Feb. 1, 1955

N. P. BEDSON

2,701,016

ROTARY FLYING SHEAR MECHANISM FOR ROD ROLLING MILLS OR THE LIKE

Filed May 31, 1949

4 Sheets-Sheet 1

Fig.1.

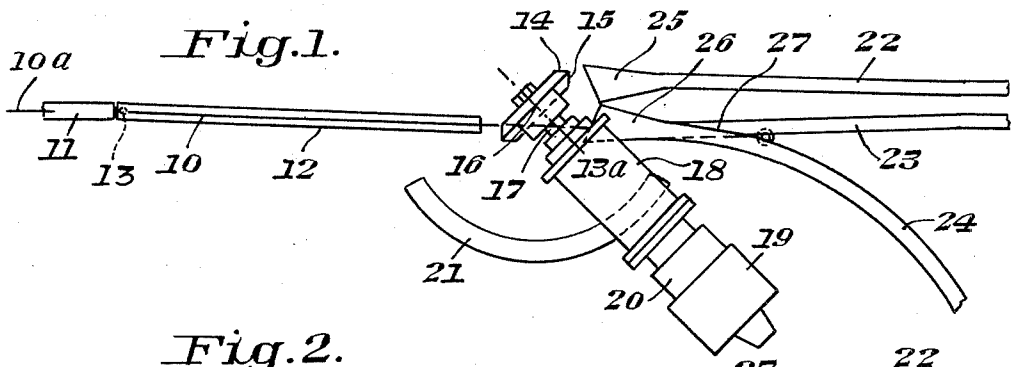


Fig.2.

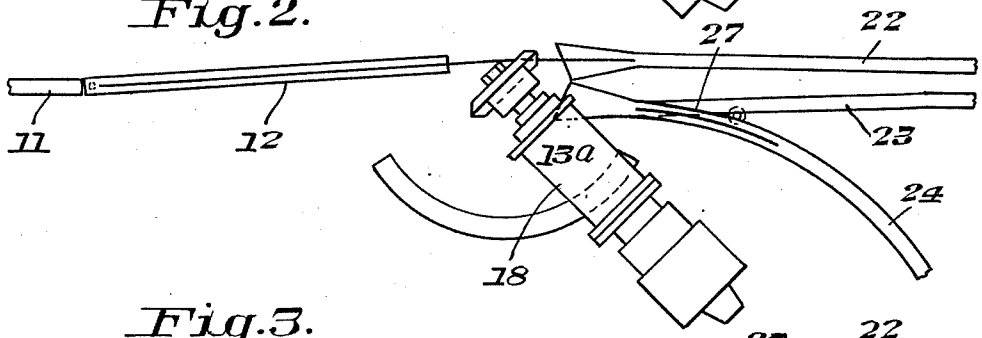


Fig.3.

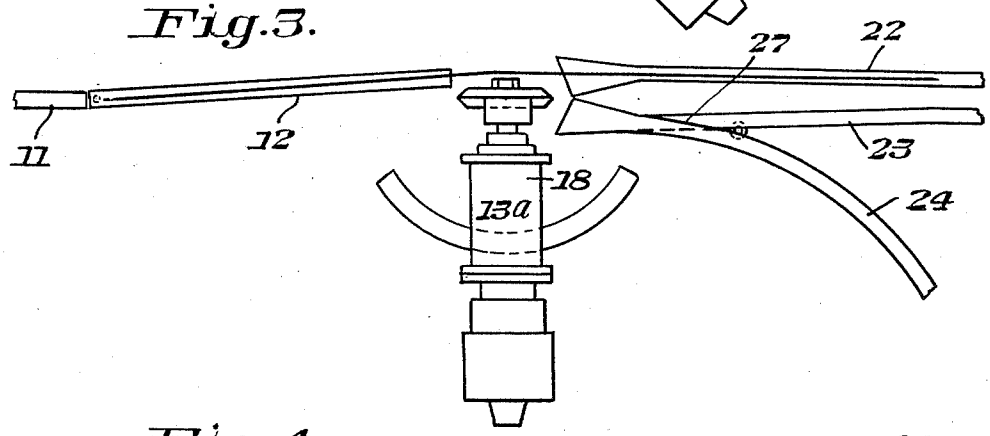
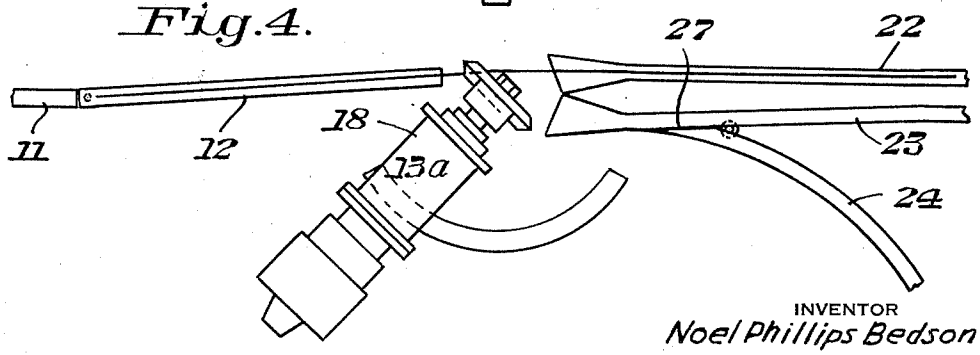


Fig.4.



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Fig. 5.

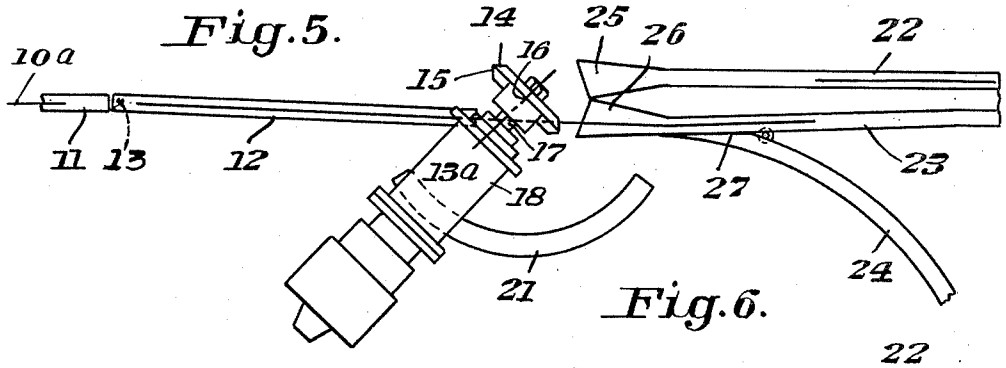


Fig. 6.

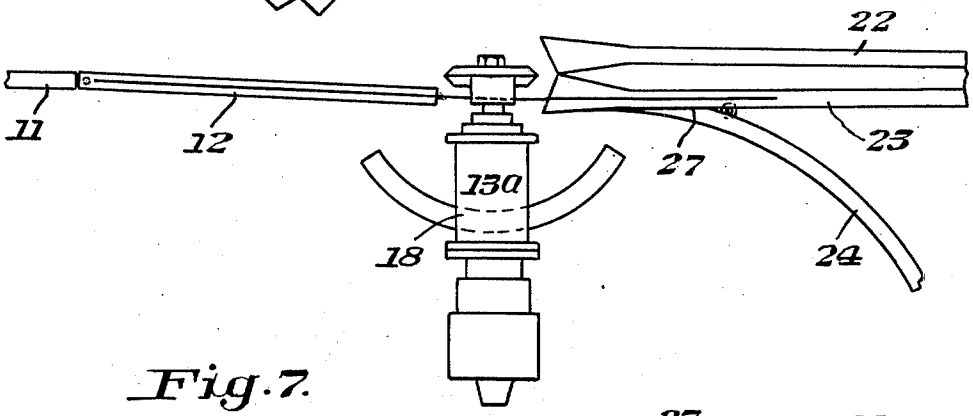


Fig. 7.

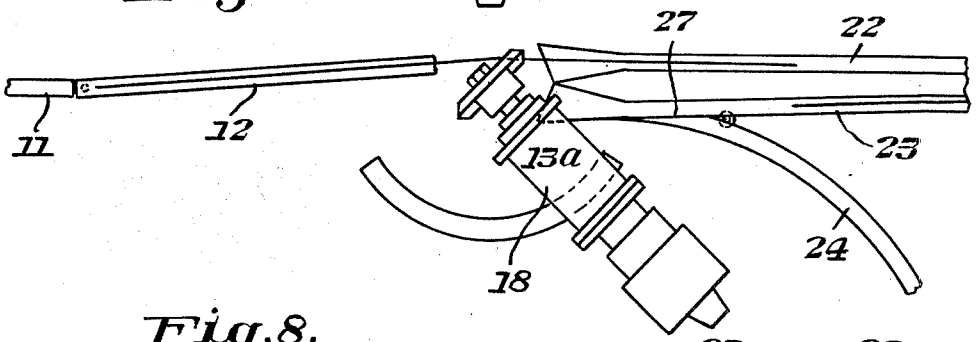
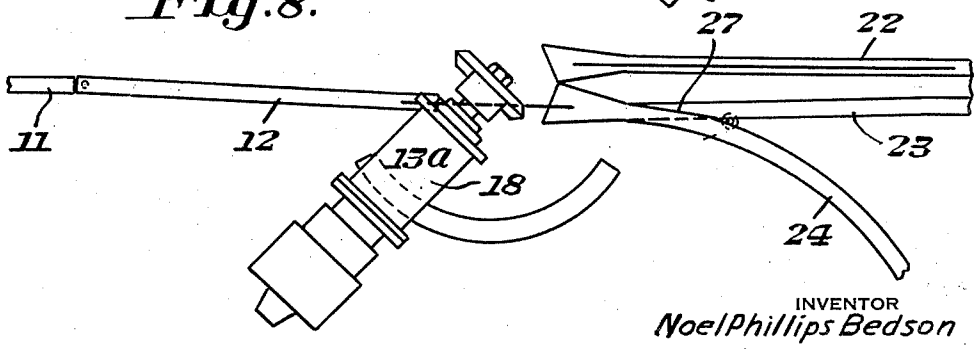


Fig. 8.



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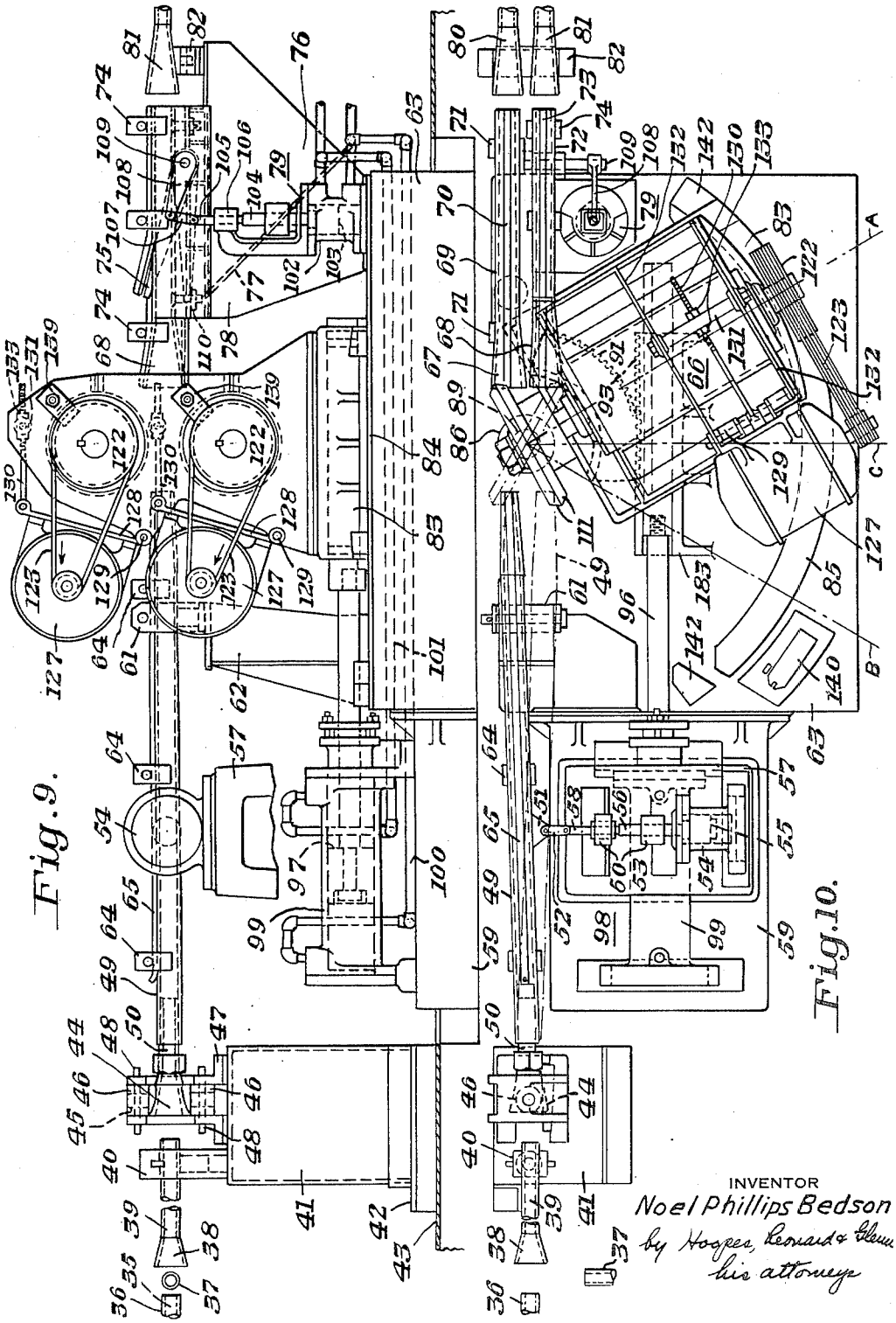


Fig. 9.

Fig. 10.

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ROTARY FLYING SHEAR MECHANISM FOR ROD ROLLING MILLS OR THE LIKE

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Fig. 12.

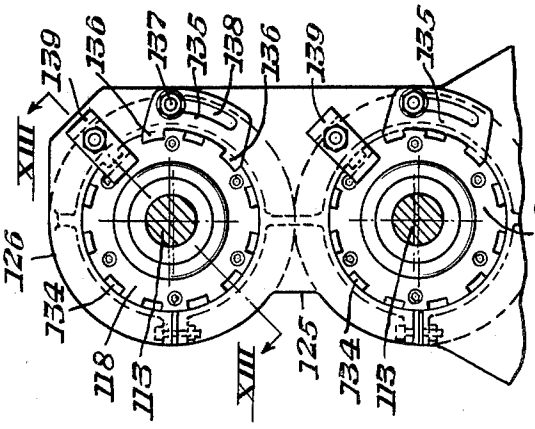


Fig. 13.

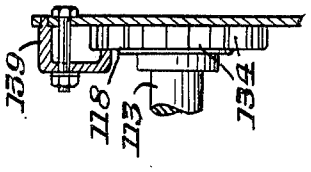
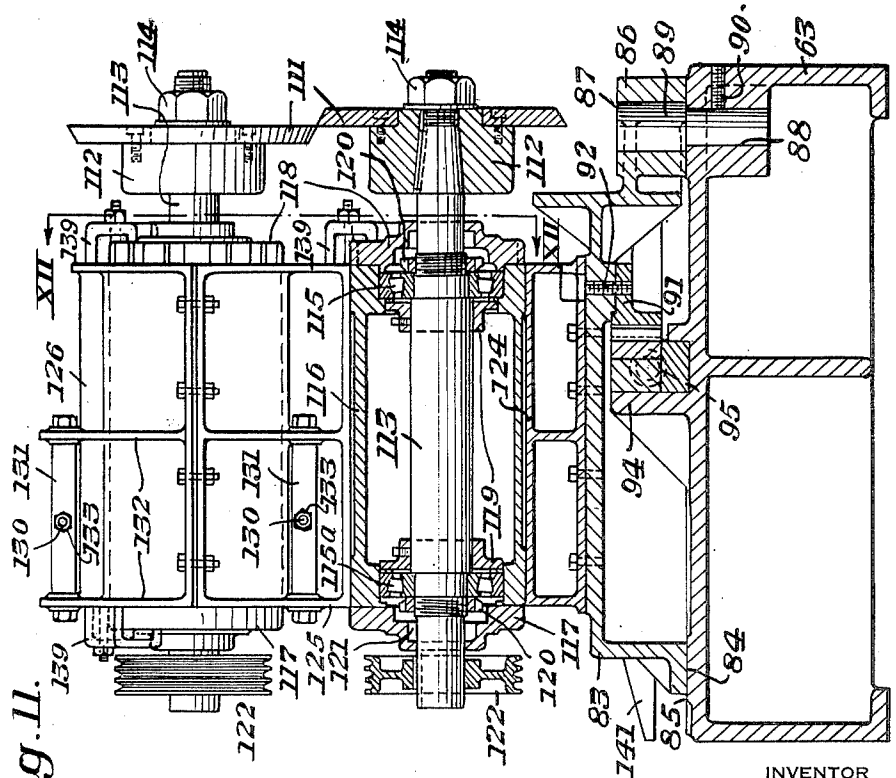


Fig. 11.



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United States Patent Office 2,701,016 Patented Feb. 1, 1955

2,701,016

ROTARY FLYING SHEAR MECHANISM FOR ROD ROLLING MILLS OR THE LIKE

Noel Phillips Bedson, Southport, England, assignor, by mesne assignments, to Blaw-Knox Company, Pittsburgh, Pa., a corporation of Delaware

Application May 31, 1949, Serial No. 96,195

6 Claims. (Cl. 164—61)

This invention relates to a rotary flying shear mechanism for rod rolling mills or the like in which a plurality of cuts may be made in each rod by a single rotary flying shears unit. More particularly, it relates to the provision of a single rotary flying shears swingably mounted relative a rod line so that a predetermined plurality of cuts may be made on each rod without any relative translatory movement between the shafts of the shears. The term "rod" as used herein includes elongated metal forms such as the small bars and strips which are capable of being readily sheared by conventional rotary flying shears.

Rotary flying shears in and of themselves are broadly old. They enable the material line to be cut while traveling at the relatively high rates of speed utilized today in rod rolling mills. Such rods customarily run through the cusp or immediately outside the cusp between the circular knives of the shears out of reach of the bite or nip of the knives. A swingable pipe adjacent the knives usually guides the running line of material and at the appropriate time forces the material into the bite of the knives effectively shearing it while its travel continues. The balance of the rod then runs on the other side of the bite of the same knives.

Heretofore, in one form of rotary flying shear mechanism in order to return the swingable guide to the approach side of the bite of the knives, relative translatory movement was effected between the shafts turning the knives. The machinery necessary to effect this translation and return was cumbersome and relatively complex. Further, it introduced another factor into the necessary registry between the knives of the shears and the synchronization therewith with the movement of the rod line. Moreover, the adjustment of the knives to compensate for wear was rendered more of a problem.

In the present invention, these problems are overcome. A single rotary flying shear unit is swingably mounted for movement in the plane of movement of the rod line when a shearing stroke is effected. Moreover, in this invention a shearing stroke can be effected in opposite directions dependent, of course, upon the unit being in the appropriate shearing position for the direction of the stroke that is to be made. No difficulty is introduced of the character described in connection with prior shears because there is no change in the fixed linear distance between the shafts of the knives of the unit. This fixed distance also improves the firmness and precision with which the unit may be made to shear. The absence of the more complex equipment of prior devices also enables any wear on the knives of the unit to be taken up with comparative ease periodically as required. The unit may also be moved into a non-shearing position for free running of the rod when cutting thereof is in prospect. The ability of a single unit to make a plurality of cuts on each rod also enables the device of this invention to be used to quickly divert succeeding movement along the rod line if there is an interruption following the position of the shears.

Other objects and advantages of this invention will be apparent from the following description and the drawings which are substantially schematic only, in which

Figures 1 to 8 inclusive represent an operational sequence of an embodiment of this invention mounted for swinging movement in a vertical plane;

Figure 9 is a view in elevation of a preferred embodiment of this invention for a rod rolling mill or the like

in which shearing is effected by movement of the rod line in a horizontal plane;

Figure 10 is a plan view of the embodiment illustrated in Figure 9;

Figure 11 is a side view, partly in cross section, of the rotary flying shears unit illustrated in Figures 9 and 10;

Figure 12 is a view taken along line XII—XII of Figure 11; and

Figure 13 is a detailed view taken substantially along line XIII—XIII of Figure 12 to illustrate the adjustment of one of the front end cap plates of the shears unit.

Illustrative operational sequence

An operational sequence of this invention for a vertically swinging shears unit is illustrated in Figures 1 to 8 inclusive. In the shearing of steel rods from a mill, the employment of rotary flying shears to effect such shearing without interrupting the forward progress of the rod along the rod line is broadly old. However, heretofore the returning of the circular knives to an initial shearing position has involved in one well-known device the intermittent separation of such knives. To effect such separation of the knives necessitated the use of cumbersome and expensive equipment, and involved generally eccentric movements with consequent problems of dynamic balance. In the instant invention the circular knives and their shafts can be maintained in fixed cutting and linear distance relation, respectively, to one another whether a single cut or a multiplicity of shearings are performed on any rod passing through the device of this invention.

In Figures 1 to 8 inclusive, a rod **10** in moving along a rod line **10***a* enters from a mill to the left through a fixed guide pipe **11**, and passes into a transfer or switch pipe **12** which is movable in a vertical plane about a pivotal center **13**. A rotary flying shears unit **13***a* has a pair of circular knives **14** and **15** disposed in tangential cutting relation with their respective shafts and axes of rotation side by side in a common plane adapted to pivot about the horizontal line **16** connecting the centers of the knives. Suitable bearings (not shown) are disposed on each side of the unit for swingable support and movement. The movement of switch pipe **12** and rod **10** is in a plane normal to the plane through the shafts of unit **13***a* and bisecting the distance between said shafts. Each such movement carries a rod **10** through the bite of knives **14** and **15** and effects a shearing operation.

Each knife as shown in connection with knife **14** is rigidly fastened to a rotatable spindle or shaft **17** which revolves within a journaling barrel fitted into a casing **18**. An aligned motor **19**, the casing of which is bolted to the lower end of casing **18** completes the nearer half of the shearing unit **13***a*. The opposite rotation of knife **15** in the other half of the unit is similarly effected but for purposes of clarity of illustration, knife **15** and the driving mechanism associated therewith are omitted from the figures in question. A guiding quadrant **21** may be employed in engagement on each side of unit **13***a*.

Normally, the plane of the knives **14** and **15** relative a horizontal plane through rod line **10***a* is at an angle of about 30° to the horizontal measured in a counterclockwise direction from a point below axis **16** when unit **13***a* is swung all the way to the right as shown in Figure 1; parallel when unit **13***a* is substantially vertical as shown in Figure 3; and at an angle of about 120° to the horizontal measured in a counterclockwise direction when unit **13***a* is swung all the way to the left as shown in Figure 4.

Immediately to the right of knives **14** and **15** are a guide pipe **22**, a lower guide pipe **23** and a scrap chute **24**. Upper pipe **22** is provided with a bell mouth **25** and a common bell mouth **26** serves both chutes **23** and **24**. A diverter gate **27** at the junction of chutes **23** and **24** is operable to guide any rod entering bell mouth **26** into one or the other of the two chutes connected therewith.

In the operational sequence schematically shown in these figures in their ascending numerical order, a rod **10** passes between knives **14** and **15** below the bite or nip thereof as shown in Figure 1 toward mouth **26** behind which gate **27** is raised to direct the front of the rod to be cropped into scrap chute **24**. Transfer pipe

12 is elevated to the position shown in Figure 2 to effect such cropping of the said front end which is shown passing down chute 24. The succeeding portion of a rod 10 which is now above the bite passes into mouth 25 and pipe 22 where it proceeds to another mill or some other further handling station. After this front cropping, rod 10 continues to run while unit 13*a* is swung into the position shown in Figure 3.

If an intermediate cut is then to be made through the rod, the unit is moved into the position shown in Figure 4 and gate 27 may be moved to open pipe 23 which also leads to a further mill or other further handling station. Thereupon, the lowering of switch pipe 12 makes an intermediate shear through the rod 10. The portion leading the cut passes through pipe 22 and the succeeding portion of rod 10 moves through pipe 23 as shown in Figure 5. Again, the rotary flying shear unit may be returned to a position as shown in Figure 6 during the continued running of the rod for an additional period before the next cut is to be made.

A further intermediate cut may then be made by moving the unit into the position shown in Figure 7 and then raising pipe 12. The portion of rod 10 following the new cut is caught by mouth 25 and travels along pipe 22. Final or end cropping of rod 10 is achieved after the unit has been swung as indicated in Figure 8 and switch gate 27 moved to open chute 24. Then by lowering transfer pipe 12 rod 10 is cut and the final end is caught by mouth 26 and passes into pipe 24 for disposal.

It is evident that such a single shears unit may thus be employed to make such cut or cuts on successive rods as desired to either avoid an interruption in the progress of a rod along the rod line or to divide a rod into shorter lengths or for other purposes.

Preferred embodiment

A preferred embodiment of the invention is represented in Figures 9 to 13 inclusive. A rod line 35 passes out of the rear of guide tube 36 past a photoelectric cell 37 and into a bell mouth 38 of a further guide tube 39. A bracket 40 rigidly supports guide tube 39. Bracket 40 is in turn affixed to a pedestal 41 mounted on a base 42 which is immovably fastened to a floor 43 in the mill. The rod line 35 then enters a bell mouth 44 having vertical journals 45 movable in bearing blocks 46. These bearing blocks in turn are fastened in a bracket 47 by keys 48. Bracket 47 is also affixed to pedestal 41. A switch pipe 49 engages a telescoping section 50 connected to bell mouth 44 to continue the guiding of rod line 35. An ear 51 integral with switch pipe 49 intermediate the ends thereof is pivotally connected by a link 52 to an actuating pneumatic or hydraulic cylinder assembly 53.

Assembly 53 is adapted to move switch pipe 49 in a horizontal plane parallel to floor 43 and by means of such movement to effect the shearing of a rod traveling along rod line 35 while such rod continues its travel. Assembly 53 comprises a cylinder 54 having a piston 55 and piston rod 56 therein. A pedestal 57 supports assembly 53 and in turn is supported on a bed plate 59 to which it is bolted. Bushing brackets 60 guide piston rod 56 which has a reduced section 58, the outer end of which is pivotally connected to the other end of link 52.

Appropriate ports and valves (not shown) are provided for the two ends of cylinder 54 to move piston 55 as and when required and thereby swing switch pipe 49 in a horizontal plane. Photoelectric cell 37 is connected to a conventional solenoid operated valve through an adjustable delay relay so that air is admitted to the head end of piston 55 to effect a cropping stroke just as a preselected length of a rod passing along rod line 35 is opposite the bite of the rotary flying shears unit of this invention when its center line coincides with line "A." Other conventional control circuits of a mechanical, pneumatic or hydraulic nature may also be employed to effect the necessary synchronized movement of piston rod 56 and thereby of switch pipe 49.

Switch pipe 49 is constrained to swing through a prescribed horizontal arc by a lateral guiding bracket 61 affixed to a pedestal 62 supported on the main bed plate 63. Bed plate 59 is rigidly connected to main bed plate 63 by being laterally bolted thereto. A series of clamps 64 hold a top strip 65 against the upper side of switch pipe 49 to assist in steadying it and prevent it from bowing during a shearing stroke.

Rod line 35 continues past a rotary flying shears unit 66 and then divides in the event of a shearing action by unit 66 so that the severed portions of a rod moving along the rod line respectively pass into a bell mouth 67 and a bell mouth 68. Bell mouth 67 is connected to a guide pipe or tube 69 which is strengthened by an overlying strip 70 held thereagainst by clamps 71. Bell mouth 68, on the other hand, leads into a guide pipe 72 which is strengthened by a top strip 73 held thereto by a clamp 74 when a diverter gate 75 is in its lowermost position. When the diverter gate is in its uppermost position, a rod or portion thereof passing into bell mouth 68 passes beneath gate 75 into a chute 76 having a downwardly inclined bottom 77. The sides of chute 76 are formed by the sides of a pedestal 78 bolted to main bed plate 63. A reciprocating cylinder assembly 79 actuates gate 75. The rod line passing through guide pipes 69 and 72 respectively enters further guides 80 and 81 supported in a bracket 82 on pedestal 78. These guides lead to a further mill such as a finishing mill or to some other working or handling station for the rods and rod portions passing therethrough.

The rotary flying shears unit 66 is supported on a sliding base 83 which has a sliding underface 84 which is arcuate in plan and adapted to move over a sliding finished quadrant surface 85 integral with bed plate 63. Base 83 is provided with an integral pivoting bracket 86 on the side thereof opposite underface 84, the center of the arc of which coincides with the axis of a vertical opening 87 drilled through bracket 86. Opening 87 is coaxial with a socket 88 integrally formed in bed plate 63. A massive pivot 89 fits into openings 87 and 88 and is locked in socket 88 by a set screw 90. Base 83 is thereby free to rotate about the upper portion of pivot 89 during operation. An arcuate gear 91 is rigidly bolted by bolts 92 to the underside of base 83, the center of gear 91 coinciding with the axis of pivot 89. The teeth on gear 91 mesh with a toothed rack 93 which slidably engages a rib 94 integral with bed plate 63, and a bearing strip 95 which underlies rack 93.

A piston rod 96 is threaded into one end of rack 93. The other end of piston rod 96 is connected to a double-acting piston 97 in a puneumatic or hydraulic cylinder assembly 98 bolted to bed plate 59. Assembly 98 is adapted to move rack 93 longitudinally and thereby swing rotary flying shears unit 66 in a horizontal plane which is tangent to the bite of the circular knives of unit 66 and contains rod line 35. Assembly 98 includes a cylinder 99 in which piston 97 reciprocates and suitable ports and bushings for piston rod 96. A compressed air connection 100 extends between the head end of cylinder 99 and the head end of the cylinder in assembly 79. A further compressed air connection 101 extends between the rod end of cylinder 99 and the rod end of the cylinder in assembly 79. In this embodiment therefore, when unit 66 is in position "A," diverter gate 75 is in its uppermost position opening chute 76; whereas, when unit 66 is in position "B," diverter gate 75 is in its lowermost position closing chute 76 and opening guide pipe 72. Hence, when unit 66 is in position "B," the movement of switch pipe 49 from its full line to its dotted line position shifts the rod line 35 from guide pipe 69 to guide pipe 72. Such a shearing operation would provide for the continuation of operations even in the event of a holdup behind guide pipes 69 and 80.

Cylinder assembly 79 comprises a cylinder 102 in which a piston 103 vertically reciprocates. A piston rod 104 has a reduced extension 105 guided in a bracket 106. Extension 105 is connected to a link 107 which in turn is connected to an arm 108 keyed to a shaft 109. Diverter gate 75 is also keyed to shaft 109 except that gate 75 is inside the side walls of guide pipe 72. In its lowermost position shown in dotted outline, gate 75 engages a stop 110 which forms the upper forward end of chute 76.

Rotary flying shears unit

Rotary flying shears unit 66 comprises a pair of circular beveled knives 111 disposed in conventional shearing relation with a vertical line connecting the centers of knives 111 being substantially coaxial with pivot 89, although such line connecting the centers of knives 111 may, if desired, be somewhat radially displaced from the axis of pivot 89. In the conventional manner, a rod is sheared by knives 111 by being moved through the bite of the knives in a horizontal plane through the bite substantially tangential thereto. The plane of the knives 111

is also so inclined to such a rod being sheared so that the respective rotation of the knives carries the rod into the bite and allows the portion thereof following the cut to continue its advance along rod line **35**.

Each knife is bolted to a block **112** keyed to a shaft **113**. A nut assembly **114** holds each block **112** with its corresponding knife **111** endwise on its shaft **113**. Shaft **113** is journaled in opposed endwise thrust bearings **115** and radial bearing **115***a* within a rotatable barrel **116**. End cap plates **117** and **118** close the hollow interior of barrel **116** to which they are bolted and also protect the bearings **115** and **115***a*. Plates **119** keyed to shaft **113** and retainer nuts **120** complete the journaling arrangements for each shaft **113**. Suitable packing boxes **121** are provided for shaft **113** in each of the respective cap plates **117** and **118**. A pulley **122** is keyed to the rear end of each shaft **113** for engagement by a plurality of flexible drive V-belts **123**.

The lowermost barrel **116** is cradled in a journaling member **124** bolted to base **83**. A casting **125** is machined in such fashion that it completes the bearing for lowermost barrel **116** and supplies the lower half of a bearing for uppermost barrel **116**. A further casting **126** is bolted to casting **125** and completes the casings for unit **66**. The casings bear against barrels **116** with a frictional grip when the casing bolts are tightened. A dog **139** bolted to each end of the casings bears against the respective cap plates **117** and **118** to positively prevent any relative endwise movement between barrels **116** and the casings.

Each set of V-belts **123** is driven by a motor **127** bolted to an adjustable platform **128**. The lower edge of each platform **128** is hingedly supported about a hinge **129** extending between appropriate vertical ribs in the casings enclosing the barrels **116**. A threaded adjustment rod **130** is pivoted to the upper end of each platform **128** and extends through a block **131** pivotally supported between vertical ribs **132** on the castings **125** and **126**. Lock nuts **133** enable rod **130** to be adjusted to maintain the appropriate tension in the respective V-belts **123**.

Each front end cap plate **118** is castellated in having recesses **134** around the periphery thereof. A spanner plate **135** has prongs **136** which engage the corresponding recesses **134**. A stud bolt **137** locks plate **135** in place by its threaded engagement with casing of the barrels after passing through an arcuate slot **138** in its respective plate **135** to insure against any accidental rotation of the barrels **116**.

Each shaft **113** has its axis positioned eccentrically of the axis of its respective journaling barrel **116**. Moreover, these eccentrics are symmetrical on the two sides of a horizontal plane bisecting the distance between the two shafts **113**. Hence, as wear occurs due to shearing operations by the knives **111**, they can be adjusted to take up such wear by so rotating the barrels **116** as to bring each knife **111** toward each other a sufficient distance to restore the shearing efficiency thereof in the plane of movement of the rod line passing through switch pipe **49**.

Illustrative operations of the preferred embodiment

The embodiment shown in Figure 9 and subsequent figures may readily be used to automatically crop the front end of rods passing along rod line **35** and to divert such rods in the event that the progress of the rod line after the shears unit **66** is passed, is stopped or interrupted. For such an operation, the shears unit **66** would normally be in readiness with the axis along line "A" as shown in Figure 10 and switch pipe **49** would be pulled back and in the dotted position therefor shown in the same figure. The time delay relay in the circuit would be so adjusted that the desired front-end length of rod would pass the vertical axis through the bite of the knives before a cut is made by means of the automatically controlled extension stroke of piston **55** in assembly **53**. Knives **111** would be rotating toward each other so as to drive the rod or workpiece through the bite. Switch pipe **49** would then be in the full line position shown in Figure 10 and the portion of the rod following the cut would pass through guide pipe **69** and guide **80** to the succeeding mill. Because gate **75** would normally be in the up position shown in Figure 9 for such an operation, the cropped front end of the rod would pass out through scrap chute **76**. The rod would continue to run through the cusp on the upper side of the bite while unit **66** remained in position "A," as shown in Figure 10, although during such running of the following portion of the rod, assembly **98** may be caused to retract piston rod **96** a sufficient distance to move unit **66** into position where its axis would coincide with line "C" shown in Figure 10 for more rapid response in the event of trouble in the succeeding portion of the rod line.

In the event of difficulty or interruption of the rod line through a succeeding mill or work stand, emergency switches at various stations may be connected in the circuit and jamming of rods moving along rod line **35** prevented by energizing the valves such as solenoid valves controlling assemblies **79**, **98** and **53** in the chronometrical order named. Such actuation would first lower gate **75** closing chute **76** and opening guides **72** and **81** which might lead to a reeling coil, another mill line or elsewhere away from the trouble zone. Then, unit **66** would be swung to position "B" and followed immediately by the return of switch pipe **49** to the dotted position shown in Figure 10 through the energization of a limit switch **140** by a fixed projection **141** fastened to base **83**. Stops **142** adjacent the two ends of quadrant **85** insure against any overrun in either direction of unit **66**. The return of switch pipe **49** to its dotted position severs the rod again so that the portion following the new cut will not be involved in any jam-up caused by the trouble in question. As soon as rods cease to pass along rod line **35**, the change in the activation of photoelectric cell **37** causes unit **66** to be returned to position "A" with switch pipe **49** remaining in its dotted position ready for the next front end cropping operation. On the other hand, if there is no difficulty in any succeeding working station affecting the rod line in the proximity of unit **66**, switch pipe **49** remains in the full line position shown in Figure 10 until the last of the rods are past the bite of unit **66** whence it is then automatically returned to switch pipe **49**'s dotted line position by assembly **53**.

By a different arrangement of the control circuit which will be readily evident to those skilled in the circuit control art, unit **66** and the combination thereof may also be employed to effect the severance of rods passing along rod line **35** into a predetermined number of sections each of a predetermined length for ease of subsequent rolling or other purpose. In these cases, a shearing cut can be made on the rod each time the unit is in position "A" by moving switch pipe **49** from its dotted to its full-line position as shown in Figure 10. Then when the next cut is to be made, unit **66** may be swung to its position "B" and switch pipe **49** then brought from its full-line to its dotted position again shearing the rod. These shearings are effected without any change in the linear distance between the shafts **113** and are quickly, easily and automatically possible in combination with whatever control circuit may be required.

Although I have illustrated and described a preferred and modified embodiment of this invention, it will be understood that changes may be made therein within the spirit of this invention and the scope of the appended claims.

I claim:

1. In a rotary flying shear mechanism for rod rolling mills or the like, in combination, a pair of spaced parallel shafts in fixed relation to each other, circular shearing knives respectively affixed to said shafts in rod shearing relation to each other, a sliding base supporting said shafts and adapted to slide in a plane normal to the plane defined by the axes of said shafts, said sliding base being pivotally connected to a bed plate about an axis lying in the shearing plane of said knives and passing through the axes of said shafts, means for rocking said sliding base about said pivot, a switch pipe in front of said circular knives closely surrounding said rod line, a pair of guide pipes behind said circular knives in the plane of movement of said switch pipe adapted to receive the respective severed portions of a rod passing along said rod line, a diverter gate in one of said guide pipes, and means interconnected with said first-mentioned means to operate said diverter gate when said first-mentioned means move said sliding base from one shearing position of said knives to the other shearing position of said knives about said pivot.

2. In a rotary flying shear mechanism for rod rolling mills or the like, in combination, a pair of spaced parallel shafts in fixed relation to each other, circular shearing knives respectively affixed to said shafts in rod shearing

relation to each other, eccentric means for adjusting said knives to maintain the same shearing plane therebetween, a sliding base supporting said shafts and adapted to slide in a plane normal to the plane defined by the axes of said shafts, said sliding base being pivotally connected to a bed plate about an axis lying in the shearing plane of said knives and passing through the axes of said shafts, means for rocking said sliding base about said pivot, a switch pipe in front of said circular knives closely surrounding said rod line, a pair of guide pipes behind said circular knives in the plane of movement of said switch pipe adapted to receive the respective severed portions of a rod passing along said rod line, a diverter gate in one of said guide pipes, and means interconnected with said first-mentioned means to operate said diverter gate when said first-mentioned means move said sliding base from one shearing position of said knives to the other shearing position of said knives about said pivot.

3. A shearing apparatus comprising means to guide a longitudinally-traveling bar in a generally horizontal normal path of travel, a cutting mechanism located somewhat beyond the guide means in the direction of travel of the bar and at one side of the said path, a guideway located beside the cutting mechanism and generally aligned with the said guide means so as to receive a bar traveling along the said path after it passes the cutting mechanism, means to move the guide means laterally of the said path and thereby to shift the bar laterally into the cutting mechanism to cause severance of the bar, a second guide located laterally of the guideway, and selectively operable means to direct a bar piece formed by such a severance into either the said guideway or the said second guide.

4. A shearing apparatus comprising means to guide a longitudinally traveling bar in a generally horizontal normal path of travel, a cutting mechanism located somewhat beyond the guide means in the direction of travel of the bar and laterally of said path, a guideway located beyond the cutting mechanism in the direction of travel of the bar and generally aligned with the guide means in position to receive a bar traveling along the said path, means to move the guide means laterally and thereby to shift the bar laterally into the cutting mechanism to cause severance of the bar, a receptacle located laterally of the guideway, and a switch mechanism located immediately beyond the cutting mechanism in the direction of the travel of the bar and operable selectively to direct the front end of the rear bar piece formed by such a severance into either the said guideway or the said receptacle.

5. A shearing apparatus as set forth in claim 4 in which the guideway includes an outer upstanding side wall having an opening therethrough immediately beyond the cutting disks in the direction of travel of the bar, and the switch mechanism includes a blade normally closing the opening, the rear end of the blade being movable inwardly adjacent the cutting disks to deflect a front end formed by severance of the bar laterally of the normal path of the bar through the opening and into the receptacle.

6. A shearing apparatus as set forth in claim 3 in which said second guide is a receptacle and the end formed by severance of the bar may be directed by the said selectively operable means into either the said guideway or the said receptacle.

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