Feb. 26, 1957 H. C. MERRITT ET AL 2,783,041

PAPER SHEET TRANSFER MECHANISM

Filed May 20, 1952 2 Sheets-Sheet 1

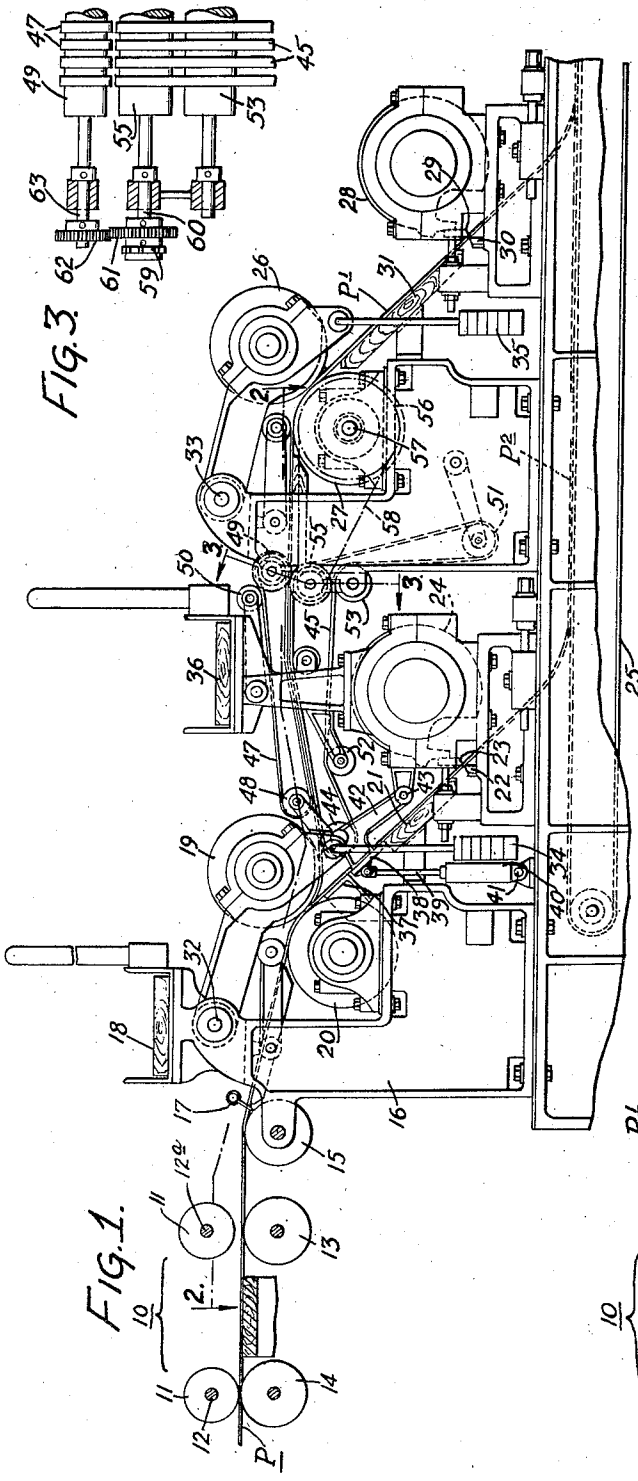


FIG. 3

FIG. 1

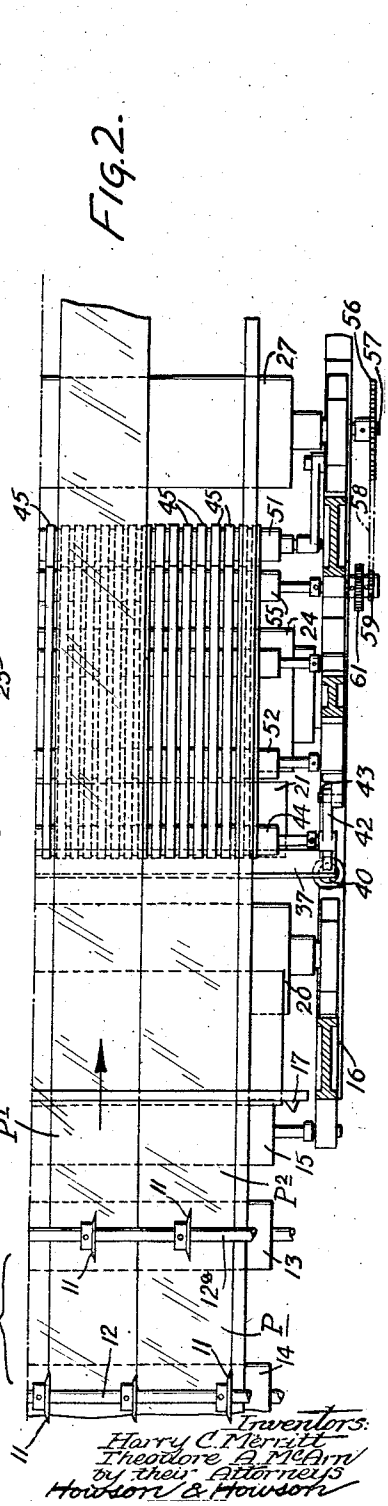


FIG. 2

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FIG. 4.

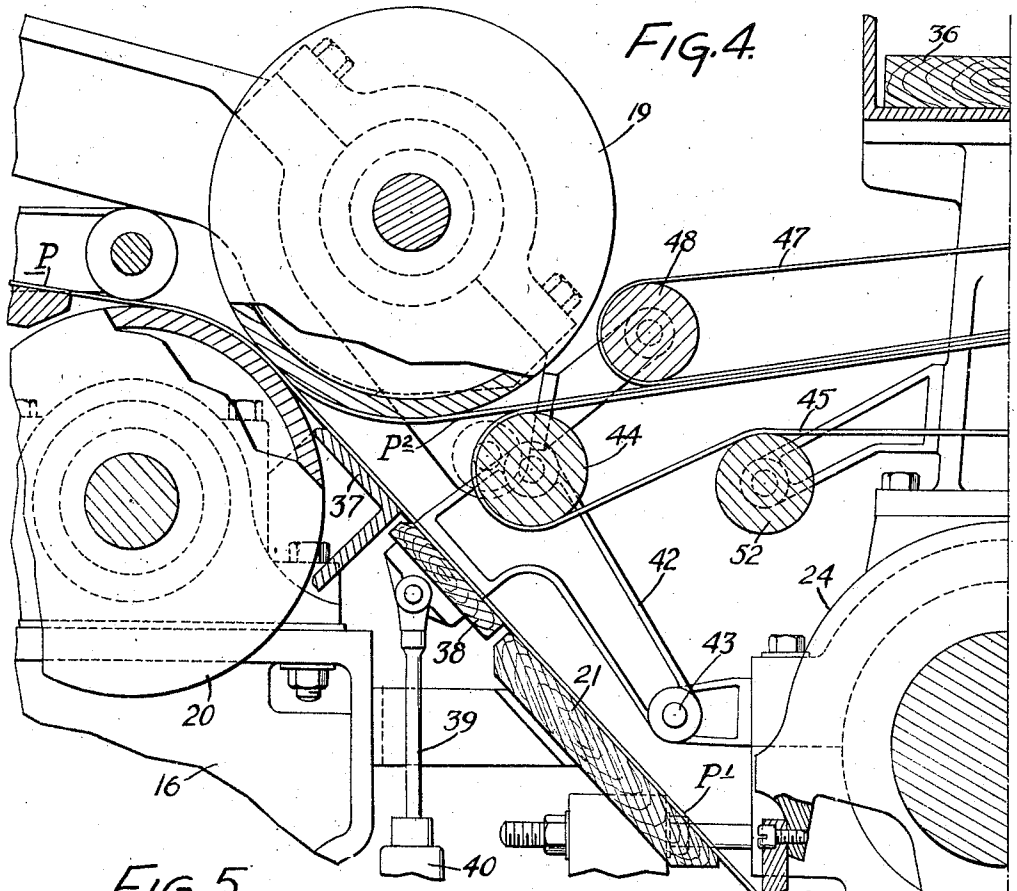
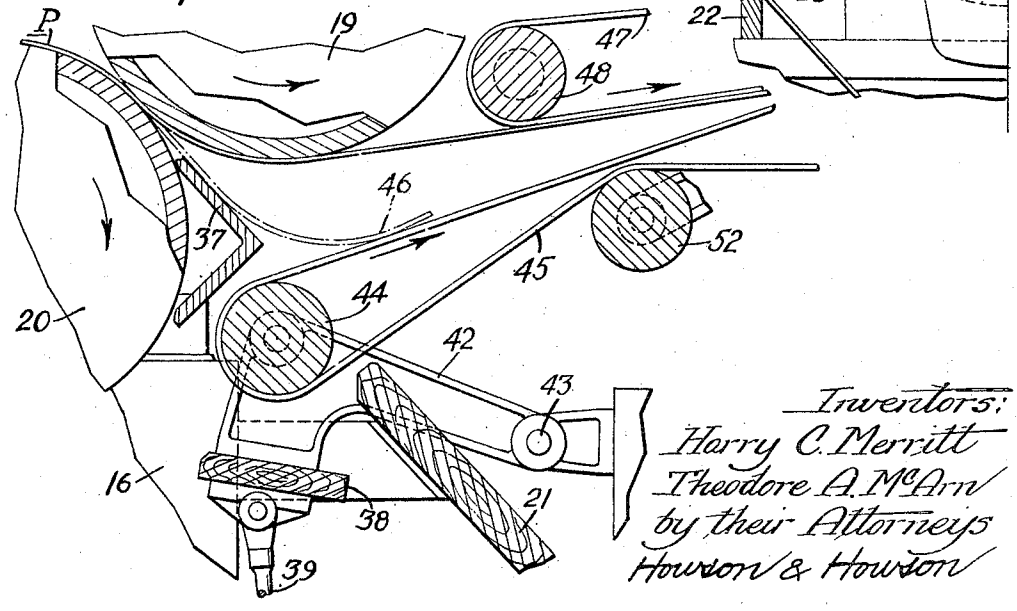


FIG. 5.



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PAPER SHEET TRANSFER MECHANISM

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1 Claim. (Cl. 271—2.1)

This invention relates to a sheet transfer device intended for use on a multiple paper cutter.

In the past, it has been necessary for the operator of a "duplex" or multiple paper cutter to stand directly above the cutter roll and reach down to transfer an end of the paper strip from a first position to a second position from which the end is fed through the second cutter assembly.

The construction of such a duplex paper cutter is well known in the art and includes a slitter at the forward end of the cutter which may be adjusted to longitudinally slit a relatively wide paper web into one or more narrower widths. The resulting strips are fed through one or more pairs of draw rolls into the cutting mechanism which severs predetermined lengths of paper from the narrow strips. In order that the cutter can be simultaneously operated to cut to different lengths more than one strip of paper at a time, it has been found necessary to start the paper through the cutter, and then, while the strips continue to be fed at a high rate of speed, the operator attempts to transfer one of the strips from an initial elevated position to a downwardly directed station where it is fed through another cutting device. This has proven to be an extremely hazardous operation and workers have all too frequently lost arms and legs in trying to maintain their balance on a narrow footwalk directly over the cutter.

Our improved construction contemplates a mechanical transfer mechanism for one or more of the strips in a multiple paper cutter, and it eliminates completely the necessity for manual transfer of the strip or strips. The addition of this improvement has been found to be a very important safety factor.

The invention disclosed and claimed herein is especially adapted for use on what is generally known as a "duplex paper cutter" of the type shown in the drawings. It will be understood, however, that the invention may equally be applied to cutters having any number of draw roll assemblies and cutting assemblies. Furthermore, it is not necessary that the transfer mechanism forming the subject matter of the invention be limited to use on a cutter since it is suited to any situation where it may be desired to mechanically change the direction of a paper strip feed. However, for the purposes of the present description the term "duplex" will be used to refer to a cutter having a plurality of draw roll assemblies and cutter assemblies.

A primary object of the invention therefore is to provide simple and effective means for transferring one or more moving strips of paper selectively from a first position to a second position in a duplex paper cutter.

A further object of the invention is to provide a duplex cutter having means for automatically transferring such paper strip feed from a first pair of draw rolls to a second pair of draw rolls.

A further object of the invention is to provide in a duplex paper cutter a plurality of tape rollers and a pivoting paper board which may be operated to divert

a moving strip of paper to a second pair of draw rolls and cutter.

A further object of the invention is to provide improved means for handling slit paper sheets while moving.

Further objects will be apparent from the specification and drawings in which:

Fig. 1 is a side view of a duplex paper sheet cutter incorporating our present invention;

Fig. 2 is a partial top view of the structure of Fig. 1 as seen at 2—2 of Fig. 1;

Fig. 3 is a fragmentary detail as seen at 3—3 of Fig. 1 showing the drive for the tape rollers;

Fig. 4 is an enlarged sectional detail of a part of the structure of Fig. 1; and,

Fig. 5 is a view similar to Fig. 4 with the parts in a moved position.

The invention comprises essentially the provision in a duplex cutter of a pivotal carriage on which a tape roller is journaled.

The carriage has a swinging paper board in addition to the tape roller which is mounted on the carriage in such a way that it may be moved to guide the leading edge of paper strips as they are fed through a pair of draw rolls. When the paper strips engage the tape on the carriage, they are directed under control of the tape feed to enter a second pair of draw rolls from which they may be fed to a cutter in accordance with conventional practice. When it is desired to run one or more narrow strips of paper through another cutter for the purpose of cutting the strips into different lengths, a set of diverting tapes is raised to permit the ends of these strips to by-pass the second pair of draw rolls and the cutter through which they had previously been fed.

Referring now particularly to Figs. 1 and 2, a standard duplex cutter is shown provided with a slitter assembly **10** having a plurality of adjustable slitter knives **11, 11** mounted on shafts **12, 12*a*** and operatively positioned to longitudinally slit a web of paper P in conjunction with backing rolls **13** and **14**. The slitter knives **11** on shaft **12** are used for trimming the edges of the web and to slit it into several narrow strips such as P1 and P2. The slitters on shaft **12*a*** are in reserve for adjustment to the next change in slit widths. After passing over backing roll **13**, the strips pass over a roll **15** journaled on cutter frame **16** and at this station an automatic transverse cutter assembly **17** may be used to sever one or more of the strips P1 and P2. In the event the automatic cutter **17** is not used, the sheets may be cut manually by an operator on the footwalk **18**.

From this point the strips are fed between a top draw roll **19** and a bottom draw roll **20** which are mounted in the conventional manner on the frame **16**. The line connecting the centers of draw rolls **19** and **20** is biased so that strips leaving the draw rolls are directed downwardly at an angle such that they will pass over the paper board **21** and thence between the blades **22, 23** of the first cutter **24**. From thence, the individual sheets feed onto the bottom transfer tape **25** to be carried from beneath the cutter.

The duplex cutter illustrated in Fig. 1 has a second set of draw rolls **26** and **27** and a cutter **28** having knives **29** and **30**. A second paper board **31** is positioned between the draw rolls **26** and **27** and cutter **28**. In accordance with standard practice, the upper draw rolls **19** and **26** may be pivotally journaled at **32** and **33**, respectively, and are weighted at **34** and **35**.

When it is desired to divert one or more of the narrow strips such as P2 to the first cutter **24** in order to cut this strip into lengths different from those being cut by cutter **28**, it has heretofore been necessary for an operator on the footwalk **36** to reach down in order to break

the strip which is being fed directly from draw rolls 19 and 20 to draw rolls 26 and 27.

In order to avoid the necessity for this manual transfer, we provide a plurality of driven tapes which cooperate to effect this transfer mechanically. When the cutter is initially threaded, the sheet is fed through the first pair of draw rolls 19 and 20 and over the paper support angle 37 (Fig. 5). A swinging paper board 38 which in effect is a part of the paper board 21 is lowered by means of a suitable link 39 operated by a fluid cylinder 40 pivoted to the frame at 41 or other suitable means. The swinging paper board 38 is supported on a pair of brackets 42 which are in turn pivotally mounted to the frame at 43. Brackets 42 also journal the swinging tape roller 44 around which the lower flight of tapes 45 is carried. When the tail 46 of the sheet strikes the tape 45, it is carried upwardly along with the tape until it becomes engaged by an upper tape flight 47 carried by tape rollers 48 and 49. The speed of upper flight 47 is slightly in excess of the speed of the lower flight 45 so that the tail of the sheet is carried between the upper and lower tape flights and thence threaded between the second draw rolls 26 and 27. The tail 46 is then fed downwardly over the paper board 31 and past cutter 28. As long as all of the strips slit from the entire web P are being cut into these uniform lengths, all of the strips of the web will be fed through cutter 28 as shown by the position of the strips in Fig. 5.

The tension in the upper tape flight is regulated by means of a tensioning roller 50 and the tension in the lower flight 45 is controlled by a roller 51. Lower tape flight 45 is carried over idler rollers 52, 53 and the tapes are driven by drive rollers 49 and 55, respectively. Figs. 2 and 3 show the drive for the tape rollers and for this purpose we employ a sprocket 56 secured to the drum shaft 57 of the lower draw roll 27 and sprocket 56 drives roller 55 through a chain 58 and a sprocket 59 on shaft 60 of roller 55. The drive for roller 49 is through a pair of spur gears 61 and 62 pinned to roller shafts 60 and 63 respectively.

With the entire sheet threaded through draw rolls 26 and 27, the swinging paper board 38 will ordinarily be retained in the position shown in Fig. 5, and the paper strips will feed directly as shown in full lines from the draw rolls 19 and 20 to the tape flights 45 and 47. When it is desired to divert one of the narrow strips such as P1 to the cutter 24, this strip is broken or cut at 17 and the swinging paper board 38 is raised to the position shown in Fig. 4. As soon as the end of the severed strip P1 passes between draw rolls 19 and 20, it will no longer continue to be fed between tape flights 45 and 47, but will pass directly downward over the paper support angle 37, the swinging paper board 38, and the stationary paper board 21. Brackets 42 are then retained in the raised

position for continued operation of the cutters in which the narrow strip P1 is fed through cutter 24 and the strip P2 continues to be fed through cutter 28.

The improved sheet transfer mechanism for a duplex cutter is simply efficient and positively eliminates hazardous manual transfer otherwise employed. The use of our device does not necessitate basic modification in the cutter and may be used with a desired number of draw rolls and their associated cutters.

Having thus described our invention, we claim:

In paper handling machinery designed to feed slit strips from a common web together or separately to one or separate operating stations, the combination comprising a pair of draw rolls operable to feed the strips forwardly, guide means lying in the plane of the path of normal advance of said slit strips discharged from said draw rolls and having a gap extending transversely at the mid-portion thereof, an endless conveyor having a portion extending through the transverse gap in said guide means and positioned in the path of the normal advance of said slit strips from said draw rolls for deflecting said slit strips and feeding them as a group to a second pair of draw rolls by which they are fed to an operating station, a pivoted carriage mounting said deflecting portion of said endless conveyor and a paper board, and means for pivoting said carriage to move said deflecting portion of said endless conveyor to a non-deflecting position, said means operable to simultaneously move said paper board into a position extending across the gap in said guide means in which it supports strips in their normal direction of travel from said first draw rolls, said deflecting portion of the endless conveyor operable in the non-deflecting position to engage said slit strips and after a group of slit strips has been deflected and drawn into said second draw rolls upon cutting of one or more of said strips to pass said cut strips undeflected to a second operating station, while the uncut strips continue to be fed in the deflected path by said second draw rolls to the first operating station.

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