April 12, 1932. F. E. KLING 1,853,434

ROTARY SHEARS

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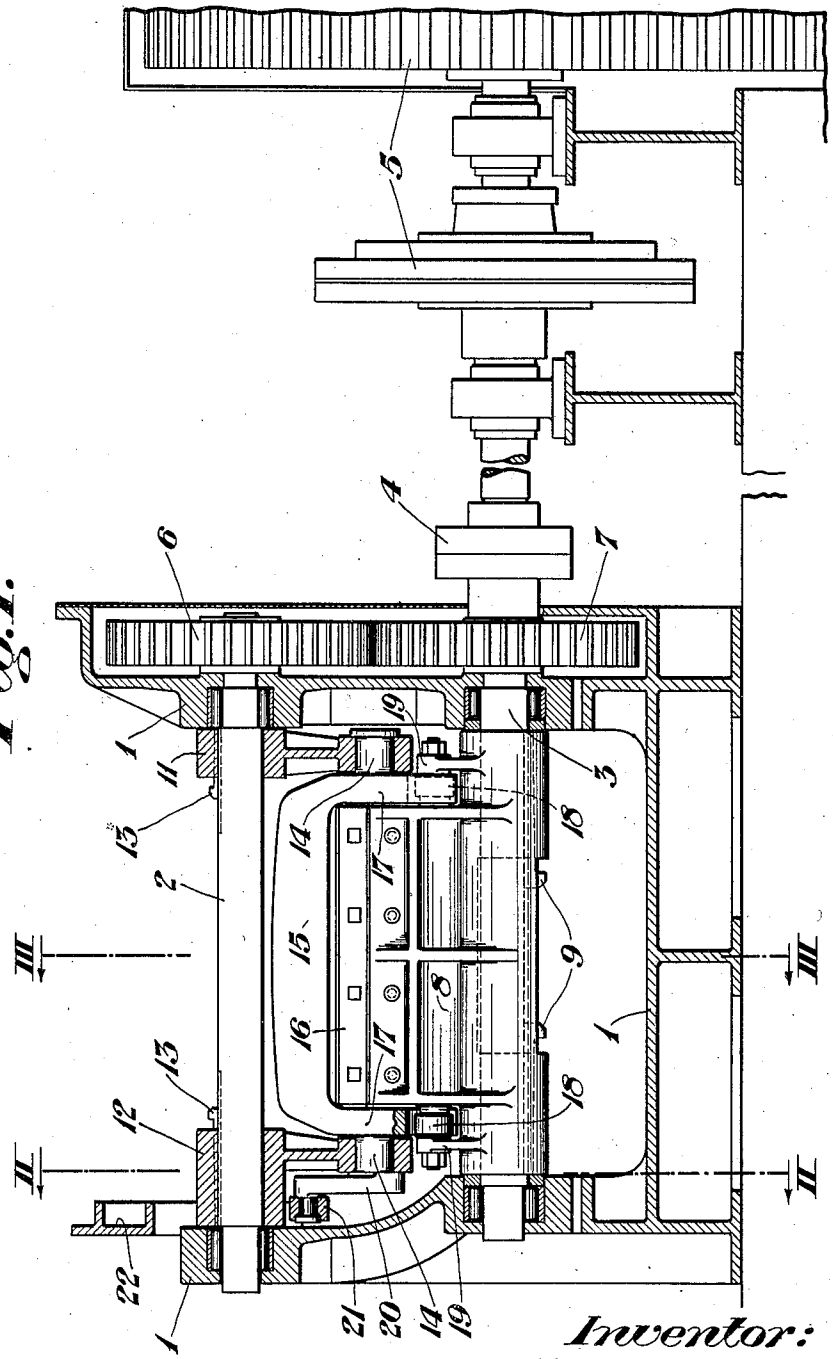

Fig. 1.

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Fig. 3.

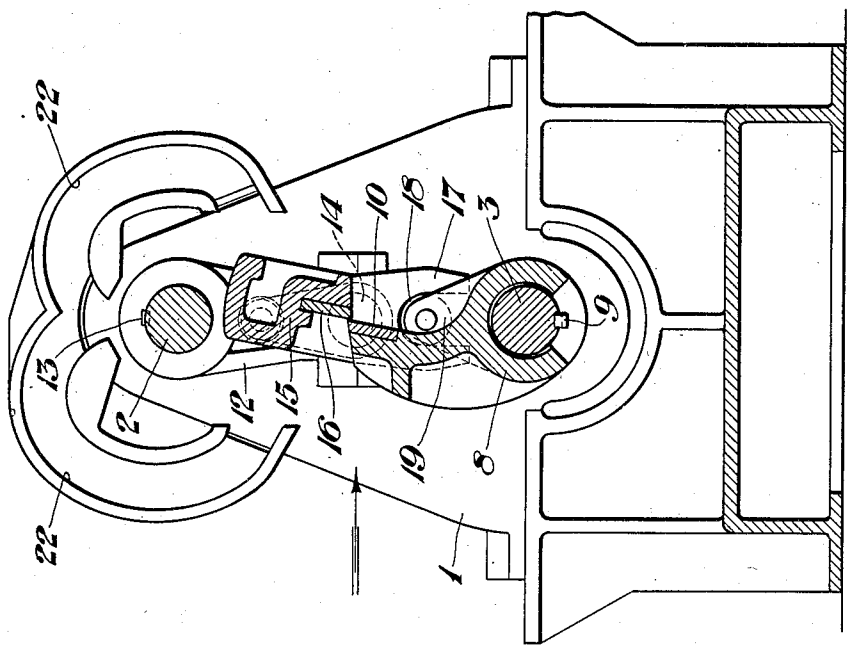

Fig. 2.

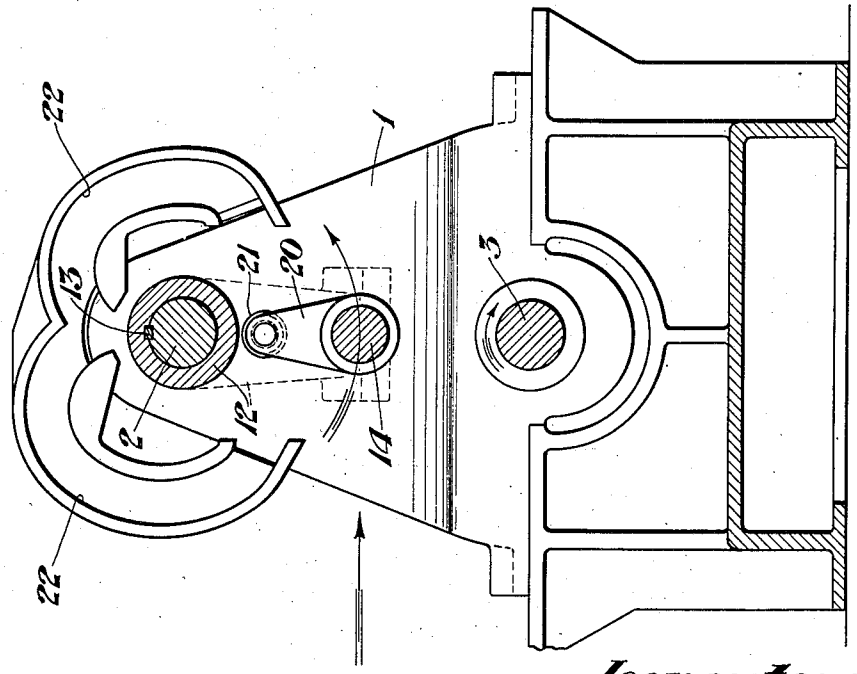

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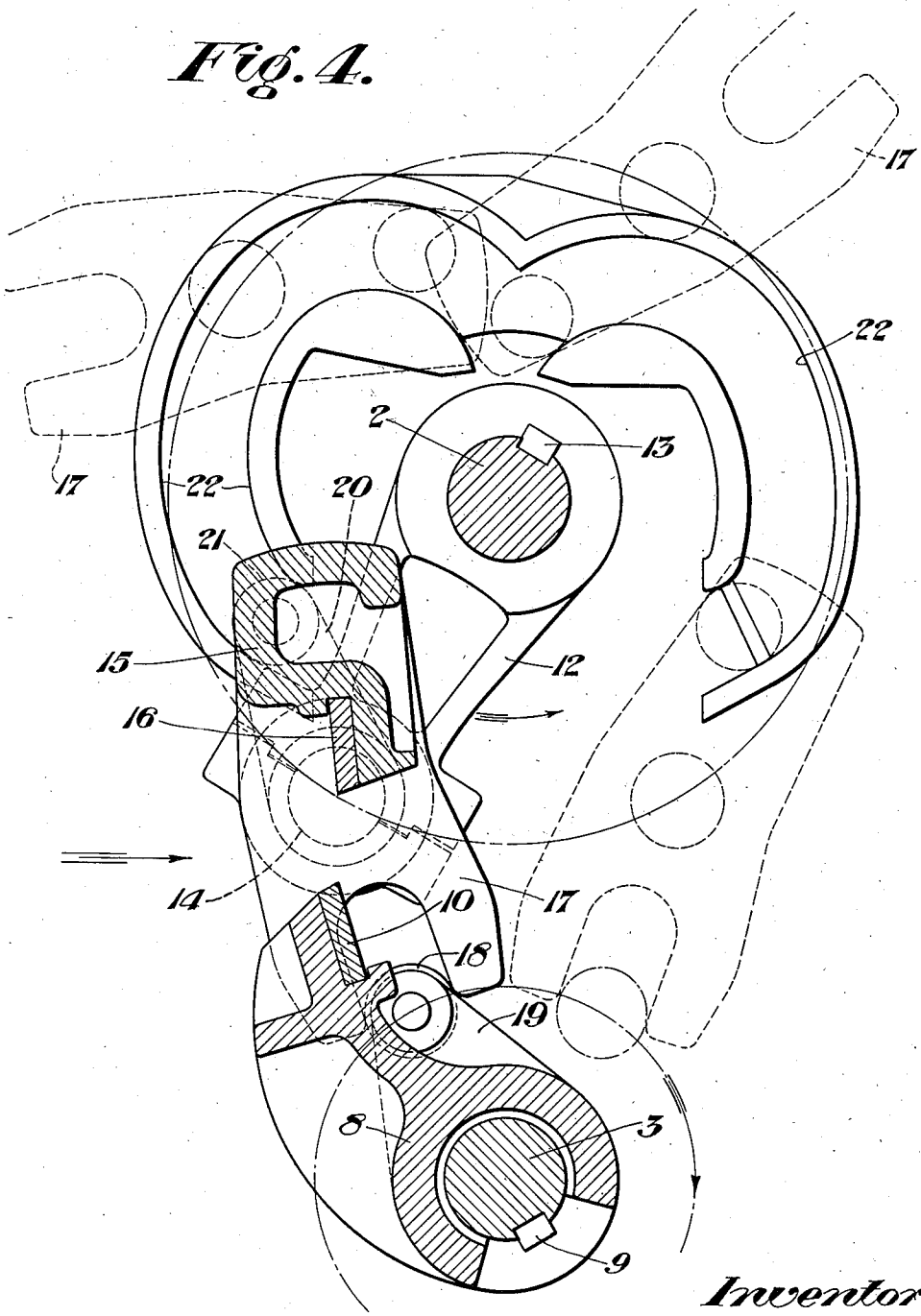
Fig. 4.



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Patented Apr. 12, 1932 1,853,434

UNITED STATES PATENT OFFICE

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ROTARY SHEARS

Application filed January 12, 1931. Serial No. 508,349.

This invention relates to rotary shears for use in shearing the ends of bars passing through a continuous mill or the like, the shears being operative to crop or sever the cold ends of the bars while the latter are moving.

It is among the objects of the invention to provide a shear in which the cutting knives are mounted in substantial alinement during the shearing cycle and in which provision is made to guide the movable knife holder during its rotary movement so that it will register with the cooperating element of the other knife member when they are brought into cutting position.

To this end a simple and mechanically durable construction is provided which will become more apparent from a consideration of the accompanying drawings constituting a part hereof and in which like reference characters designate like parts and in which Figure 1 is a sectional elevational view of a rotary shear embodying the principles of this invention; Figure 2 a vertical sectional elevational view taken along the line II—II, Figure 1; Figure 3 a similar view taken along the line III—III, Figure 1; and Figure 4 a section of the cutting and guiding mechanism diagrammatically illustrating the position of the knife holder and its guiding means during the operating cycle.

With reference to the several figures of the drawings, the structure therein illustrated comprises a suitable framework 1 in which is journaled a pair of shafts 2 and 3 with their axes in parallel alinement, the shaft 3 being conected through coupling 4 to a suitable clutch and gear reduction unit, generally designated at 5, designed to operate the shear in a manner to co-ordinate it with the operation of the mill.

Shafts 2 and 3 are connected through gear wheels 6 and 7 so that the shaft 2 is positively driven as is shaft 3. Mounted on shaft 3 is a knife holder 8 which is secured to rotate with the shaft by keys 9, the knife holder being provided with a knife 10 as shown in Figures 3 and 4.

Shaft 2 is provided with a pair of arms 11 and 12 which are secured to the shaft 2 by keys 13. The arms pivotally engage trunnions 14 of a swinging knife holder 15 carrying knife 16, the knife holder being provided with bifurcated ends or yokes 17 which cooperate with rollers 18 that are journaled in lugs 19 of the bottom knife holder 8. The knife holder 15 is provided with an arm 20 which carries a roller or follower 21 that operates in a guide 22 secured to the frame of the machine, the guide 22 being of such contour as to guide the knife holder in a manner to bring its yoke portions in alinement with roller 18 of the bottom knife holder as shown in Figure 4 of the drawings.

The operation of the rotary shear is briefly as follows: The bars are passed between the knives which latter are rotated in clockwise direction as viewed in Figure 4, the material passing from the left to the right hand side of the knives. The knife holder 15 is shown in four positions in Figure 4, the full line position being the initial position in which the knives are approaching their cutting action as they come into engagement with the bars to be cut. In this position, the roller 18 is entering the slide of the yoke 17 and the roller 21 is leaving the guide 22. Thus, when the knives are brought into cutting engagement with the material, the roller 18 and yoke 17 cooperate to maintain the knives in proper alinement which is substantially parallel during the cutting cycle.

In the first dotted line position on the right hand side of the figure, roller 18 is shown as leaving the yoke 17 and roller 21 as entering the guide 22. In the second upper position the roller 21 is shown passing through the guide and causing the knife holder to swing in such manner that its yoke portion will be in alinement to receive roller 18 of the knife holder 8 when the pivotally mounted knife holder 15 again reaches its initial cutting position.

From the foregoing description it will be evident that by the roller and guide mechanism, a pivotally mounted knife holder may be employed in a rotary shear to provide alinement of the cutting members during their cutting action and to bring the mem-

bers in register when they are again approaching their cutting position.

Although one embodiment of the invention has been herein illustrated and described, it will be obvious to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. Metal cutting shears comprising in combination a pair of rotary shafts journaled in a frame with their axes in parallel alinement, a swinging knife holder mounted on the upper of said shafts and a knife holder mounted on the lower shaft, a guide and roller associated with said knife holders to maintain the knives in substantial alinement during their shearing action and means for guiding said swinging knife holder during its rotating movement to bring the guide and roller in register at the beginning of the shearing operation.

2. Metal cutting shears comprising in combination a pair of rotary shafts journaled in a frame with their axes in parallel alinement, a swinging knife holder mounted on the upper of said shafts and a knife holder mounted on the lower shaft, said swinging knife holder having a guide and said lower knife holder a roller adapted for cooperative engagement with said guide, and means associated with said swinging knife holder for guiding the latter in its rotating movement to cause the guide and roller to register at the beginning of the shearing operation.

3. Metal cutting shears comprising in combination a pair of rotary shafts journaled in a frame with their axes in parallel alinement, a swinging knife holder mounted on one of said shafts and a knife holder fixedly mounted on the other of said shafts, said swinging knife holder having a guide at each end and said other knife holder having a roller at each end adapted for cooperative engagement with said guides, and means including an arm on said swinging knife holder and a fixed guide on the frame of the shear for guiding said swinging knife holder in its rotating movement to cause said guides at each end of said swinging knife holder and said rollers on said fixed knife holder to register at the beginning of the shearing operation.

4. Metal cutting shears comprising in combination a frame, a pair of rotary shafts journaled in said frame with their axes in parallel alinement, a swinging knife holder mounted on one of said shafts and a knife holder fixedly mounted on the other of said shafts, said swinging knife holder having a guide at each end and said other knife holder having a roller at each end and adapted for cooperative engagement with said guides, and means associated with said swinging knife holder for guiding the latter in its rotating movement to cause said guides and rollers to register at the beginning of the shearing operation.

5. Metal cutting shears comprising in combination a frame, a pair of rotary shafts journaled in said frame with their axes in parallel alinement, a pair of arms keyed to one of said shafts, a swinging knife holder having trunnions journaled in said arms, a second knife holder fixedly mounted on the other of said shafts, said swinging knife holder having a guide at each end and said second knife holder having rollers at each end adapted for cooperative engagement with said guides, and means including an arm on said swinging knife holder and a fixed guide on said frame for guiding said swinging knife holder in its rotating movement to cause said guides at each end of said swinging knife holder and said rollers on said second knife holder to register at the beginning of the shearing operation.

In testimony whereof, I have hereunto set my hand.

FRED E. KLING.