June 29, 1965 H. A. SCOTT ETAL 3,191,475

SHEAR ASSEMBLY FOR A MOVING WEB

Filed March 18, 1963 4 Sheets-Sheet 1

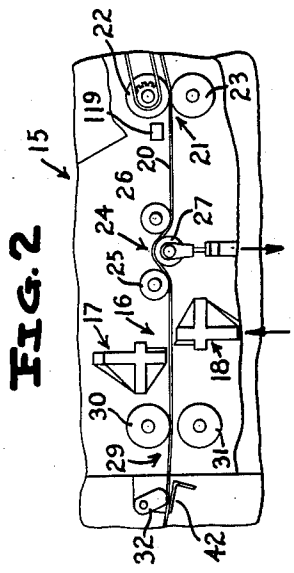


FIG. 2

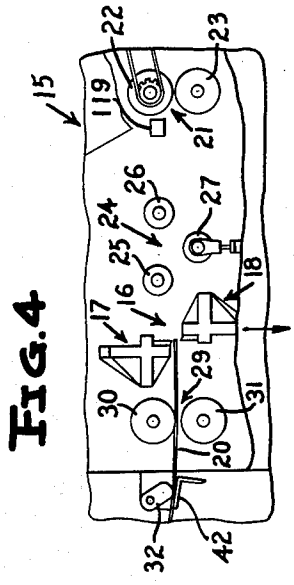


FIG. 4

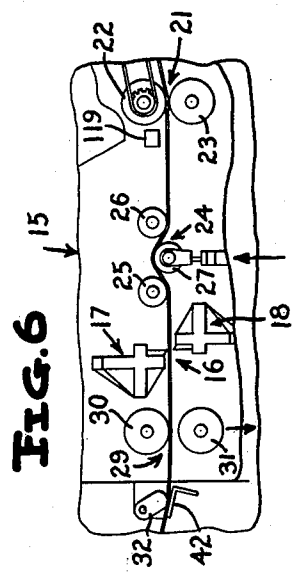


FIG. 6

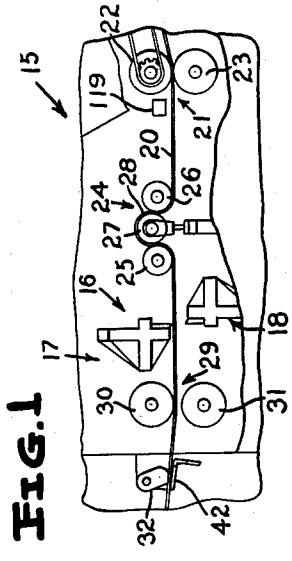


FIG. 1

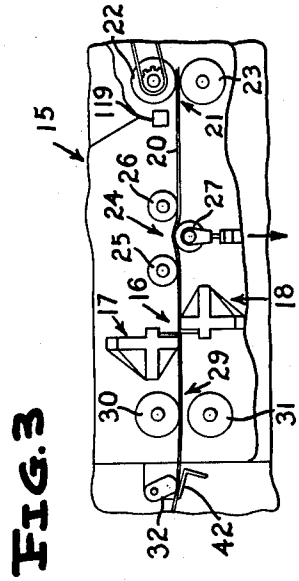


FIG. 3

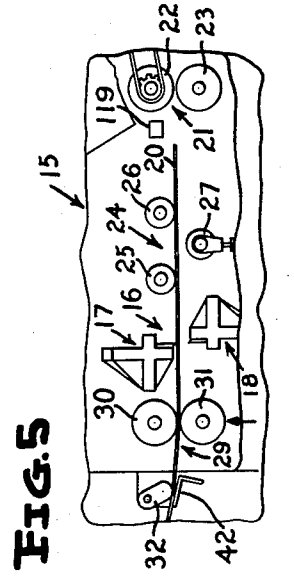


FIG. 5

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June 29, 1965 H. A. SCOTT ETAL 3,191,475

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Filed March 18, 1963 4 Sheets-Sheet 2

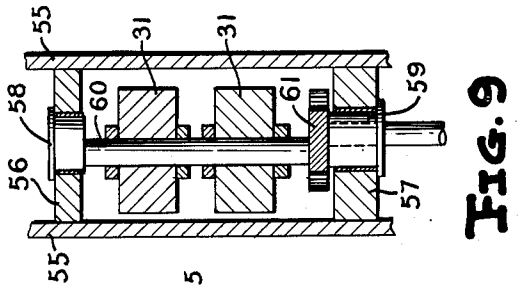


FIG. 9

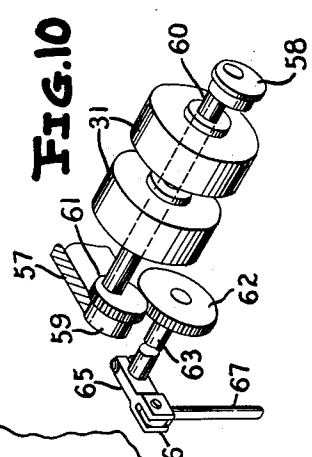


FIG. 10

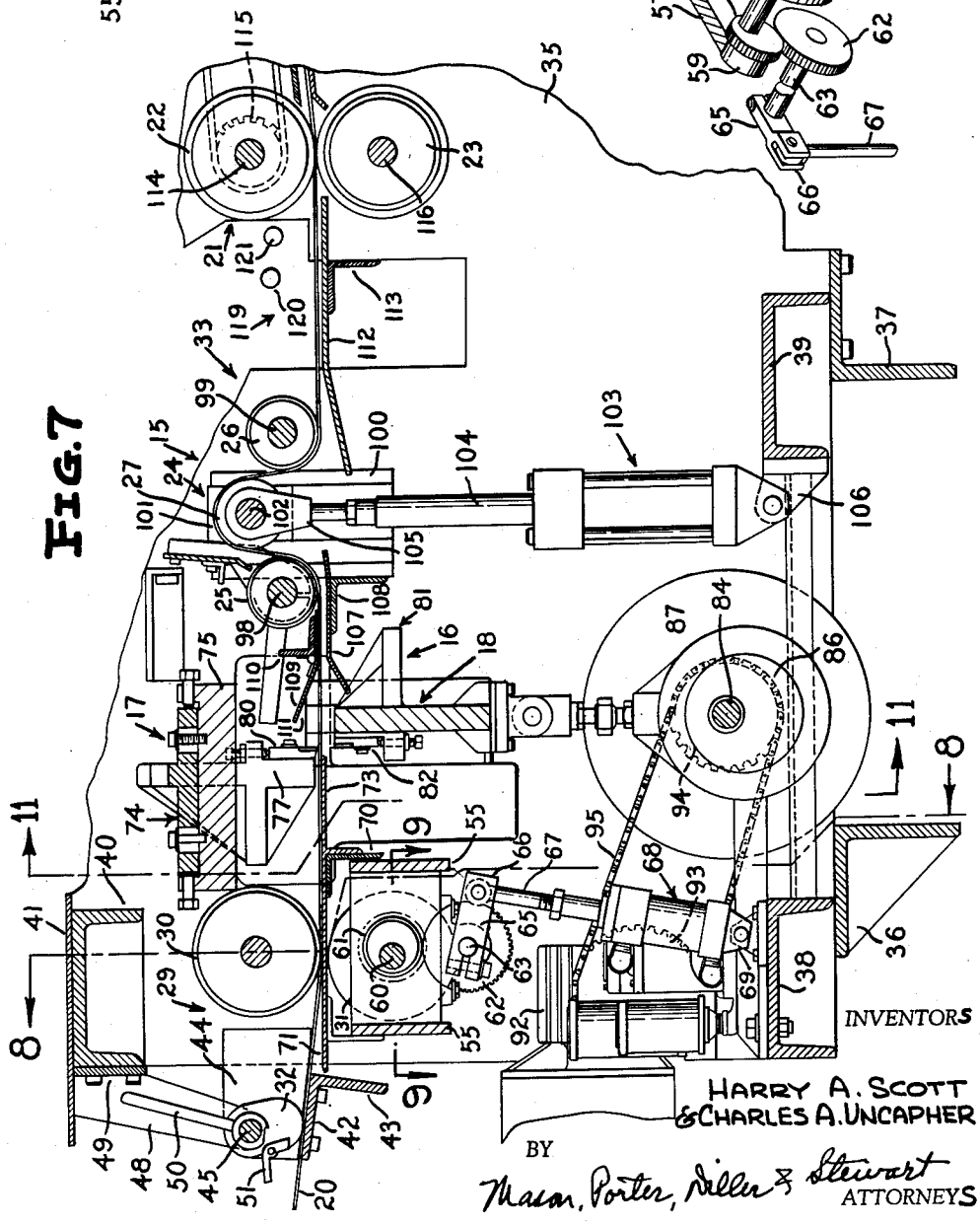


FIG. 7

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June 29, 1965 H. A. SCOTT ETAL 3,191,475

SHEAR ASSEMBLY FOR A MOVING WEB

Filed March 18, 1963 4 Sheets-Sheet 3

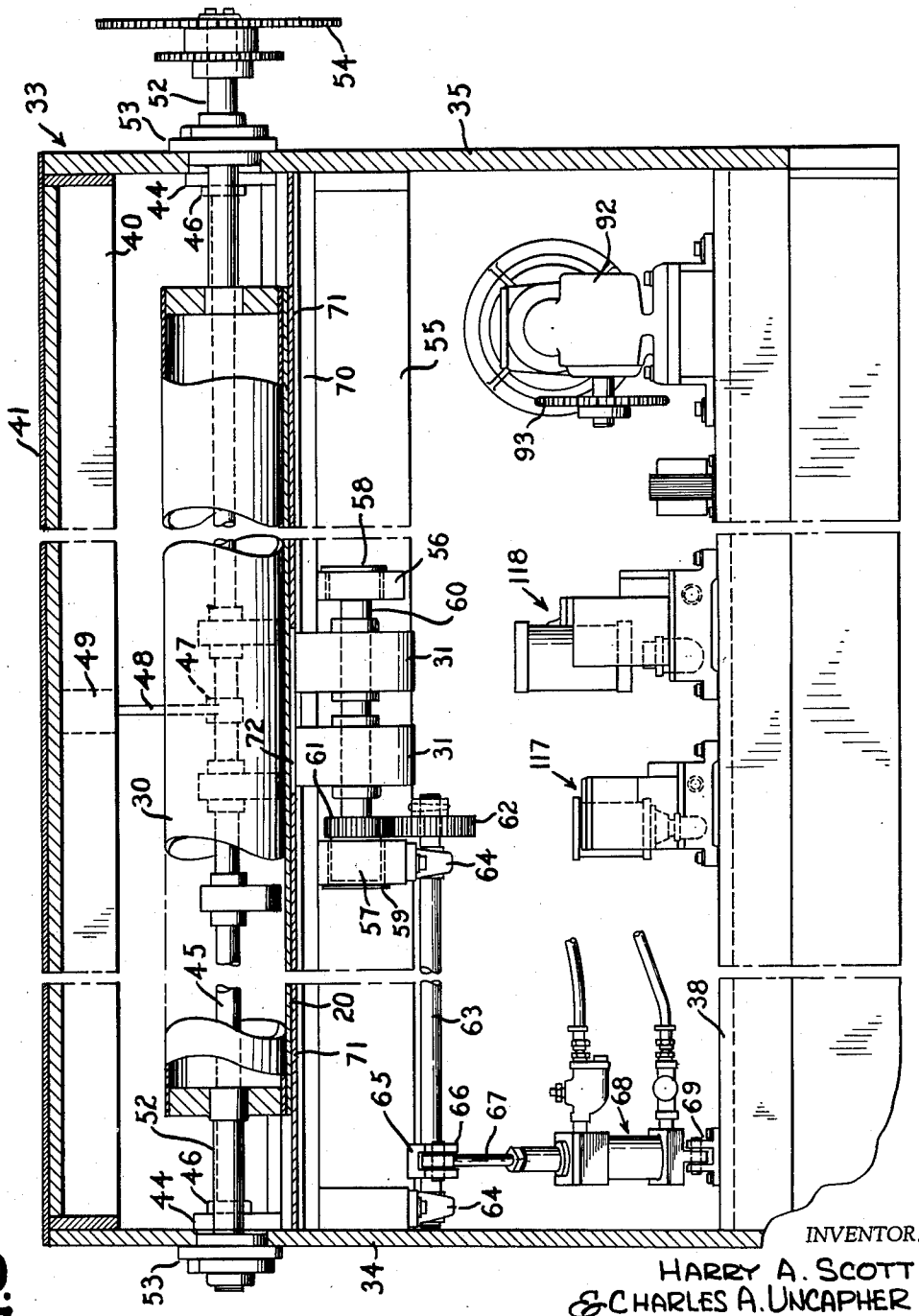


FIG. 8

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June 29, 1965 H. A. SCOTT ETAL 3,191,475

SHEAR ASSEMBLY FOR A MOVING WEB

Filed March 18, 1963 4 Sheets-Sheet 4

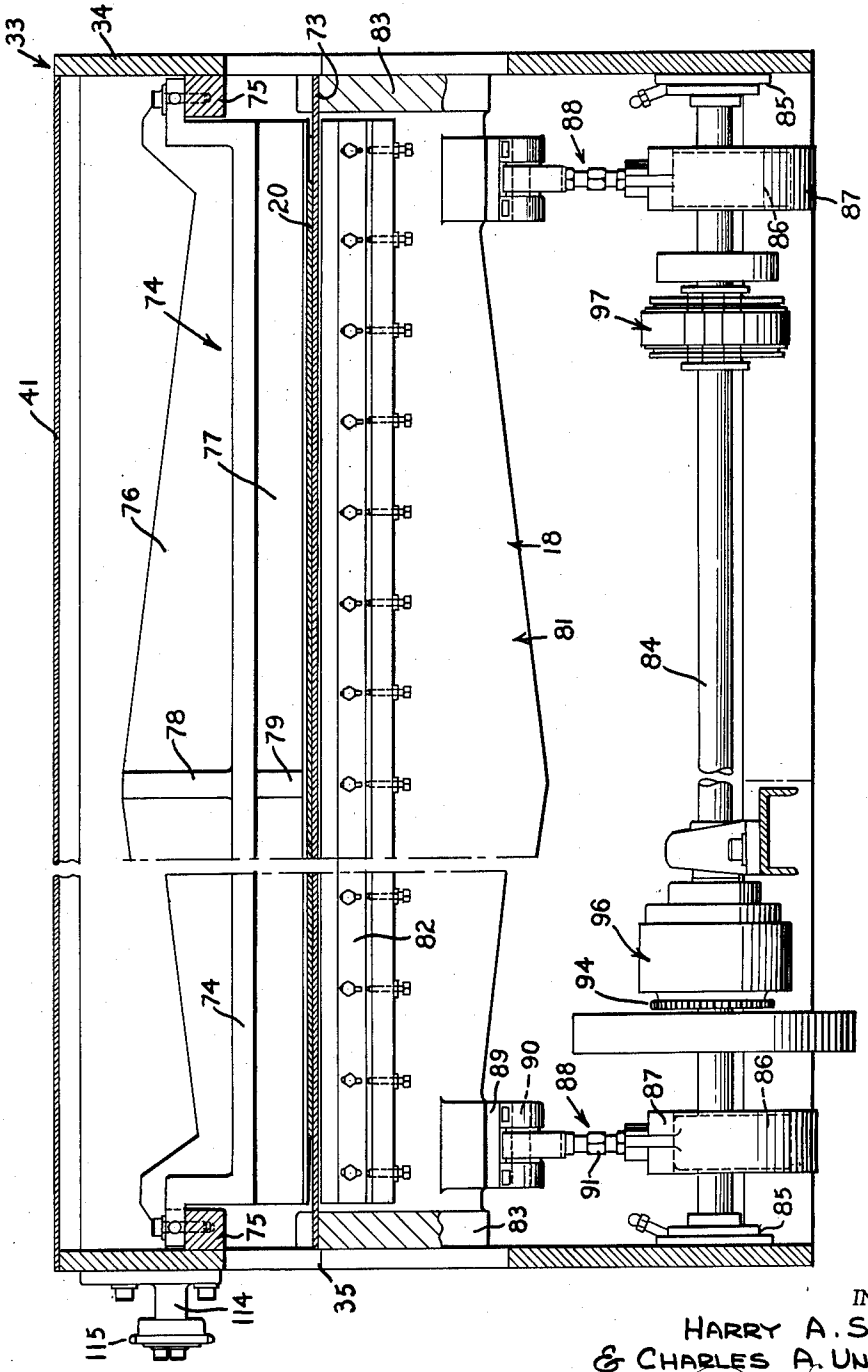


FIG. 11

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United States Patent Office 3,191,475 Patented June 29, 1965

3,191,475

SHEAR ASSEMBLY FOR A MOVING WEB

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Filed Mar. 18, 1963, Ser. No. 265,663
13 Claims. (Cl. 83—155)

This invention relates in general to new and useful improvements in shear mechanisms, and more specifically to a novel shear assembly particularly adapted for shearing a moving web.

In accordance with this invention, it is proposed to utilize a fixedly mounted shear of the type which operates in a plane transversely of a moving web for the purpose of shearing the moving web without any compensation being made in the operation of the shear for the fact that the web is moving. It is proposed to provide suitable web stack storage means which stores a portion of the moving web that is delivered to web feed means at the time the shear is operated so that the portion of the web aligned with and to be sheared by the shear is stationary at the time it is contacted by the shear.

Another object of this invention is to provide a novel shear assembly for a moving web wherein the web is drawn through the shear and there is disposed intermediate the shear and web feed means a web slack storage assembly which is automatically operable to store slack out of the moving web passing through the shear and to automatically discharge the stored web during the operation of the shear at the demand rate of the web feed means whereby the web is constantly moved through the feed means during the initial portion of the shear operation wherein the web, although it continues to move through the feed means at the predetermined rate, is stationary at the shear so that the shear is operative on a stationary web portion.

Another object of this invention is to provide the combination with a shear of the type having a fixed blade and a reciprocating blade, web storage means which includes a pair of spaced web guides and a movable third web guide which, in cooperation with the fixed web guides, serves to form a loop in the moving web, and there being means for simultaneously retracting the third web guide and moving the movable shear blade whereby the stored web portion is delivered at the time the shear is operated wherein the web aligned with the shear remains stationary until it has been severed.

Yet another object of this invention is to provide a novel web feed and shear assembly wherein feed means are normally provided for drawing a web through a shear, there being a web slack providing means disposed intermediate the shear and the feed means, and second feed means for effecting the pushing of the web through the shear to the first mentioned feed means whereby at the start of a web feeding operation, the web is pushed, after which it is drawn with respect to the shear, so that after each shearing operation, the newly formed leading edge of the web may be pushed through the shear for the eventual drawing thereof by the first mentioned feed means.

A further object of this invention is to provide a novel shear assembly for shearing moving webs, the shear assembly being of an extremely simple construction as compared to flying shears and the like and at the same time being operable to assure an easily formed cut transversely of the web with the cut being accurately produced.

A still further object of this invention is to provide a novel method of shearing a moving web utilizing a fixedly mounted shear, the method including the steps

of storing the web intermediate the shear and feed means for the web, and then at the time the shear is being operated, paying out the stored web portion so that the movement of the web at the shear is momentarily discontinued and the shearing operation takes place on a fixed web portion.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings:

In the drawings:

FIGURES 1 through 6 are schematic elevational views showing the various positions of the apparatus of this invention during a sequence of operation.

FIGURE 7 is an enlarged fragmentary longitudinal sectional view taken through the apparatus and shows the specific details thereof.

FIGURE 8 is an enlarged transverse vertical sectional view taken along the line 8—8 of FIGURE 7 and shows specifically the details of the web feed means for initially pushing a web through the shear.

FIGURE 9 is an enlarged fragmentary horizontal sectional view taken along the line 9—9 of FIGURE 7 and shows specifically the mounting of the movable rolls of the feed means.

FIGURE 10 is a fragmentary perspective view of the means for varying the positions of the movable rolls of the feed means of FIGURE 9.

FIGURE 11 is a transverse vertical sectional view taken generally along the line 11—11 of FIGURE 7 and shows specifically the details of the shear.

In order to provide for a full understanding of the purpose and structure of the various parts of the invention, reference is first made to the schematic illustations of FIGURES 1 through 6. The shear assembly, which is generally referred to by the numeral 15, includes a shear, generally referred to by the numeral 16. The shear 16 includes a fixed shear member 17 and a movable shear member 18. A web 20 extends between the shear members 17 and 18 and is adapted to be severed thereby. The web 20 is normally drawn through the shear 16 by web feed means, generally referred to by the numeral 21. The web feed means 21 includes a driven feed roll 22 and a back-up roll 23.

It is to be understood that in accordance with this invention, the web 20 must be stationary at the point of engagement by the shear 16 during a shearing operation. In order to accomplish this, the shear assembly 15 includes a web slack providing device, generally referred to by the numeral 24. The slack providing device 24 is disposed intermediate the shear 16 and the feed means 21, and includes a pair of guide rolls 25 and 26 which are spaced longitudinally of the direction of the movement of the web 20 a distance generally equal to the diameter of one of the guide rolls. A third web guide roll 27 is mounted for movement in between and out from between the guide rolls 25 and 26 with the web 20, as is clearly shown in FIGURE 1, passing under the guide roll 25 up around and over the guide roll 27 and then under the guide roll 26. By moving the guide roll 27 up between the guide rolls 25 and 26, an intermediate loop 28 may be formed in the web 20 for storage purposes between the shear 16 and the feed means 21.

Secondary feed means, generally referred to by the numeral 29, are provided for initially feeding the web 20 through the shear 16, through the slack providing device 24 and in between the feed rolls 22 and 23. The feed means 29 includes a fixedly mounted feed roll 30 and a movable back-up roll 31 which is mounted for movement towards and away from the feed roll 30. Normally, the roll 31 is spaced from the feed roll 30

so that the feed means 29 have no affect on the feeding of the web 20. In this manner, the web 20 is normally drawn through the shear 16 by the feed means 21 and when the leading portion of the web 20 is severed, there will be no feeding of the web by the feed means 29.

Referring now to FIGURE 2, it will be seen that when it is desired to cut the web 20, the shear 16 is actuated to move the lower shear member 18 upwardly, as is shown in FIGURE 2. As the shear member 18 moves upwardly, the third guide roll 27 is permitted to move downwardly so that the slack stored in the web is received by the feed means 21 and the web 20 in the immediate vicinity of the shear 16 is stationary during the shearing operation.

When the leading portion of the web has been sheared by the shear 16, it is continued to be fed by the feed means 21 while the trailing portion remains stationary. The backward movement of the portion of the web which has not passed through the shear 16 is restricted by a plurality of dogs 32 so that the unsevered portion of the web remains stationary and ready for further advancement when called for.

Referring now to FIGURE 2, it will be seen that as the movable shear member moves upwardly the third web guide 27 is in the process of moving downwardly so that the movement of the web 20 past the shear 16 is stopped. This continues until the elements of the shear assembly 15 are brought into engagement with the web and serve to sever the web. The severed web is then drawn out of the apparatus, which is the subject of this invention, by the web feed means 21, as is clearly shown in FIGURE 4. The movable back-up rolls 31 of the feed means 29 are then lifted for cooperation with the fixed feed roll 30 to effect the feeding of the newly formed leading edge of the web through the shear 16, the slack providing device 24 and the feed means 21, as is clearly shown in FIGURE 5.

Reference is now made to FIGURE 6 wherein it will be seen that as the web is fed through the slack providing device 24, slack is accumulated so as to be available for paying out to the feed means 21 at the time of the shearing operation.

Referring now to FIGURES 7, 8 and 11 in particular, it will be seen that the shear assembly 15 includes a frame, generally referred to by the numeral 33. The frame 33 consists primarily of a pair of side plates 34 and 35 which are connected together at the lower edges thereof by means of a pair of transverse supports 36 and 37. The side plates 34 and 35 also have the lower portions thereof connected together by lower transverse frame members 38 and 39 which are of inverted channel configurations. The upper portions of the plates 34 and 35 are connected together by upper transverse frame members of which only one transverse frame member 40 is shown. A cover plate 41 extends over the top of the apparatus of the shear assembly 15 between the side plates 34 and 35.

The web 20 is received in the shear assembly 15 over a generally horizontal flange 42 of an angle member 43 which is supported by a pair of brackets 44 extending to the left from the side plates 34 and 35. The flange 42 has associated therewith the anti-back-up dogs 32 which are mounted on a transverse shaft 45 which has the ends thereof suitably journalled in bearings 46 shown in FIGURE 8. The shaft 45 is supported intermediate its ends by means of a bearing 47 supported by a depending arm 48 secured by means of a bracket 49 to the upper transverse frame member 40.

The anti-back-up dogs 32 are normally engaged by gravity with the upper surface of the moving web 20 and have a tendency to clamp the web 20 against the horizontal flange 42 in the event there is any backward movement of the web 20. The shaft 45 carries a dog releasing lever 50 which is engageable with a catch member 51 carried by each dog 32, as is clearly shown in FIGURE 7.

After the web 20 passes over the horizontal flange 42, it passes in between the rolls of the feed means 29. The driven roll 30 of the feed means 29 is carried by a shaft 52 which is journalled in suitable bearings 53 carried by the side plates 34 and 35. The shaft 52 extends beyond the side plate 35 and the outer end thereof is provided with a drive sprocket 54. The feed roll 30, as is clearly shown in FIGURE 8, extends a major portion of the width of the frame 33.

The previously described movable feed roll 31 is actually in the form of a pair of feed rolls which are relatively narrow and engage only the central portion of the feed roll 30. In order to facilitate the mounting of the feed rolls 31, the frame 33 includes a pair of transversely extending plates 55, as is generally shown in FIGURES 7 and 9. The plates 55 have extending therebetween support plates 56 and 57. The plate 56 has rotatably journalled therein an eccentric mount 58 while a similar eccentric mount 59 is journalled in the plate 57. A shaft 60 extends between and is preferably secured to the mounts 58 and 59 for swinging or rotatable movement therewith. The feed rolls 31 are rotatably journalled on the shaft 60.

It will be readily apparent that due to the eccentric construction of the mounts 58 and 59, the position of the shaft 60 may be varied relative to the shaft 52 so that the feed rolls 31 may be moved between a position cooperating with the feed roll 30 and a position widely spaced from the feed roll 30 wherein there is no web feeding cooperation between the rolls.

In order to effect a change in the position of the shaft 60, the eccentric mount 59 is provided with a gear 61 with which there is meshed a gear 62. The gear 62 is secured to one end of a shaft 63 which is rotatably journalled in a pair of bearings 64 carried by the plates 55. The shaft 63 is provided adjacent one end thereof with a crank arm 65 which has a bifurcated end 66 is which there is secured an end of a piston rod 67 of a double acting fluid motor 68. The fluid motor 68 is of a conventional type and is provided with a pivotal mount 69 carried by the frame member 38. The fluid motor 68 will be operated in a manner to be described hereinafter to effect the shifting of the shaft and the movement of the feed rolls 31 between operative and inoperative positions.

The plates 55 have angle brackets 70 secured to upper portions thereof with the angle brackets 70, in turn, supporting a guid plate 71 for the web 20. The feed rolls 31 are adapted to extend through an opening 72 in the plate 71, as is clearly shown in FIGURE 8. An angle guide member 73 is carried by one of the angle members 70 and has an upper flange which serves as an extension of the plate 71 to effect the supporting and guiding of the web 20 intermediate the feed means 29 and the shear 16.

The fixed member 17 of the shear 16 includs a generally U-shaped frame 74 which is carried by a pair of U-shaped brackets 75 secured to the inner face of the side plates 34 and 35, as is clearly shown in FIGURES 7 and 11. Suitable fastening means are carried by the ends of the frame 74 and the brackets 75 to effect the desired centering of the frame 74. The frame 74 includes an upper reinforcing web 76 and a lower reinforcing web 77 which are reinforced in the central portions thereof by means of integral gussets 78 and 79, respectively. The lower reinforcing web 77 has secured to the side thereof a fixed upper knife blade 80 which is adjustably mounted.

The movable shear member 18 includes a rigid frame 81 which is substantially of the same construction as the frame 74, but is supported in an inverted position. The frame 81 supports a lower knife blade 82 which is mounted in the same manner as is the knife blade 80 and in opposed cooperating relation.

The ends of the frame 81 of the movable shear member 18, in lieu of being vertically offset as are the ends of the frame 74, are mounted in suitable guides 83 carried by the

inner faces of the side plates 34 and 35 to restrict the movement thereof to vertical movement.

In order to effect the reciprocatory movement of the shear member 18, there is carried by the frame 33 a lower shaft 84 which has the ends thereof rotatably journalled in bearings 85 carried by the side plates 34 and 35. The shaft 84 is provided adjacent the bearings 85 with eccentrics 86 having engaged therewith yokes 87 which are parts of connecting rods, generally referred to by the numeral 88. Each connecting rod 88 is provided at the upper end thereof with a bracket 89 which is rigidly secured to the frame 81 and which is connected to the connecting rod 88 by means of a pin 90. The intermediate portion of the connecting rod 88 is of an adjustable length and includes a turn buckle type assembly 91 to facilitate this adjustment and thus accurate control of the movement of the knife blade 82 relative to the knife blade 80.

The shaft 84 is driven by a power unit 92 which may be of the variable speed type and which has a drive sprocket 93. The drive sprocket 93 is aligned with a sprocket 94 and is drivingly connected thereto by means of a drive chain 95. The sprocket 94 is part of a conventional single revolution clutch assembly 96 which is of the electrically controlled type. Normally, the shaft 84 is stationary and rotation thereof is accomplished only by energizing the clutch 96. It is highly desirable that the rotation of the shaft 84 in any single rotation thereof be limited to exactly one complete cycle of rotation. To this end, although the electric clutch 96 has been provided, the shaft 84 is also provided with a conventional electric brake 97 which serves to instantaneously stop the rotation of the shaft 84 when the clutch 96 is disengaged. If it is so desired, the brake 97 may be provided with the same control means as the clutch 96 so that when the electric clutch 96 is energized, the brake 97 will be de-energized, and the brake 97 is energized when the electric clutch 96 is de-energized.

The guide rolls 25 and 26 of the slack providing device 24 are carried by shafts 98 and 99 which are suitably supported by the side plates 34 and 35. The side plates 34 and 35 are provided with vertically disposed guideways 100 intermediate the guide rolls 25 and 26. The guideways 100 receive guide blocks 101 disposed at opposite ends of a transverse shaft 102 on which the third guide roll 27 is journalled.

The guide roll 27 is vertically reciprocated by means of a double-acting fluid motor 103 which includes a piston rod 104. A connecting type fitting 105 is adjustably secured to the upper end of the piston rod 104 and is secured to the shaft 102. The lower end of the fluid motor 103 is pivotally supported by a bracket 106 carried by the transverse frame member 39.

In order to facilitate the feeding of the web 20 through the shear 16 below the guide roll 25 and over the guide roll 27, there is provided a lower web guide 107 which is supported by a transverse angle member 108. An upper web guide 109 cooperates with the web guide 107 and is supported by a transverse angle member 110. A portion of the web guide 109 is hingedly mounted so that it, in combination with a diverging portion of the web guide 107, defines a wide entrance opening 111 to assure passage of the leading edge of the web 20 between the web guides 107 and 109.

After the leading edge of the web 20 initially passes over the lowered guide roll 27, it is guided into the feed means 21 by means of a web guide plate 112 supported by a transverse angle member 113. After the leading edge of the web 20 passes over the guide 112, it passes between the feed rolls 22 and 23. The feed roll 22 is carried by a shaft 114 which is suitably journalled for rotation in bearings (not shown) carried by the side plates 34 and 35. One end of the shaft 114 projects through the side plate 35 and is provided with a drive sprocket 115. The feed roll 23, which is actually a back-up roll, is carried by a shaft 116 which is suitably supported by the side plates 34 and 35.

Referring now to FIGURE 8, it will be seen that the frame 33 supports a pair of electrically operated control valves 117 and 118 for the fluid motors 68 and 103, respectively. The control valves 117 and 118 are conventional valves and may be actuated by any desired type of operator.

In order to provide for the automatic operation of the shear assembly 15, a web detector 119 is provided adjacent the feed means 21. The web detector is preferably of the photocell type and, as is schematically illustrated in FIGURE 7, includes a light source 120 and a pick-up head 121. The position of the web detector 119 may be varied from that shown in FIGURE 7.

Referring now to FIGURE 1, it will be seen that the web 20 is drawn between the inoperative feed means 29, and through the shear 16 and the slack providing device 24 by the feed means 21 which are of the pulling type. Suitable control means are actuated to effect the operation of the electric clutch 96 and the electric brake 97. These same control means normally also operate the control valve 118 so as to effect the movement of the piston rod 104 and the guide roll 27 carried thereby downwardly. The control means may be of any type including a manual device, a device which is operated by a web length measuring device, or a detector for markings on the web. The manner in which the electric clutch 96 is energized and the operation of the fluid motor 103 is initiated is not, in itself, a part of this invention. At this time, it is pointed out that it is possible to provide control means on the shaft 84 for operating the control valve 118 so that the operation of the fluid motor 103 has a slight time delay as compared to the energization of the electric clutch 96.

When the electric clutch 96 is energized, the movable shear member 18 begins its upward movement. When the fluid motor is actuated, the guide roll 27 is moved downwardly so that as the guide roll moves down, the shear member 18 moves up. The rate of movement of the guide roll 27 downwardly is controlled so that the amount of web delivered by the slack providing device 24 is equal to that which is fed by the feed means 21. As a result, the movement of the web 20 at the shear 16 stops and the web remains stationary at the time the shear member 18 engages the web 20 and cooperates with the shear member 17 to sever the web. After the web has been severed, the third web guide 27 continues to move downwardly to a position below the normal straight path of the web 20, as is clearly shown in FIGURE 4. At the same time, the trailing edge of the web 20 is fed through the feed means 21 and the severed portion of the web is utilized in any desired manner.

At the termination of the web severing operation, the feeding of the web 20 is again initiated in any desired manner, including manually operable means, through the operation of the valve 117 to effect the operation of the fluid motor 68 in a manner wherein the feed roll 31 is moved up into cooperating relation with respect to the feed roll 30, which is driven. At this time it is pointed out, as is clearly shown in FIGURE 4, that the web 20 remains between the feed rolls 30 and 31 at all times and when the feed rolls 30 and 31 cooperate, they function to push the newly formed leading edge of the web 20 through the shear 16, through the slack providing device 24 and between the feed rolls 22 and 23. As the leading edge of the web 20 approaches the feed rolls 22 and 23, it is detected by the web detector 119 and the valves 117 and 118 are actuated so as to lower the feed roll 31 and to move the third web guide 27 upwardly between the web guides 25 and 26. This sequence of operation is clearly shown in FIGURES 5 and 6.

At this time it is pointed out that depending upon the position of the web detector 119, it may be desirable to provide a slight time delay in the electric circuit leading to the valves 117 and 118 to assure the engagement of the web 20 by the feed rolls 22 and 23 before the valves

117 and 118 are actuated. Also, it is pointed out at this time that, if so desired, the web detector 119 could also be utilized in shutting down the drive mechanism of the shear assembly when the trailing edge of the severed portion of the web passes the web detector and the web is no longer aligned with the web detector.

It will be readily apparent that through the provision of simple means to effect the feeding of the web and means for storing slack in the moving web, a conventional reciprocating fixedly mounted shear may be utilized for the purpose of severing lengths of a web moving at a high speed. Thus complicated flying shears and other expensive shear mechanisms are eliminated.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor modifications may be made in the shear assembly within the spirit and scope of the invention, as defined in the appended claims.

We claim:

1. A method of shearing a moving portion of a web utilizing a fixedly mounted shear comprising the steps of initially forcing a free end of the web through the shear, then drawing the web through the shear while discontinuing the forcing of the web, storing a portion of the moving web, and at the time of shearing stopping the movement of the web at the shear by paying out the stored web portion in accordance with the movement of the web.

2. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, second web feed means intermittently operable to advance a newly formed web leading edge through said shear and said web slack providing means to the first mentioned web feed means in timed relation to the operation of said web slack providing means.

3. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, second web feed means intermittently operable to advance a newly formed web leading edge through said shear and said web slack providing means to the first mentioned web feed means in timed relation to the operation of said web slack providing means, said second feed means including a fixedly mounted rotatable feed roll and a cooperating movably mounted rotatable feed roll.

4. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, second web feed means intermittently operable to advance a newly formed web leading edge through said shear and said web slack providing means to the first mentioned web feed means in timed relation to the operation of said web slack providing means, said second feed means including a fixedly mounted rotatable feed roll and a cooperating movably mounted rotatable feed roll, and means for moving said movably mounted feed roll into cooperating relation with respect to said fixedly mounted feed roll to initiate web feed, and means for automatically retracting said movably mounted feed roll after feeding of the web to said first mentioned web feed means is assured.

5. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, second web feed means intermittently operable to advance a newly formed web leading edge through said shear and said web slack providing means to the first mentioned web feed means in timed relation to the operation of said web slack providing means, said second feed means including a fixedly mounted rotatable feed roll and a cooperating movably mounted rotatable feed roll, said movably mounted feed roll being carried by a shaft having eccentric mounts, said mounts being connected by said shaft for rotation in unison, and means directly connected to one of said mounts for directly rotating said one mount and for rotating the other of said mounts through said shaft.

6. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, said web slack providing means including a pair of web guides spaced longitudinally of said web path, and a third web guide disposed intermediate said pair of web guides and movable generally normal to said web path to form in cooperation with said pair of web guides a web loop of a size to provide the amount of web fed by said feed means during said shear operation, said third web guide having connected thereto support means for effecting the projection and retraction thereof, means connected to said support means for effecting the retraction of said third web guide in timed relation to the operation of said shear, and other means for effecting the projection of said third web guide after a newly formed web leading edge is engaged with said web feed means.

7. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, said web slack providing means including a pair of web guides spaced longitudinally of said web path, and a third web guide disposed intermediate said pair of web guides and movable generally normal to said web path to form in cooperation with said pair of web guides a web loop of a size to provide the amount of web fed by said feed means during said shear operation, said third web guide having connected thereto support means for effecting the projection and retraction thereof, means connected to said support means for effecting the retraction of said third web guide simultaneous with the operation of said shear, and other means for effecting the projection of said third web guide after a newly formed web leading edge is engaged with said web feed means.

8. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, said web slack providing means including a pair of web guides spaced longitudinally of said web path, and a third web guide disposed intermediate said pair of web guides and movable generally normal to said web path to form in cooperation with said pair of web guides a

web loop of a size to provide the amount of web fed by said feed means during said shear operation, second web feed means intermittently operable to advance a newly formed web leading edge through said shear and said web slack providing means to the first mentioned web feed means in timed relation to the operation of said web slack providing means, said second feed means including a fixedly mounted rotatable feed roll and a cooperating movably mounted rotatable feed roll.

9. The shear assembly of claim **8** wherein said third web guide has connected thereto support means for effecting the projection and retraction thereof, means connected to said support means for effecting the retraction of said third web guide in timed relation to the operation of said shear, and other means for effecting the projection of said third web guide after a newly formed web leading edge is engaged with said web feed means.

10. The shear assembly of claim **8** wherein said third web guide has connected thereto support means for effecting the projection and retraction thereof, means connected to said support means for effecting the retraction of said third web guide simultaneous with the operation of said shear, and another means for effecting the projection of said third web guide simultaneous with the retraction of said movably mounted feed roll.

11. A shear assembly for a moving web comprising a shear fixedly mounted along a path of web movement, web feed means for drawing a web through said shear, and web slack providing means disposed intermediate said shear and said web feed means for automatically supplying the web to said web feed means with said web being stationary at said shear at the time of operation of said shear, said web slack providing means including a pair of web guides spaced longitudinally of said web path, and a third web guide disposed intermediate said pair of web guides and movable generally normal to said web path to form in cooperation with said pair of web guides a

web loop of a size to provide the amount of web fed by said feed means during said shear operation, means connected to said third web guide slack storage for reciprocating said third web guide between a position wherein said third web guide overlaps said first and second web guides and a web releasing position remote from said first and second web guides, intermittently operated second web feed means in advance of said shear, and means for initiating the operation of said second web feed means only when said shear is open and said third web guide is in the web releasing position thereof.

12. The apparatus of claim **11** wherein said third web guide reciprocating means is operable to move said third web guide to the slack storage position only after a free end of a web is engaged by said second feed means.

13. The apparatus of claim **11** wherein said third web guide reciprocating means is in the form of a reciprocating shaft supporting said third web guide.

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