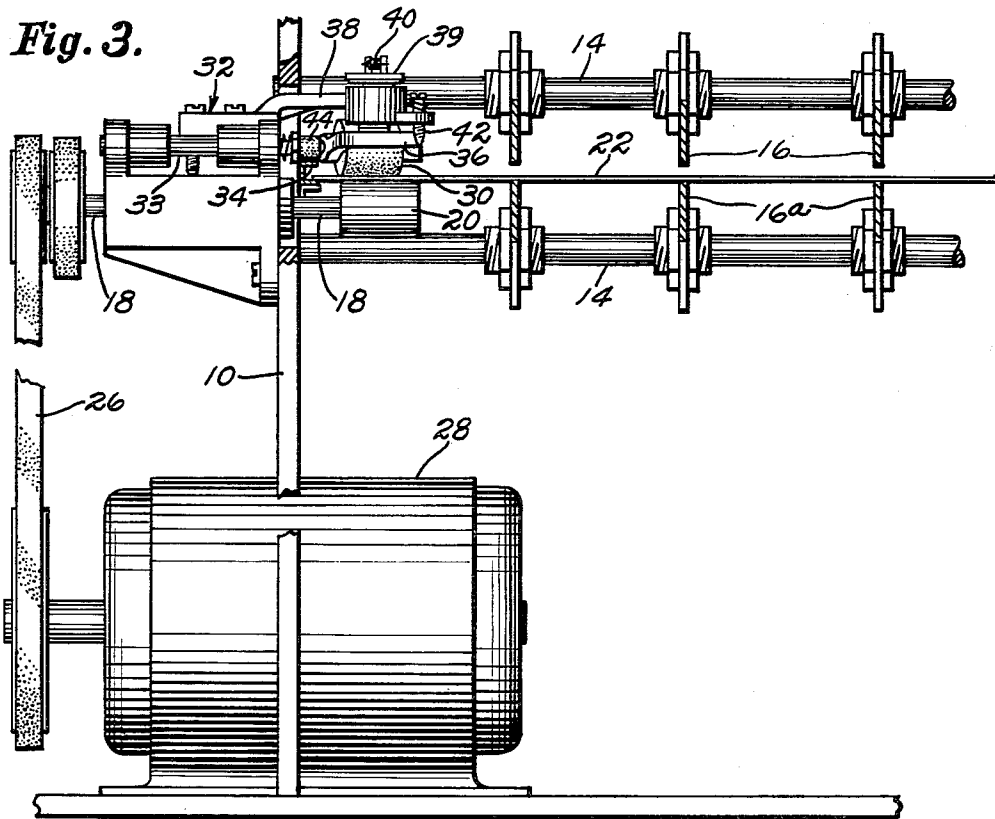
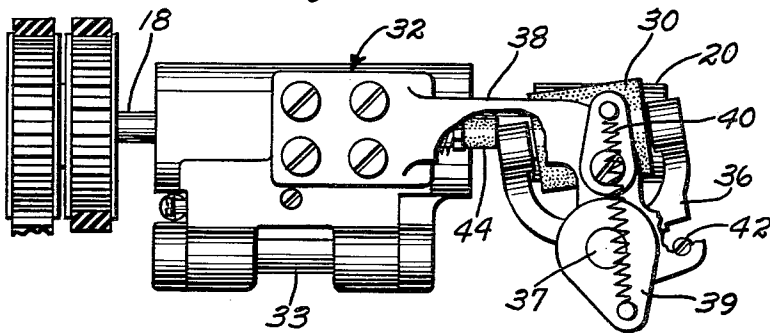


Fig. 4.



INVENTOR.
KENNETH L. LOCKEY.
BY
Harry R. Dumont
ATTORNEY.

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SHEET SIDE REGISTRATION APPARATUS

Kenneth L. Lockey, Livonia, Mich., assignor to Burroughs Corporation, Detroit, Mich., a corporation of Michigan
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2 Claims. (Cl. 271-52)

This invention relates generally to a sheet transport system and, more particularly, to a sheet side registration apparatus therefor.

It is an object of this invention to provide an improved apparatus for side registering sheets without requiring interruption of the normal forward flow of the sheets.

It is an additional object of this invention to provide a side registration apparatus for sheets which is particularly adapted for the feed of sheets of varying widths and lengths or for feeding of web materials.

It is a further object of this invention to provide a side registration apparatus for sheet feeding whereby the force applied through the sheet against the side guide is readily removable to prevent damage to the sheet edge.

It is a still further object of this invention to provide a side registration apparatus for a sheet transport system which is reliable in its operation regardless of the contour of the sheet path required.

These and other objects of the present invention will become apparent from the following description. In order to more clearly understand the present invention, reference may be made to the accompanying drawings which illustrate one preferred embodiment.

In the drawings:

FIG. 1 is a top plan view of a linear portion of the sheet transport system. A part of the sheet is broken away to show the interrelation of the parts;

FIG. 2 is an elevation of a curvilinear portion of the sheet transport system;

FIG. 3 is a front elevation of the side registration apparatus; and

FIG. 4 is a detail showing the pressure roll and its mode of assembly.

With reference to the drawings, FIG. 1 shows the basic construction of the transport system which includes a supporting means having side frames 10 and 12, which are spaced apart by a plurality of rods 14. A plurality of longitudinally extending upper and lower guide rails 16 and 16a serve to define the pathway for the sheet and are laterally movable along rods 14 to accommodate sheets of varying widths. The side registration apparatus is associated with the sheet drive apparatus and is mounted along the left-hand side frame 10. Journalled in side frame 10 are a plurality of shafts 18, each of which carries a drive roll 20. Each drive roll 20 is engageable with the lower surface of a sheet 22 shown moving in an arrow indicated path through the transport system. Each drive roll 20 is preferably formed of a material of a relatively low coefficient of friction such as stainless steel and the like. Each shaft 18 is coupled to a drive mechanism including pulleys 24 and belts 26 which receive a common drive from drive motor 28 shown hereinafter in connection with FIG. 3. A plurality of pressure rolls 30 are shown in engagement with the upper surface of sheet 22. Pressure rolls 30 are preferably formed of material having a relatively high coefficient of friction as compared to drive rolls 20 such as plastic, rubber or the like. Each roll 30 is forced downwardly and into engagement with the sheet and the drive roll 20 therebeneath by the substantial weight of a lever or mounting plate 32. Each mounting plate is pivotally mounted or hinged at one edge to a shaft 33 extending from the outer surface of side frame 10 in bushings of a bracket. The side guide for the left-hand edge of the sheet is provided by

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a U-shaped channel 34 mounted on the inside surface of side frame 10. Each pressure roll is rotatively mounted in a pivotable bearing member or yoke 36. The yoke 36 has an upstanding stud 37 which is journalled in a lateral extension or end portion of rigid lever 38, which extends from plate 32. An overcenter spring 40 is coupled between rigid lever 38 and a plate or arm 39 mounted on the upper end of stud 37 to normally bias the yoke 36 and the roll 30 which it carries so that the axis of the roll is diagonal to the side guide 34. Thus, it will be seen that, with roll 30 in frictional engagement with the sheet, it will exert a force on the sheet tending to drive the sheet toward the side guide 34.

FIG. 2 shows a portion of the side registration apparatus arranged along a combined linear and curvilinear path. When the sheet moves through side guide 34 and between guide rails 16 and 16a, it is subjected to a variable force in opposition to its forward movement. The apparatus of the present invention is particularly adapted to keeping the sheet registered in such a system. The individual pressure rolls 30 are displaceable between an active and an inactive state by a single pivotal movement with a minimum of travel from side guide 34 required. This enables the feeding of a wide range of widths of sheets. The successive individual operation and deactivation of the pressure rolls, as best illustrated in FIG. 1, makes possible the feeding of an accurately side-registered web. Further shown in FIG. 2 are screws 42, which provide a limit for the clockwise pivotal movement of rolls 30 so as to inactivate them by aligning their axes parallel to their opposed drive rolls 20.

FIG. 3 illustrates the conventional manner in which the drive of motor 28 is transmitted through belts 26 to drive rolls 20. Also shown is the manner of movement of the sheet 22 between rolls 20 and 30. In this figure the left-hand edge of sheet 22 has not yet had been properly registered with the side guide 34 so that roll 30 is shown in a position whereby it is driving the sheet in toward side guide 34. Also shown is the manner in which the sheet 22 is generally confined between upper guide rails 16 and lower guide rails 16a.

FIG. 4 shows the pressure roll 30 in its extreme leftward position against a bumper 44 mounted on the end of plate 32. A portion of the end of rigid lever 38 is broken away to illustrate the location of limit screw 42 to stop the rightward pivotal movement of yoke 36 when roll 30 has its axis parallel to that of roll 20. Also shown is the manner in which spring 40 is mounted over-center relative to the center of rotation or pivot point for yoke 36 furnished by stud 37.

The mechanism provided by the present invention provides a high degree of alignment accuracy for sheets in transport. The pressure roll and driving roll arrangement makes a force immediately available to register the sheet edge. As the edge of the sheet strikes the side guide, the slight clockwise turning of the sheet initiates the pivotal movement of the pressure roll into its inactive position and the pressure of the sheet edge against the side guide is immediately relieved. Thus, the present invention provides protection against damage to the edge of the sheet. The alignment of the axis of drive roll 20 is substantially normal to the side guide and the path of the sheet so that forward drive proceeds without interruption during the registering action of the pressure roll.

What is claimed is:

1. In a sheet transport apparatus, laterally spaced pairs of rails defining a path of sheet travel, supporting means supporting said rails, a sheet side edge guide member parallel to said rails, a rigid lever hinged to said supporting means and extending over said guide member parallel to the hinge axis, a lower sheet driving roller

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arranged with its axis of rotation at right angles to the path of sheet travel, an upper pressure roller mounted to swivel on said lever in overlying relation to said driving roller, and an overcenter spring holding said pressure roller in position to urge a sheet against the side guide member and yieldable to the feeding force of the driving roller on alignment of the sheet.

2. In a sheet transport apparatus, laterally spaced pairs of rails defining a path of sheet travel, supporting means supporting said rails, a sheet side edge guide member extending along said rails, a rigid lever hinged on said supporting means to pivot about an axis transverse to the path of sheet travel, said lever extending over said guide member crosswise of the path of sheet travel and having an end portion extending counter to the direction of sheet

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travel, a lower sheet driving roller, an upper pressure roller overlying said driving roller and pivoted to swivel on the end portion of said lever, an arm operatively connected to pivot said pressure roller, and an overcenter spring connected to said arm to hold said pressure roller in a position feeding a sheet toward said guide member and yieldable to the driving force of said driving roller upon alignment of the sheet.

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