July 12, 1955 T. N. CARTER 2,712,852

CUTTER UNIT FOR SLITTING MACHINES

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FIG. 1

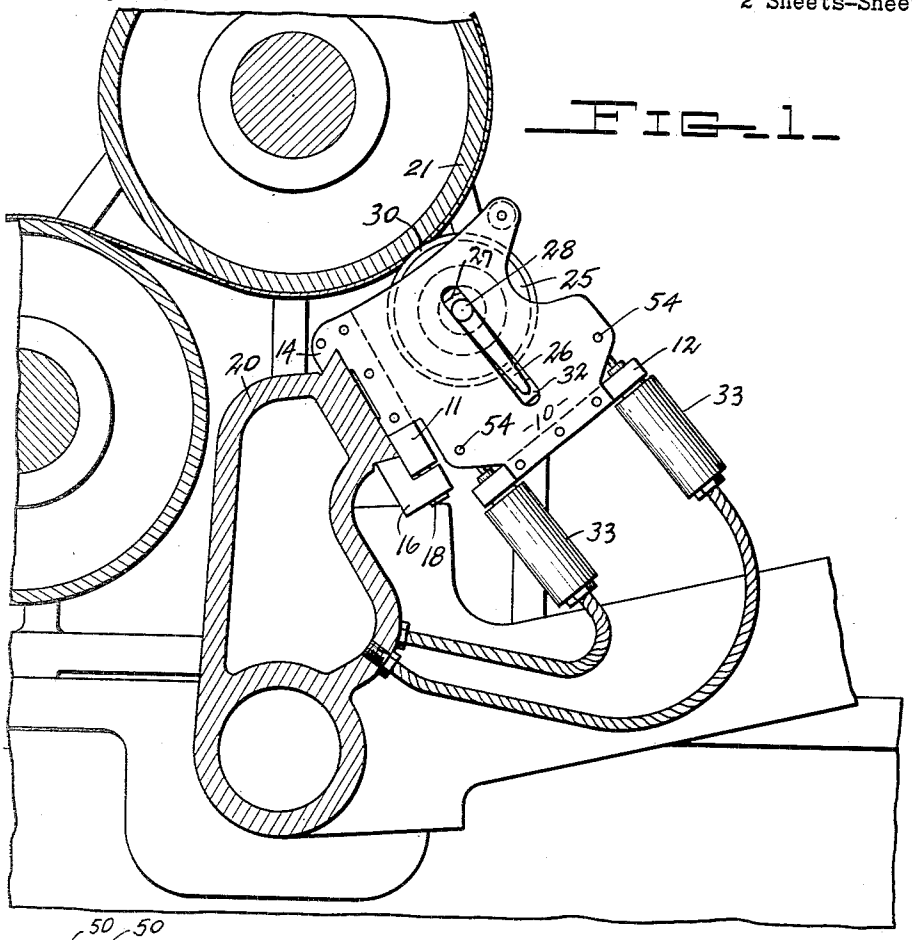
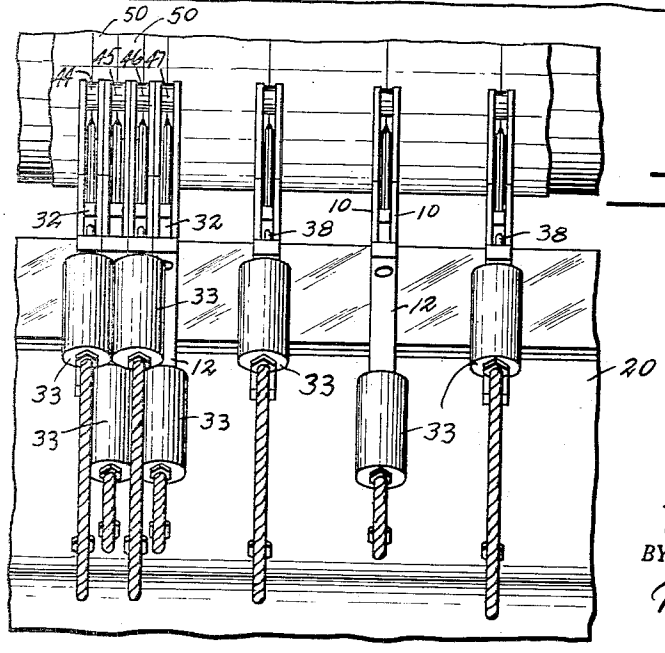


FIG. 2



INVENTOR:
Thomas N. Carter,
BY
Bodell & Thompson,
ATTORNEYS.

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FIG. 3

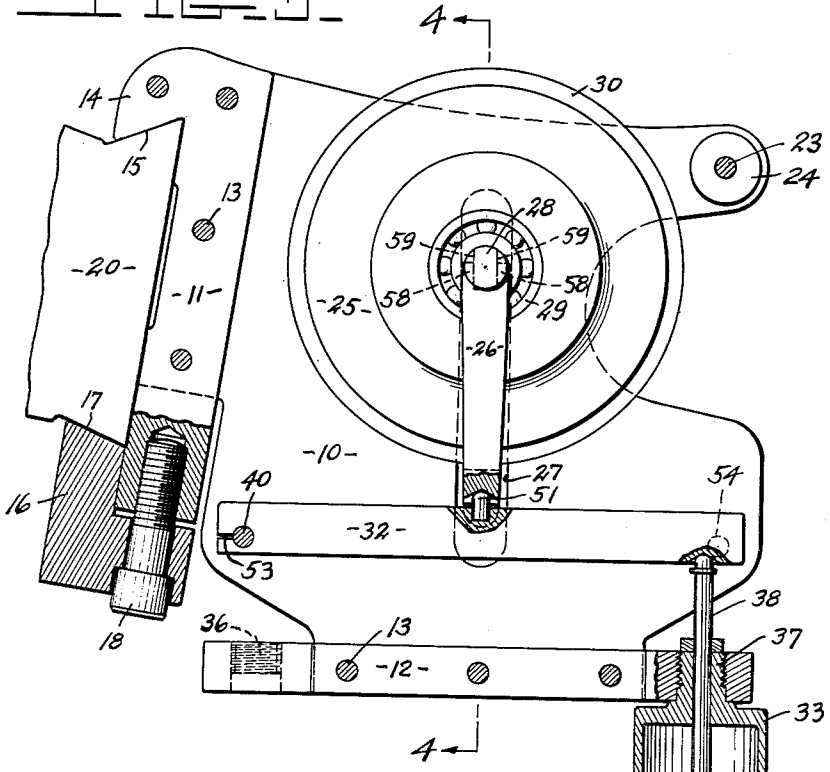


FIG. 4

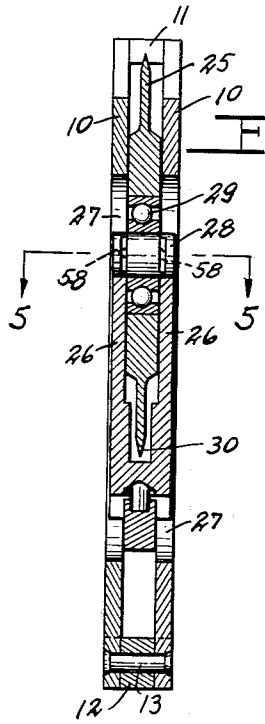
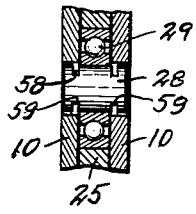


FIG. 5



INVENTOR:
Thomas N. Carter,
BY
Bodell & Thompson
ATTORNEYS.

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2,712,852

CUTTER UNIT FOR SLITTING MACHINES

Thomas N. Carter, Watertown, N. Y., assignor, by mesne assignments, to The Black-Clawson Company, Hamilton, Ohio, a corporation of Ohio

Application July 21, 1951, Serial No. 237,906

4 Claims. (Cl. 164—70)

This invention has to do with a cutter unit for web slitting machines as, for example, machines used for slitting a wide web of paper into narrow widths or strips, the slitting operation usually being performed in connection with rewinding the web, whereby the narrower strips are wound into rolls. These slitting machines include a backing roll over which the web is passed and one or more slitting units, each having journalled therein a slitting wheel arranged in juxtaposition to the backing roll and engaging the same. The slitting wheels function to slit the paper as it is passed over the backing roll. Often the wide web of paper is slit into a plurality of strips and sometimes it is desired to slit the web into very narrow strips. The slitting units, in which the slitting wheels are journalled, are detachably mounted on a suitable support extending parallel to the axis of the backing roll, and the units are secured to the supporting bar and so spaced apart from each other as to slit the paper into strips of the desired width.

The slitting wheels of the unit are yieldingly urged against the backing roll, this being accomplished in some machines by a fluid operated piston and cylinder structure. The units now in use are of substantial width, or of such width that when mounted in adjacency to each other, the minimum width of the slitted strip is in excess of that desired.

This invention has as an object a cutter unit for web slitting machines embodying a structure for rotatably supporting the slitting wheel and being of substantially less width than those heretofore employed whereby, when the units are arranged in close adjacency, the web may be slitted into narrow strips.

The invention has as a further object, a device of the type referred to wherein the slitting wheel support is actuated by a fluid operated piston and cylinder structure embodying an arrangement whereby the piston and cylinder structures may be quickly and conveniently located on the units so that two units can be placed in adjacency without interference by the piston and cylinder structures.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevational view of a cutter unit embodying my invention with adjacent portions of the slitting machine shown in cross section.

Figure 2 is a front elevational view of a plurality of the units mounted on the slitting machine, contiguous portions of which are shown in the view.

Figure 3 is a view of one of the slitting units with one side plate of the body removed and parts shown in section.

Figure 4 is a view taken on line 4—4, Figure 3.

Figure 5 is a fragmentary sectional view taken on line 5—5, Figure 4.

The unit consists of a body member formed with a recess extending inwardly from one side thereof. In the drawings, this body is disclosed as being formed of side plates 10 separated to provide the recess, this separation being effected by a member 11 arranged intermediate the plates 10 at what might be termed the rear edge thereof. A spacer member 12 is positioned between the plates at the lower edge thereof. The side plates 10 are secured together and to the spacer members 11, 12, as by rivets 13. The member 11 is formed adjacent its upper end with a rearwardly extending projection 14 machined to form a V-way 15, and a clamping member 16, machined to form the opposite V-way 17, is detachably mounted on the lower end of the spacer, as by a screw 18. This arrangement is employed to mount the body detachably on the supporting bar 20 extending in juxtaposition to the backing roll 21 of the slitting machine, as will be well understood. This arrangement permits the units to be adjusted lengthwise of the supporting bar 20 and clamped thereto in adjusted position. The side plates 10 are secured together at their upper forward portions by a rivet 23 passing through a spacer 24.

The slitting wheel 25 is journalled in a supporting yoke. This yoke is formed with spaced apart portions between which the slitting wheel is mounted for rotation and these spaced apart portions of the yoke are arranged in registration with, or within the thickness of, the side walls of the recessed body or, as here shown, the side plates 10. Motion transmitting mechanism, including a piston and cylinder assembly, is connected to the supporting yoke to effect movement of the yoke and the cutter wheel journalled therein toward the backing roll 21.

Preferably, the spaced apart portions 26 of the supporting yoke are slidably mounted in slots 27 formed in the side plate 10, the wheel 25 being mounted upon a pin 28 carrying an antifriction bearing 29 and with the ends of the pins positioned in the upper ends of the spaced side portions 26 of the yoke. With this arrangement, the portions 26 are arranged in registration with the side plates 10, or within the thickness thereof, whereby the thickness of the portions 26 is not added to the thickness of the side walls of the recess or, in other words, the side walls of plates 10 are spaced apart a distance only sufficient to accommodate the slitting wheel 25 and permit free rotation thereof. The wheel has a peripheral portion 30 extending outwardly through the open side of the recess beyond the body. The slots 27 are of appreciably greater length than the supporting yoke to permit movement of the same and the slitting wheel toward and from the backing roll 21.

A lever 32 is arranged in the recess of the body and is pivotally mounted at one end thereto. A cylinder and piston assembly 33 is detachably mounted to the body and is cooperable with the free end of the lever to effect pivotal movement thereof, the supporting yoke engaging the lever intermediate its ends.

With the structure described, the unit is only a fraction of an inch in width. Of necessity however, the piston and cylinder assembly 33 is of substantially greater width than the thickness of the unit. Accordingly, if the piston and cylinder assembly of each unit is mounted in the same relative position on the body, these assemblies would interfere and the units could not be placed in close adjacency.

The invention embodies an arrangement by which the piston and cylinder assemblies may be mounted in different positions on each of the bodies, whereby the units

can be located on the supporting bar 20 in close adjacency. The body of the unit, or the bottom spacer 12 is formed with a threaded aperture 36 in proximity to the rear side of the unit, and with a similar aperture arranged at the forward side of the unit. The cylinder 33 is formed with a threaded stem 37 adapted to be screwed into either of the threaded apertures in the member 12. In Figure 3 of the drawings, the cylinder 33 is shown as threaded into the aperture at the forward side of the body, and with the piston rod 38 engaging the forward end of the lever 32, the rear end being pivotally connected to the body, or side plates 10, by a pivot pin 40.

A fluid conduit is connected to the lower end of the cylinder 33, as by being threaded in the aperture 41 to apply fluid pressure to the under side of the piston 42 to effect upward movement thereof which, through the piston rod 38, effects pivotal movement of the lever 32 about the pin 40 and upward movement of the cutter wheel supporting yoke and the cutter wheel 25 carried thereby. As shown in Fig. 2, each piston rod has its axis extending substantially in the plane of the cutter wheel associated therewith.

If it is desired to place two or more of the units in close adjacency, as indicated at 44, 45, 46, 47, in the left portion of Figure 2, the cylinders 33 on alternate units are mounted in the apertures at the forward side of the body, and the cylinders on the intervening units are mounted in the rear apertures 36. That is, the cylinders on adjacent units are staggered, permitting the units to be mounted on the supporting bar 20 with their sides engaging.

With this arrangement, a web can be slit into narrow strips indicated at 50, Figure 2, the width of the strips not exceeding the width or thickness of the individual units and because of the arrangement of the slitting wheel supporting yoke, the thickness of the units is equivalent only to the thickness of the slitting wheel and the side plates 10.

A pin 51 is mounted on the lever 32 intermediate the ends thereof and engages a recess formed in the lower end of the wheel supporting yoke, see Figure 3. This arrangement forms a pivotal connection between the yoke and the lever. One end of the lever is apertured to receive the pivot pin 40 and is formed with a slit 53. The aperture for the pin 40 is reamed to frictionally engage the pin and maintain it in apertures 54 formed in the side plates 10 at the front and rear sides of the body. The under side of the opposite end of the lever 32 is recessed to form a pivot socket for the upper end of the piston rod 38. If it is desired to have the cylinder and piston assembly of a cutter unit arranged in adjacency to the cutter unit shown in Figure 3 positioned at the rear side of the body, the pivot pin 40 is withdrawn from the body, the lever 32 changed end for end, and the pivot pin inserted through the apertures 54 at the forward side of the body and through the aperture of the lever. The cylinder is then threaded into the aperture 36, whereby it is operable to effect pivotal movement of the lever 32 in the same manner. With this structure, the units may be readily changed by the operator to effect the arrangement he desires.

The front ends of the side members 26 of the wheel supporting yoke are recessed to receive the pin 28. The projections 58 on each side of the recess are of reduced thickness, and the pin 28 is formed on opposite sides adjacent each end with notches or slots 59 to receive the projections 58. With this structure, the pin 28 is detachably mounted on the upper end of the wheel supporting yoke, and is held against axial displacement.

The slitting wheel 25, bearing 29 and pin 28, may be separated from the yoke by lifting the wheel assembly upwardly from the yoke, whereupon the pin 28 may be pushed out axially and the wheel removed from the recess in the body for sharpening, or in this manner the wheel can be readily replaced.

What I claim is:

1. A slitting unit for mounting in conjunction with a plurality of identical such units and a backing roll on a machine for slitting web materials to adapt such machine to making closely spaced cuts in such web materials, comprising a main body of substantially greater width from front to back than the thickness thereof, a cutter wheel, means on the back of said body for mounting said body on said machine in predetermined working relation with said backing roll, a support for said cutter wheel mounted on said body for movement with respect thereto carrying said cutter wheel toward and away from said backing roll in the mounted position of said unit, a lever for moving said support, pivot means adjacent one end of said lever, means located at positions adjacent both the front and back of said body for receiving said pivot means in a selected one of said positions with said lever in position to engage said support, a fluid pressure piston and cylinder forming an assembly of greater diameter than the thickness of said body for operating said lever, a piston rod projecting from said cylinder, and means located adjacent both of said pivot receiving means for selectively mounting said cylinder on said body with said piston rod in operating engagement with the opposite end of said lever from said pivot means and with its axis extending substantially in the plane of said cutter wheel to provide for mounting a plurality of said units in such close side by side relation that the respective said cylinders thereon are maintained in overlapping out-of-contact relation with each other by location alternately at the front and back of said plurality of units.

2. A slitting unit for mounting in conjunction with a plurality of identical such units and a backing roll on a machine for slitting web materials to adapt such machine to making closely spaced cuts in such web materials, comprising a hollow main body of substantially greater width from front to back than the thickness thereof, a cutter wheel, means on the back of said body for mounting said body on said machine in predetermined working relation with said backing roll, bearing means for said cutter wheel mounted in said body for movement with respect thereto carrying said cutter wheel toward and away from said backing roll in the mounted position of said unit, a lever for moving said bearing means, pivot means adjacent one end of said lever, means located at positions adjacent both the front and back of said body for receiving said pivot means in a selected one of said positions with said lever in position to engage said bearing means, a fluid pressure cylinder and piston forming an assembly of greater diameter than the thickness of said body for operating said lever, a piston rod projecting from said cylinder, and means located adjacent both of said pivot receiving means for selectively mounting said cylinder on said body with said piston rod in operating engagement with the opposite end of said lever from said pivot means and with its axis extending substantially in the plane of said cutter wheel to provide for mounting a plurality of said units in close side by side relation with the respective said cylinders thereon located alternately at the front and back of said plurality of units and thereby adapted to overlap in out-of-contact relation with each other.

3. A slitting unit for mounting in conjunction with a plurality of identical such units and a backing roll on a machine for slitting web material to adapt such machine to making closely spaced cuts in such web materials, comprising means including a pair of side plates forming a hollow main body of substantially greater width from front to back than the thickness thereof, a cutter wheel, means on the back of said body for mounting said body on said machine in predetermined working relation with said backing roll, a support for said cutter wheel mounted in said body for movement with respect thereto carrying said cutter wheel toward and away from said backing roll in the mounted position of said unit, a lever for

moving said support, pivot means adjacent one end of said lever, means located at positions adjacent both the front and back of said body for receiving said pivot means in a selected one of said positions with said lever extending across said body in position for engagement by an intermediate portion thereof with said cutter wheel support to cause movement of said support in response to movement of said lever, a fluid pressure cylinder and piston forming an assembly of greater diameter than the thickness of said body for operating said lever, a piston rod projecting from said cylinder, a bar secured to said body adjacent said lever and extending from back to front of said body in generally perpendicular relation with the path of said movement of said support, and means located adjacent each end of said bar for selectively mounting said cylinder thereon with said piston rod in operating engagement with the opposite end of said lever from said pivot means and with its axis extending substantially in the plane of said cutter wheel to provide for mounting a plurality of said units in close side by side relation with the respective said cylinders thereon located alternately at the front and back of said plurality of units and thereby adapted to overlap in out-of-contact relation with each other.

4. A slitting unit for mounting in conjunction with a plurality of identical such units and a backing roll on a machine for slitting web materials to adapt such machine to making closely spaced cuts in such web materials, comprising means including a pair of side plates forming a hollow main body of substantially greater width from front to back than the thickness thereof, a cutter wheel, means on the back of said body for mounting said body on said machine in predetermined working relation with said backing roll, yoke means supporting said cutter wheel in said body, slot means in said side plates supporting said yoke means for guided movement in said body carrying said cutter wheel toward and away from said backing roll in the mounted position of said unit, a lever for moving said yoke means, pivot means adjacent one end of said lever, means located at positions adjacent both the front and back of said body for receiving said pivot means in a selected one of said positions with said lever extending across said body in position for engagement by an intermediate portion thereof with said yoke means to cause movement of said yoke means in response to movement of said lever, a fluid pressure cylinder and piston forming an assembly of greater diameter than the thickness of said body for operating said lever, a piston rod projecting from said cylinder, and means located adjacent both of said pivot receiving means for selectively mounting said cylinder on said body with said piston rod in operating engagement with the opposite end of said lever from said pivot means and with its axis extending substantially in the plane of said cutter wheel to provide for mounting a plurality of said units in such close side by side relation that the respective said cylinders thereon are maintained in overlapping out-of-contact relation with each other by location alternately at the front and back of said plurality of units.

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