

[54] **ONE-CHAIN BI-DIRECTIONAL PAPER MOVER**

3,392,893 7/1968 Bennett..... 226/74

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[57] **ABSTRACT**

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Transport device for moving continuous forms having marginal feed holes to and away from a print station. More particularly, the bidirectional paper mover includes a single endless chain having a plurality of feed pins secured thereto for cooperation with the marginal holes of the continuous forms. The chain is disposed about an outer guide which provides a path for the paper transport's endless chain and two guides providing the same kind of path in the upper and lower portion of the transport device, respectively. The purpose of the outer guide is to create an operating section for printer or platen means.

[21] Appl. No.: **488,649**

[52] U.S. Cl. 226/74

[51] Int. Cl.² R65H 17/38

[58] Field of Search 226/74, 75, 170-173

[56] **References Cited**

UNITED STATES PATENTS

2,171,003	8/1939	Mabon.....	226/74 X
2,179,150	11/1939	Hageman.....	226/74
2,633,354	3/1953	Mixer.....	226/75

7 Claims, 4 Drawing Figures

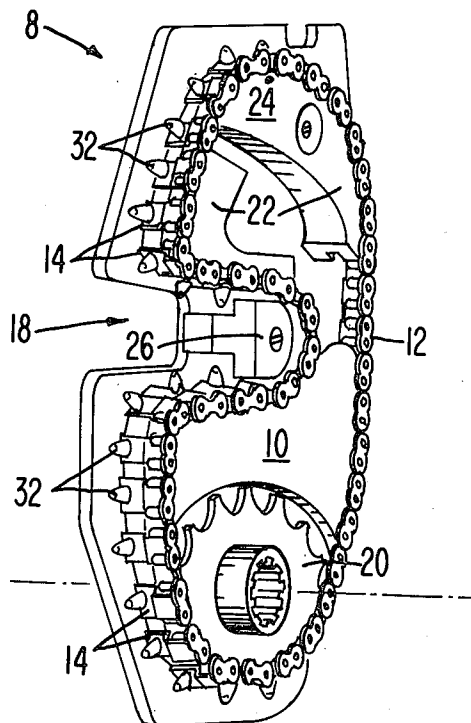


FIG. 2.

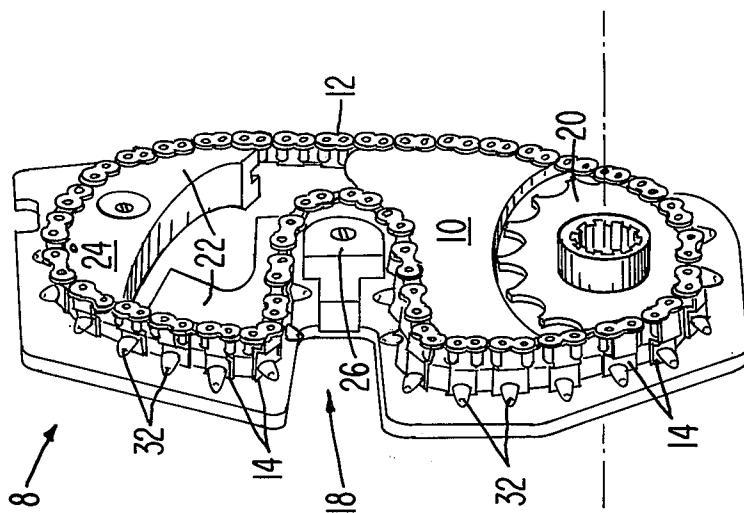
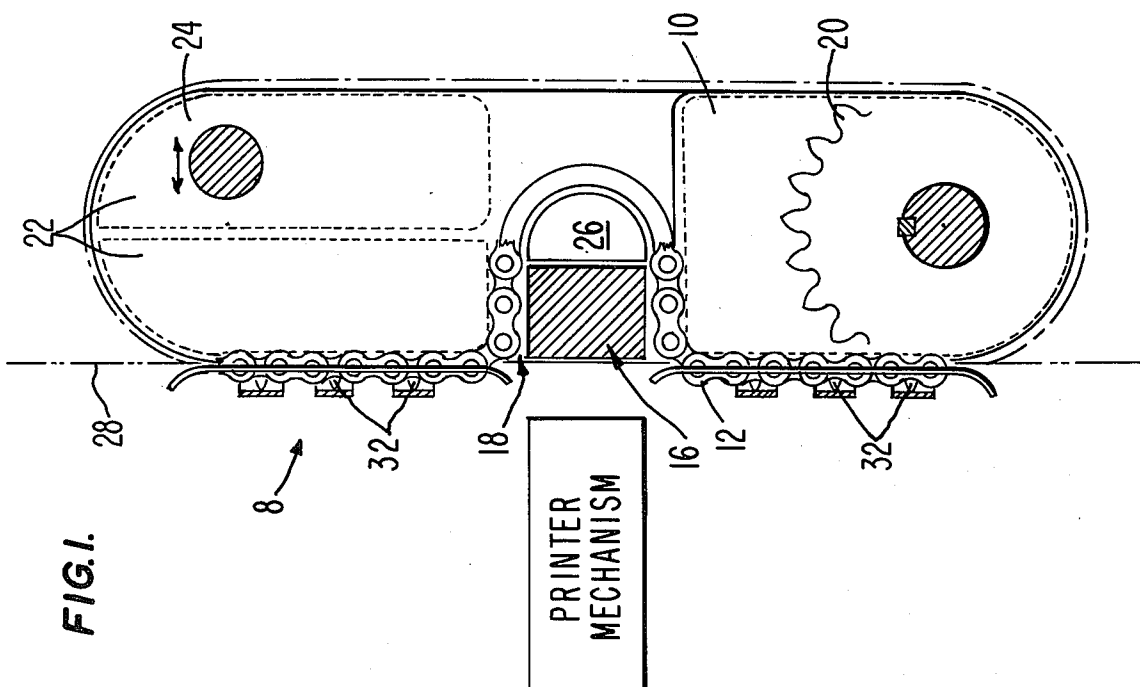
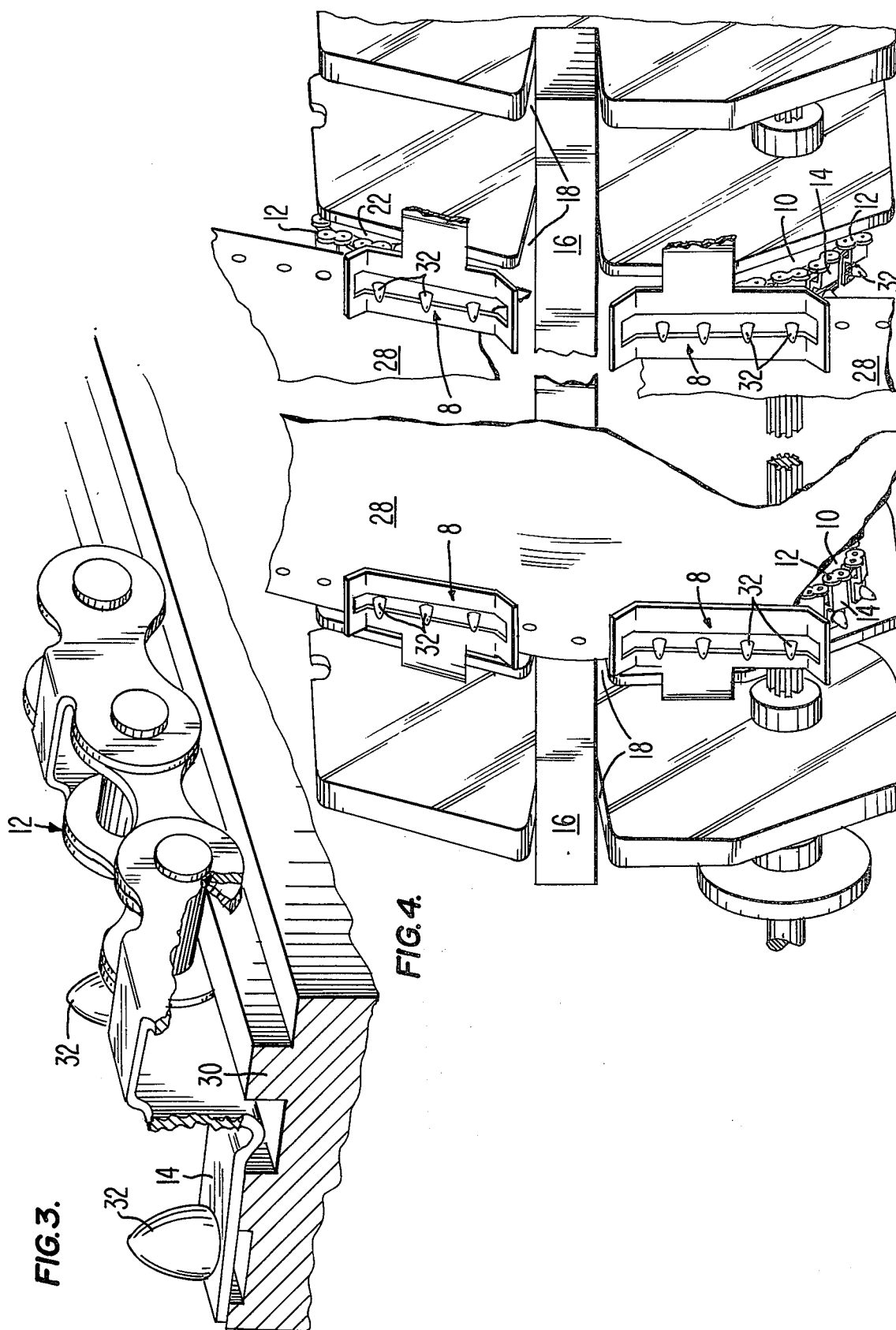


FIG. 1.





ONE-CHAIN BI-DIRECTIONAL PAPER MOVER

BACKGROUND OF THE INVENTION

One-chain paper movers in bookkeeping machines and the like are known in many forms. They have replaced two separate superimposed and cooperating mover units with two chains which actuate a web or document.

The earlier one-chain paper movers engaged the paper along an extended path as in British Pat. No. 649,199.

In later developments such an extended path was interrupted by pulling the paper mover band or chain aside so as to provide space for an operating region, e.g. for a printer and platen arrangement. An example is U.S. Pat. No. 3,392,893. It has only one drive, but instead of a chain as a driving means, as in the present invention, it employs a flexible band in cooperation with a plurality of idlers. Even the "outer guide" which pulls the flexible band aside for creating an operating region is a pulley. The use of idler pulleys calls for moving parts other than the drive pulley which is clearly undesirable.

SUMMARY OF THE INVENTION

The main object of the invention is to provide document transport means including an endless, non-elastic chain engageable by a drive sprocket wheel. The endless chain is moved about an upper and a lower guide section, with one of these sections including the transport means and the other one a chain tensioning device. Between the two guide sections an operating region is arranged which includes a platen. This means that a document, for example in form of a web with perforated edges, is moved past the two guide sections and printed upon in the operating region.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic partial cross-sectional view of the improved one-chain bi-directional paper mover.

FIG. 2 is a perspective view of the preferred embodiment of the device showing the configuration of the chain.

FIG. 3 is a detailed view of the chain.

FIG. 4 illustrates in schematic form how two units according to the invention are arranged on the carriage of a bookkeeping machine.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The cross-sectional view of FIG. 1 and the perspective view of FIG. 2 show a one-chain bi-directional paper mover 8 according to the invention with a first guide section 10 engaging an endless chain 12 which is provided with lateral extensions 14 (see FIGS. 2 and 3) for entering the perforated edges of paper webs or documents to be moved between a printing unit (not shown) and a platen 16 (FIG. 1,4) provided in a cavity 18 (FIG. 2) of the paper mover.

In this first guide section 10 a sprocket gear 20 is provided which is adapted to engage corresponding openings in the endless chain 12.

The chain 12 surrounds the first guide section 10 and a second guide section 22 which includes a chain tensioning device 24 of known structure.

Between the two guide sections 10 and 22 over which the chain slides with a minimum of friction (for exam-

ple by using a metal chain and plastic guide sections), an outer, third guide section 26 is provided which pulls the chains 12 away from the plane in which the paper 28 is moved. In this manner an operating region in form of the cavity 18 is created which in the present design accommodates the platen 16.

In the detailed view of FIG. 3 it is illustrated how the chain 12 is constructed and how it glides over edges 30 which are provided on the chain-engaging sides of all three guides sections 10, 22 and 23.

The lateral chain extensions 14 have been provided so that the actual chain remains unencumbered by the paper-engaging projections 32. Such a structure is necessary because the chain 12 glides over the guide sections with both its inside and its outside. This is obvious from considering the guiding functions of the "inner" sections 10 and 22 on the one hand, and the "outer" section 26 on the other hand.

A paper web 28 (see FIGS. 1 and 4) or other document with spaced holes in both edges and which is engaged by the projections 32 of the lateral chain extensions 14, is moved either up or down past the operating region which has the form of the cavity 18 through which the platen 16 extends.

Since it is important to have a taut endless chain, the chain tensioning device 24 is set just once in such a manner that the chain 12 is tensioned as required.

The avoidance of rotatable parts in the form of idler pulleys means that there is only insignificant wear of the nonelastic chain 12 and the edges 30 on the guide sections 10, 22 and 26. Also a very good paper registration is attained.

While the invention has been described with respect to the preferred embodiment thereof, it will be understood that the invention and its various features are capable of changes and variations which are within the spirit and the scope of following claims:

What is claimed is:

1. In a one-chain paper mover, an endless chain having means for engaging a paper web or document to be fed past an operating region, a first guide section and a second guide section spaced from each other and positioned within said endless chain and about which said endless chain is slidably guided, and a third guide section positioned in the operating region and outside said endless chain and between said first and second guide section, said third guide section guidingly deflecting a portion of said chain inwardly in the operating region.

2. The combination as claimed in claim 1 wherein a platen extends through said operating region.

3. The combination as claimed in claim 1 wherein one of said guide sections comprises the chain driving means and the other one of said guide sections comprises tensioning means which can be set so as to keep the endless chain operationally taut.

4. The combination as claimed in claim 1 wherein the chain driving means is a sprocket wheel.

5. The combination as claimed in claim 1 wherein a cavity is provided in the operating region where the chain is inwardly deflected by the said third guide section to receive a platen over which the paper is fed.

6. The combination as claimed in claim 1 wherein the means for engaging a paper web to be fed past said operating region comprise projections provided on said endless chain.

7. The combination as claimed in claim 1 wherein the means for engaging a paper web to be fed past said operating region comprise lateral extension provided on said endless chain, said lateral extensions carrying projections.

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