Nov. 18, 1952 R. D. PRICE 2,618,335

SOLENOID OPERATED ROD SHEAR

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FIG. 1.

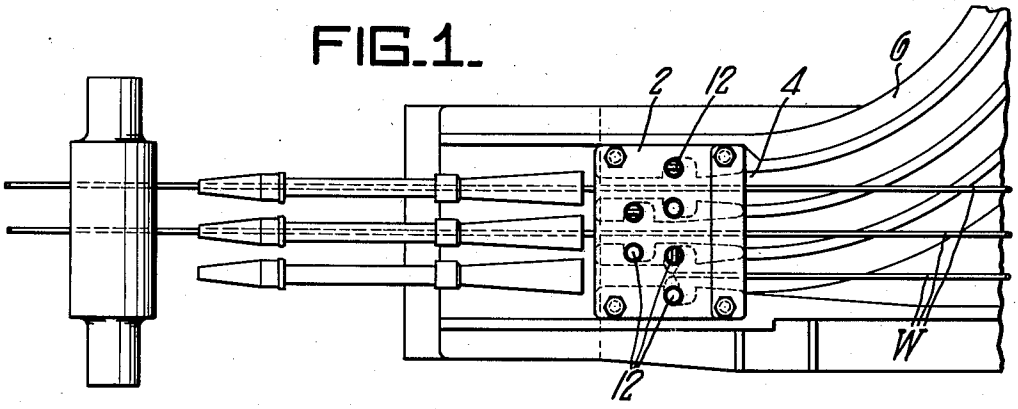
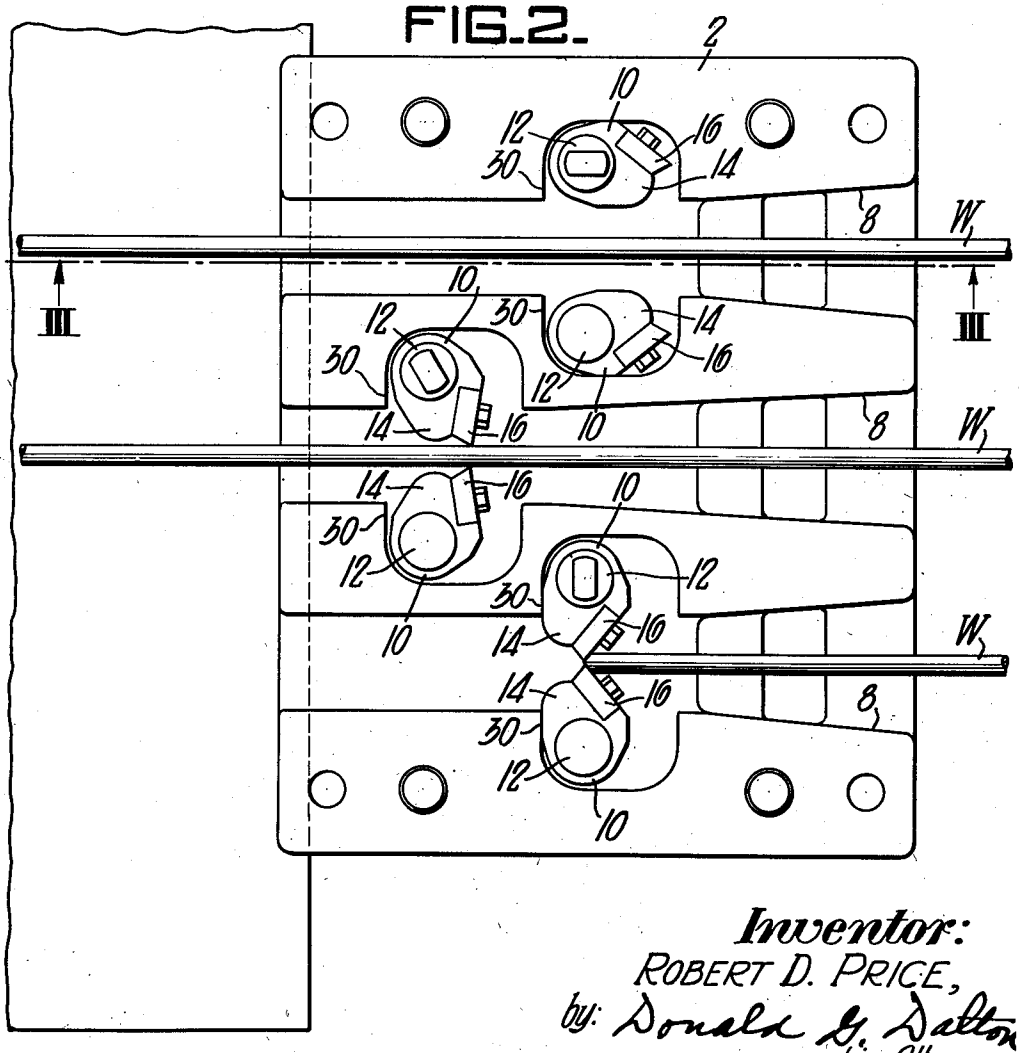


FIG. 2.



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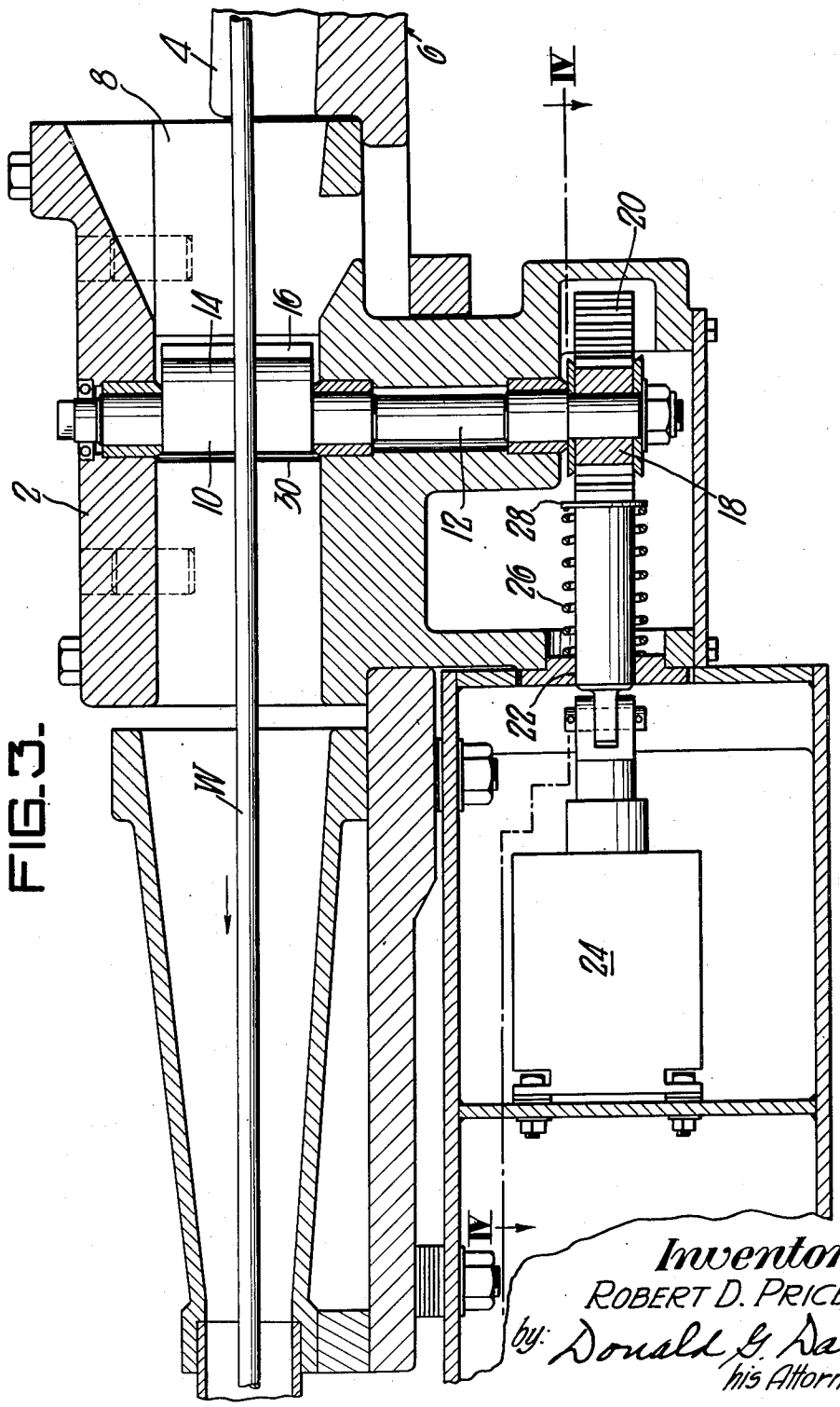


FIG. 3.

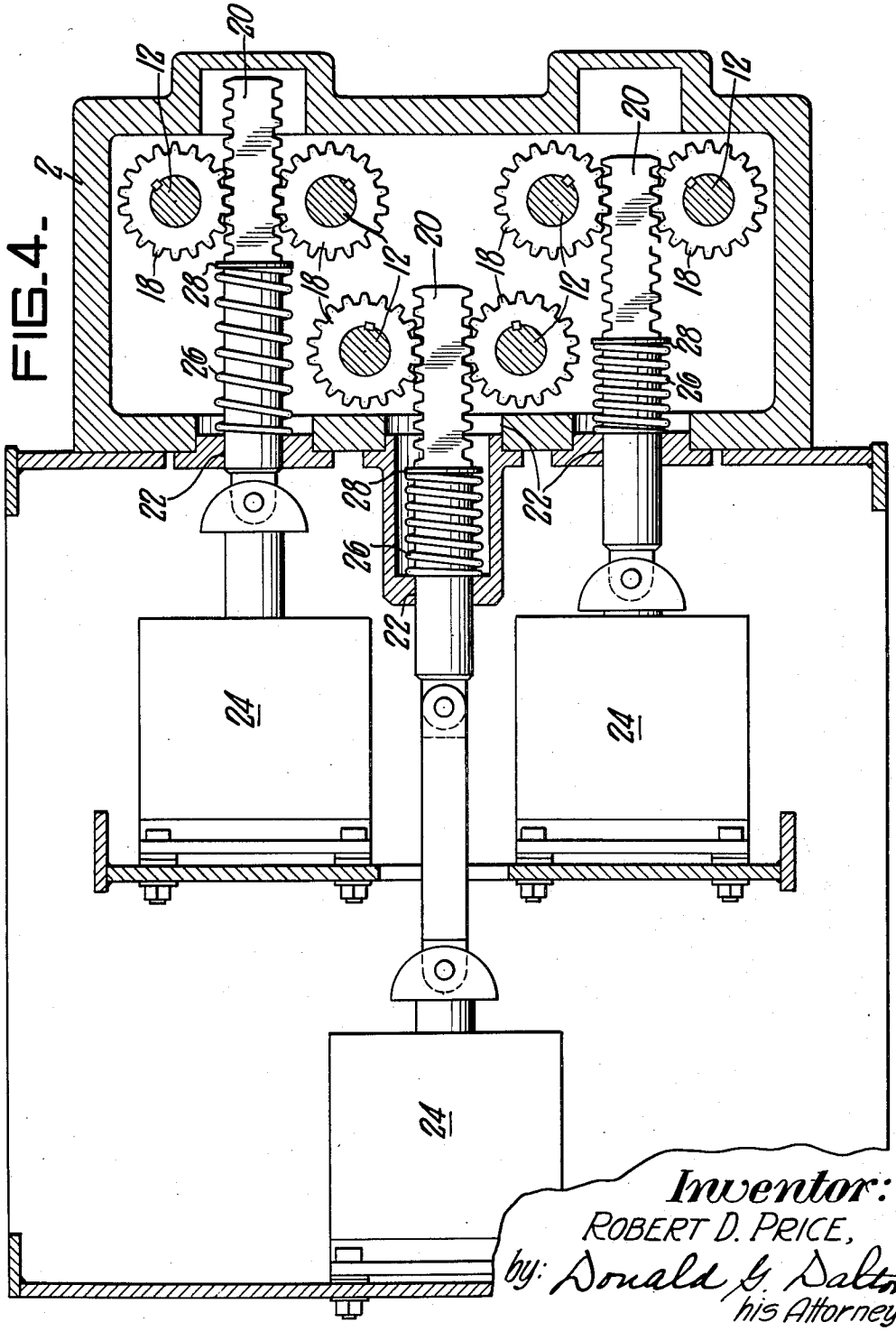
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SOLENOID OPERATED ROD SHEAR

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FIG. 4.



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SOLENOID OPERATED ROD SHEAR

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Application December 8, 1950, Serial No. 199,841

2 Claims. (Cl. 164—66)

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The present invention relates to a solenoid operated shear for a rod mill or the like.

In certain types of rod mills it is necessary to loop or reverse the direction of the rod travel from one roll stand to the next. It is frequently necessary, when cobbles occur, in this type of mill to cut the moving rod to prevent it from going on through the mill and causing damage. Periodically, particularly immediately after a pass change or roll change has been made on the mill, an inspection sample is cut from the moving rod. By inspecting the sample, the roller or finisher is able to determine whether or not the mill requires additional adjustment.

In the modern rod mill the direction of rod travel is automatically reversed from one roll stand in line to one located parallel to the line by means of a device called a repeater. The repeater is made up of a number of open topped troughs bent into a semi-circle.

Normally there is no personnel near the repeater to cut the rod if trouble develops. Prior to my invention, if difficulties in rolling, such as cobbles, did arise it was usual practice for a workman to run to the looping rod and attempt to cut it with an ax. This was extremely dangerous and offset to great degree the advantages derived through the use of automatic repeaters.

It is accordingly an object of my invention to provide a rod mill shear which may be installed in the line of a rod mill, particularly at the exit ends of the repeaters, and which may be operated from a remote position to cut rod moving through the mill.

Another object of my invention is to provide a rod shear which is actuated by means of an electrical solenoid.

These and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a general plan view showing the shears of my invention installed in the line of a rod mill;

Figure 2 is an enlarged plan view of the invention with the top of the housing removed;

Figure 3 is a longitudinal sectional view taken on the line III—III of Figure 2; and

Figure 4 is a plan view taken on the line IV—IV of Figure 3.

Referring more particularly to the drawings, reference numeral 2 indicates a housing which may be positioned in the line of a rod mill adjacent the exit ends 4 of an automatic repeater 6. The housing is provided with three longitudinal passages 8 through which the rod W travels

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after it emerges from one of the exit ends 4. Three pairs of spaced shear heads 10 mounted on shafts 12 are enclosed within the housing 2 with one pair astride each of the passages 8. Each shear head 10 includes a cam or eccentric portion 14 and a removable and adjustable cutting blade 16. A pinion 18 is keyed or otherwise mounted on the end of each of the shafts 12. A rack bar 20 is disposed between and in mesh with each pair of pinions 18, as shown in Figure 4, so that the movement of the rack 20 will rotate the shear heads of each pair in opposite directions through a predetermined angle. Although I have shown the rack 20 positioned between the pinions 18, it will be understood that this arrangement may be modified to suit operating conditions; in some instances, for example, it may be desirable to have the pinions in mesh with each other and the rack in operative connection with one of the pinions.

The rack 20 extends rearwardly from the pinions to project through an opening 22 in the rear wall of the housing 2. The projecting end of rack 20 is attached to a solenoid 24 which is actuated by a remote push button control (not shown). A compression spring 26 is mounted circumferentially around the rack 20 with one end bearing against the rear wall of the housing 2 and the other end bearing against a flange 28 which is provided on the rack 20. Thus, actuation of the solenoid 24 will draw the rack toward the solenoid in the direction away from the pinions to rotate the shearing heads 10 to cutting position. An abutment 30 is provided in the housing 2 against which the eccentric portion 14 strikes when the blades 16 reach cutting position. Abutment 30 prevents the shear heads from rotating beyond the junction point of the blades. When the solenoid is open the compression spring 26 acts to thrust rack 20 between the pinions 18 in the direction away from the solenoid, thus causing the shears 10 to rotate back to the retracted position shown by the topmost pair of shears in Figure 2. As seen in Figure 2, the topmost paired shear heads 10 are shown in retracted position; the middle pair of shear heads is shown in intermediate position wherein the eccentric portions 14 have guided the rod W into shearing position and the cutting blades 16 are approaching shearing position; the lower pair of shear heads 10 is shown in shearing position. It will be noted that each of the pairs of shear heads may be operated independently of the others. The number of shears in each shear housing or unit depends, of course, on the

size of the rod mill, that is, the number of strands in the mill.

As shown in Figures 1 and 3, one of each of the pairs of shear heads extends through the top of housing 2 so that the shear heads may be turned with a wrench when it is desired to adjust the blades 16. The blades 16 are removable and may be sharpened and shimmed to proper position as they wear.

In operation, to shear rod W, the circuit to solenoid 24 is closed by means of a push button control in the rod mill operating pulpit (not shown) causing rack 20 to be pulled by the solenoid 24. The moving rack 20 turns pinions 18 which are mounted on the shafts 12. As the shear heads 10 swing toward each other the rod W is guided into shearing position by the eccentric portions 14 on the shear heads. The blades 16 of the shear heads hit and bite into the moving rod W which is traveling in the same direction as the swinging motion of the shear heads. The momentum of the moving rod helps the rod shear itself when the blades 16 of the shearing heads are directly opposite and almost touching each other. Abutment 30 in the housing 2 stops the shear heads 10 at this instant. After being sheared, the forward part of the rod W is pulled out of the housing by the rolls in the next stand. The remaining part lays against the shear heads 10 and on the repeater looping floor.

Spring 26 on the rack 20, which helps to cushion the shock of the moving rod hitting the shear heads, compresses as solenoid 24 closes. After shearing, the remaining rod is pulled from the shear housing and the spring 26 returns the shear heads to retracted position.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. A shear for a rod mill having a plurality of roll stands comprising a housing having a passage through which the rod travels, said housing having a pair of opposed recesses therein disposed astride said passage, a shaft mounted rotatable shearing head disposed in each of said recesses, said shearing heads each including a blade and an eccentric portion, a pinion fixedly mounted on the end of each shaft remote from said shearing head, a rack disposed between and in operative connection with said pinions, means for actuating said rack to rotate said shear heads through a predetermined angle, said actuating means comprising a solenoid attached to said rack adapted to pull the same in the direction away from said pinions when actuated, and spring means attached to said rack for urging the same toward said pinions, and an abutment in each of said recesses disposed in the path of said eccentric portions for limiting the rotative movement of said shear heads, said abutments being coextensive with said eccentric portions in a plane parallel to the axis of rotation of said shear heads.

2. A shear for a rod mill as defined in claim 1 characterized by said shear heads being positioned in mirror image relation with said eccentric portions facing each other and said blades facing substantially away from each other so that rotation of one head in one direction and rotation of the other head in the opposite direction will cause the eccentric portions of the shear heads to approach each other to act as guide means on either side of said rod passage.

ROBERT D. PRICE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
966,557	Jewell	Aug. 9, 1910
2,155,578	Anderson	Apr. 25, 1939

FOREIGN PATENTS

Number	Country	Date
513,639	Germany	Nov. 20, 1930