SLOT CLOSURE FOR BACK GAUGE OF PAPER-CUTTING MACHINES

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

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FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

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This invention relates to paper-cutting machines and more particularly to a device for closing the guide slot in the machine table, through which slot an arm extends from the back gauge to a feed screw for driving the back gauge.

Various devices are known in the prior art for achieving this purpose, for example, as shown in the U.S. patent to Thunem No. 2,881,834 of April 14, 1959.

Prior art constructions have certain drawbacks in the use of a flexible strip of spring steel or the like which is pulled along the slot by the back gauge as it moves, to thus cover the slot. The strip is difficult to manufacture so that it will be absolutely straight and fit properly in the slot length. Other known constructions are complex and expensive in that a large plurality of links must be articulated and cover plates welded thereto, thus forming a chain which runs in the slot.

The present construction, as disclosed herein, overcomes such drawbacks by providing a series of closure plates which are carried on parallel cables pulled by the back gauge wherein such plates are not articulated nor connected with each other but merely assembled in contiguity with each other, having transverse flexibility so as to be aligned in the slot without any need for precision manufacture.

It is accordingly an object of the invention to provide a device which is rugged and long lasting and substantially impervious to wear or breakdown. Thus, by avoiding link connections a large plurality of breakdown points are avoided and by providing transverse flexibility the device will readily slide in a slot without side scraping or interference.

Other objects and features of the invention will be apparent from the disclosure to follow, in conjunction with the drawings in which:

FIGURE 1 is a fragmentary partially cross-sectional side view of the invention;
FIGURE 2 is an end view of FIGURE 1 partially in cross section;
FIGURE 2a is a diagrammatic elevation of the cable and back gauge system;
FIGURE 2b is an enlarged fragmentary view partially in section of one side of the construction;
FIGURE 2c is a fragmentary plan view of FIGURE 2b taken in the direction 2c—2c of FIGURE 2b;
FIGURE 3 is a plan view of one of the plates mounted on a clip, which effects a sub-combination of the overall assembly;
FIGURE 4 is a forward (or rear) end elevation of FIGURE 3;
FIGURE 5 is a side view of the clip of FIGURE 3;
FIGURE 6 is a side view in elevation of a carrier block to which the clip of FIGURE 3 is fastened;
FIGURE 7 is an end view of the carrier block;
FIGURE 8 is a plan view of the carrier block;
FIGURE 9 is a plan illustration of a series of closure plates carried on the parallel cables and showing a clip for holding the plates in place, the view being from the underside in the direction of the arrow A in FIGURE 2a;
FIGURE 10 is a sectional view 10—10 of FIGURE 9;
FIGURE 11 is an underside view of the front portion of the gauge showing a clip for securing cable ends;
FIGURE 12 is a section through 12—12 of FIGURE 11;
FIGURE 13 is an elevation showing the rear end of the gauge and the mode of attachment of the cable ends thereto; and
FIGURE 14 is a bottom view of FIGURE 13.

Referring now to the drawings:
FIGURES 1 and 2 show a portion of a front pulley 10 which carries a series of slot closure elements in the form of closure plates 13, which are spot welded to respective clips 16 in turn secured to respective carrier blocks 20 of keystone shape, having sloped front and rear sides 21 (FIGURE 6).

Referring to FIGURES 3 through 7, the plates 13 will be seen to be bent down slightly at their sides 23 and 26, and to be spot welded as indicated in FIGURE 3 at the points 27 to the clips 16. The bent sides 23 and 26 slant downwardly into side recesses 28 of slot 5 in table 5 (FIGURES 2a and 2b), so that paper stacks can slide crosswise on the table without snagging, the recesses being formed by shoulders 29 extending from the slot sides.

Referring to FIGURE 5, it will be noted that the sides of the clips 16 are slotted 30 to provide tongues 32, 34 and 36. These tongues are clinched against the sides 40 (FIGURE 7) of respective carrier blocks 20 for each plate. Thus, each carrier block as seen in FIGURES 6, 7 and 8 is a solid member having undercuts to provide sloping shoulders 43 on each side thereof with a center notch 46 cut into each shoulder. Respective clips 16 are simply placed over the carrier blocks and the tongues 32 and 36 bent into the undercut as shown in FIGURE 2.

The center tongues 34 are bent into the respective notches 46 which lock the clips to respective blocks. Each carrier block is keystone in shape as seen in FIGURE 6 and has a flat top 50 and an arcuate shoulder 53 on each side.

Accordingly, as illustrated in FIGURES 1, 2, 6 and 7, the composite sub-assembly of a carrier block 20, a plate 13, cables 55 passing through the corner spacing provided between each clip 16 and the respective block 20, wherein the cables rest on the arcuate surfaces of respective shoulders 53.

The symmetrical keystone shape of the carrier blocks 20 is such that they can rest on the surface of the pulley 10 wherein the bottom surfaces 56 of the blocks are contiguous tangentially with the inner periphery 57 of the pulley (FIGURES 1 and 2), and the engaged slanted front and rear surfaces form a continuous semi-circular array.

The arcuateness of the block shoulders 53 is such that they form a continuous half-circle concentric to the pulley 10. Accordingly, when pulley 10 has half its perimeter, as indicated in FIGURE 2b, engaging a series of blocks 20, the cables 55 form a continuous half-circle around the pulley concentric therewith and there is no change in the cable length in the transition from straight to curved condition, an important feature of the invention. The same is true of rear pulley 57, FIGURE 2a.
3. The pulleys are provided with suitable side flanges such as 60, which retain the blocks transversely, as will be clear from consideration of FIGURE 2.

Referring to FIGURE 2a, a diagrammatic illustration therein discloses the back gauge G having the depending arm A 44 which passes below a table T of the machine via the slot S. The pulleys 10 and 57 are disposed at the ends of the slot. The arm A has threaded engagement with the lead screw L for actuation of the gauge. Passing around the pulleys shown by phantom lines are the cables which in double phantom lines indicate that portion of the cables which carries the table blocks 20 with the closure plates 13. Clips 65, to be later described, fasten to the cables at the ends of the series of closure plates. At the front side of the gauge there is a clip 68 which fastens the cables to the gauge. The cable ends are fastened at the rear of the gauge by means of a clip 72, which also includes a tensioning means to be described.

The actual length of cable covered by the closure elements is equal to the length of the slots plus half the periphery of the front pulley 10.

FIGURE 3 illustrates a fragmentary elevation partially in section at the front of the closure plate system, showing transition of the plates from slot S to the pulley 10. It will be noted by comparison of FIGURE 2b with FIGURE 2c that the slot width increases to a width D as it approaches the pulley, the shoulders 29 of the recesses 18 being eliminated in going to provide the full slot width whereby the plates 13 can descend below the cable level on the pulley as they move in the direction of the arrow B (FIGURE 2c).

Similarly, in reversing direction of the plates, they come up flush to the table level through the widened slot before passing into the recessed portion of the slot. The clearance C as shown on FIGURE 2b is provided to insure proper clearance of plates above shoulders 29 and the entrance portion of the shoulder may be sloped as shown at 30 in order to prevent any possible interference with the transverse edges of the plates as they move towards the left as shown on FIGURE 2b.

FIGURE 9 and 10 show plan and elevation views, respectively, of a clip 65 consisting of two pieces which straddle the cables and are secured together as by a bolt 66 for the purpose of effecting a stop at each end of the clips, generally indicated on FIGURE 2a, and which clips maintain the blocks so contiguous to each other as the edges 67 (FIGURE 6), on a straight run and maintain uniform arcuratness around the pulleys.

Referring to FIGURES 11 and 12, the clip 68 is shown as bolted to the bottom of the gauge base, and it will be seen to have a transverse bore 75 through which is looped a single cable which forms the two parallel cables 55 extending forwardly of the gauge to carry the blocks 20. Thus, the cables pass around the front pulley 10 and to the rear pulley 57 (FIGURE 2a), passing around the rear pulley and terminating at the rear of the base plate of the gauge.

FIGURES 13 and 14 show a mode of attachment of the arms 86 at the rear of the gauge. Thus, the elevation view of FIGURE 13 shows the ends of the parallel cables as being clinched in clip 72 consisting of the split portions 78 and 81 having complementary concave and convex portions which form a bight in the cable ends in order to effect secure clamping when the clip portions are fastened as by a bolt 83.

The rear edge of the back gauge may be provided with a single clip 86 suitably apertured for the cables to pass therethrough with compression springs 84 extending between the angle and the clip 72 in order to provide tension on the cable ends to maintain a taut condition therefor. Placement of clip 65 on the cables determines the degree of tension. It should be noted that the bolt 83 extends only through the clip component 78 and 81, and not into the back gauge base so that the clip 72 can be movable with respect to the angle 86 for maintaining tension. A single tension spring arrangement could also be devised in the manner illustrated in my Patent No. 2,881,834.

Having thus described the invention, I am aware that various modifications may be made without departing from the spirit thereof, and accordingly do not seek to be restricted to the precise illustrations herein given except as set forth in the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A cutting machine table having a movable back gauge, and a guide slot in said table in which said back gauge is moved, and a closure device for the slot comprising cable means having ends connected to said back gauge, pulley means disposed below said tables and said cable means passing around said pulley means, a plurality of individual, discrete, plate means, said cable means passing through said plate means and said plate means being carried by said cable means, and means to maintain said plate means in a contiguous array on said cable means for a predetermined length thereof to maintain said plate closed as said back gauge moves, a pair of parallel cables and said plate means comprising block members having recesses through which said plates pass, whereby said block members are supported on said cables, and said plate means further comprising a plurality of plates having clip elements securing said plates to respective blocks, said clip elements being disposed in relation to respective recesses to secure said cables therein.

2. A cutting machine table having a movable back gauge, and a guide slot in said table in which said back gauge is moved, and a closure device for the slot comprising cable means having ends connected to said back gauge, pulley means disposed below said tables and said cable means passing around said pulley means, a plurality of individual, discrete, plate means, said cable means passing through said plate means and said plate means being carried by said cable means, and means to maintain said plate means in a contiguous array on said cable means for a predetermined length thereof to maintain said plate closed as said back gauge moves, said plate means comprising members having curved shoulder means of a radius greater than the radius of said pulley means whereby said shoulder means are concentric of said cable means around said pulley means.

3. A cutting machine table as set forth in claim 2, said members having sloping ends in contiguous end to end array around a portion of said pulley means.

4. A cutting machine table as set forth in claim 3, said pulley means comprising a pulley having a surface contiguous with bottom surfaces of said members, said curved means having a shoulder, said shoulder extending in a continuous half circle, said cable means passing from a straight to a curved condition around said pulley without change in length of the portion passing therearound.

5. A slot closing device for a cutting machine table having a guide slot for a back gauge, comprising a pair of pulleys and means for disposing said pulleys at the ends of a table slot, a pair of parallel cables passing around said pulleys and means for securing the ends of said cables to a back gauge, a series of individual closure plates carried on said cables and means for maintaining said plates on a predetermined portion of the length of said cables disposed and disposed within said slot, a respective carrier block for each of said plates, a clip secured to each of said carrier blocks and forming passages therewith through which said cables pass, said closure plates being secured to respective clips.

6. A slot closing device for a cutting machine table having a guide slot for a back gauge, comprising a pair
of pulleys and means for disposing said pulleys at the ends of a table slot, a pair of parallel cables passing around said pulleys and means for securing the ends of said cables to a back gauge, a series of individual closure plates carried on said cables and means for maintaining said plates on a predetermined portion of the length of said cables and disposed within said slot, said covers plates having downwardly slanted side edges to be disposed below the surface of a table with which said device is used.

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