July 17, 1962 E. E. SMITH 3,044,636

BILLET TURNER

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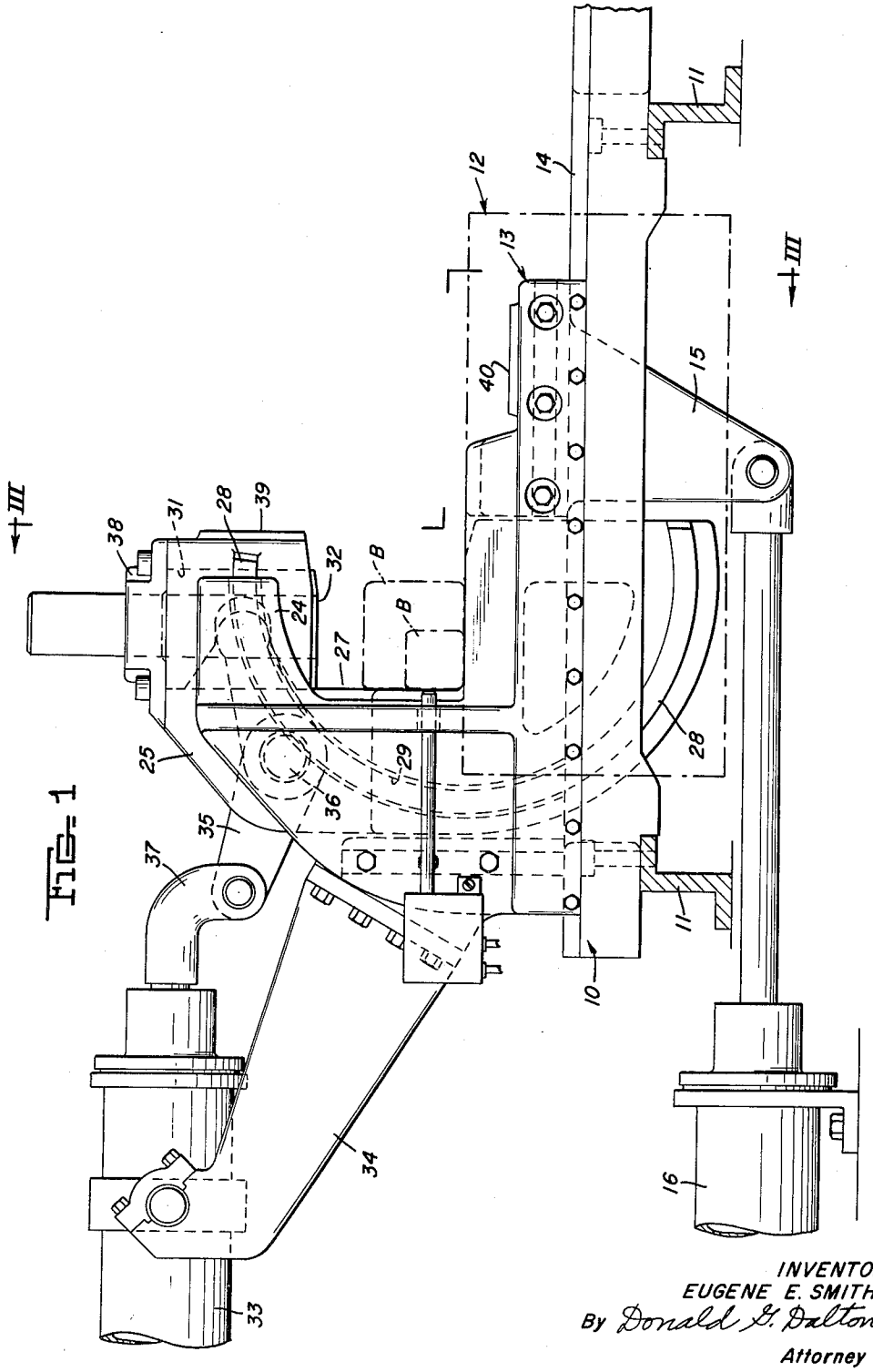


FIG. 1

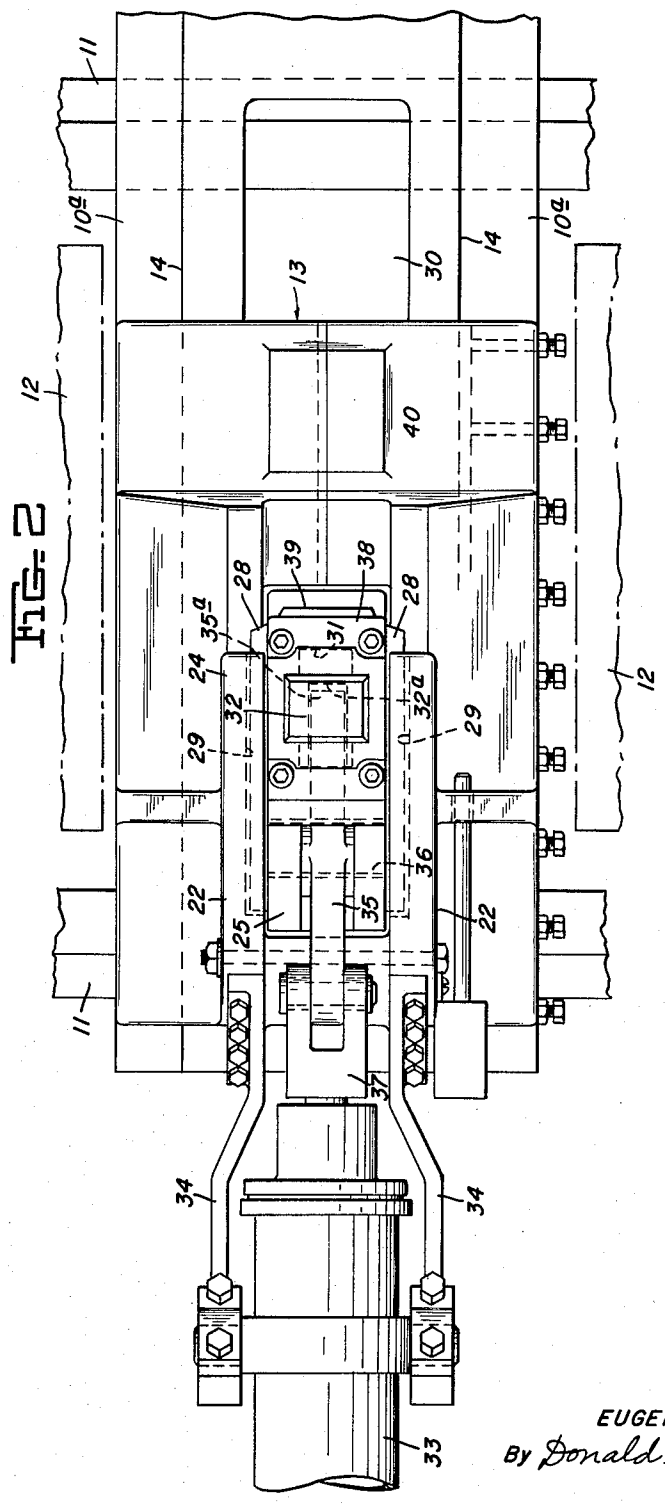
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FIG. 2



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FIG. 4

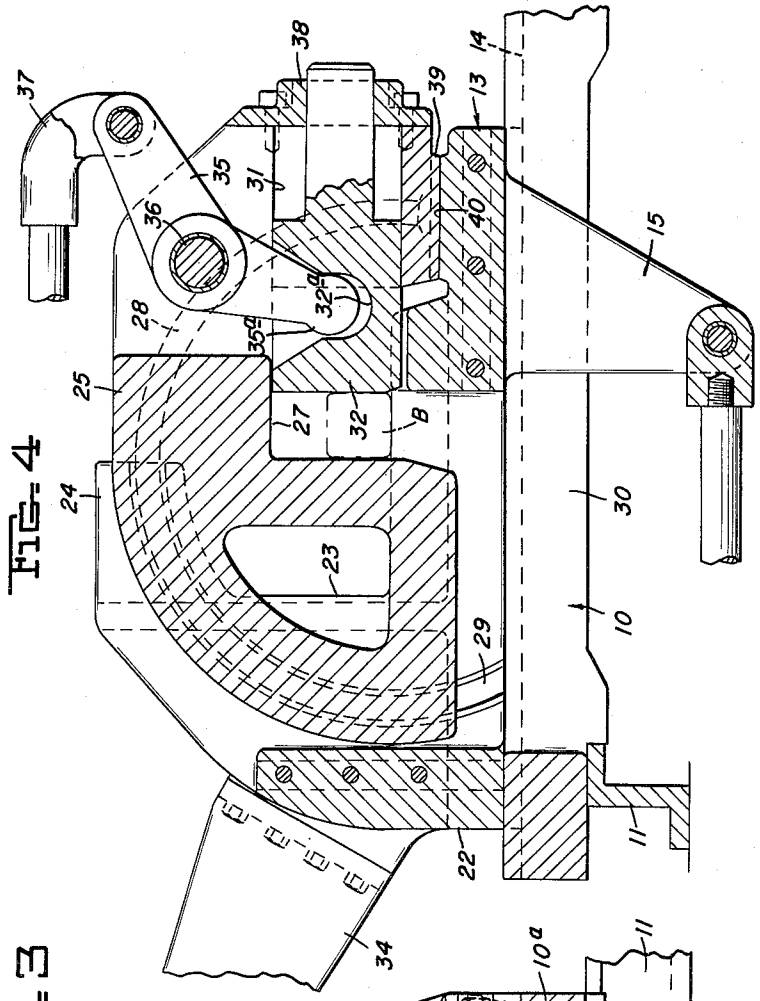
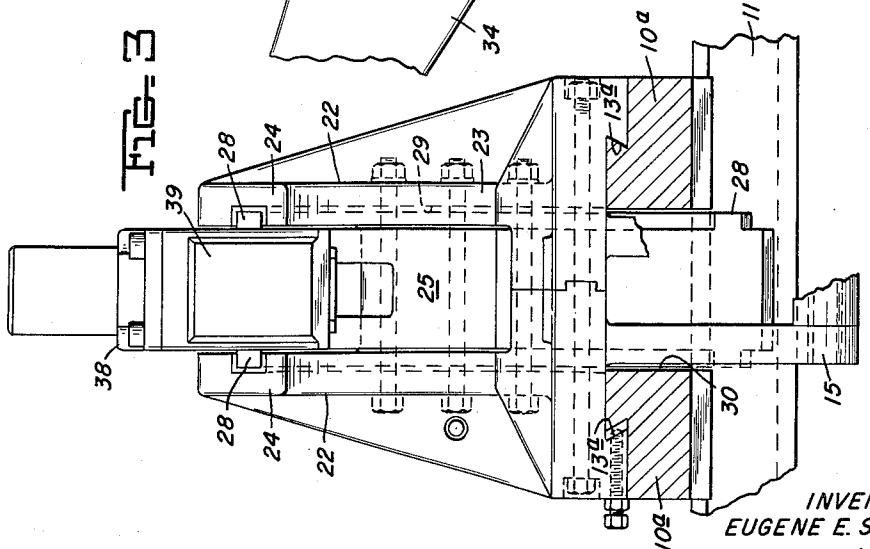


FIG. 3



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3,044,636

BILLET TURNER

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1 Claim. (Cl. 214—1)

This invention relates to a billet turner adapted to be incorporated in the roller table employed for conveying billets to a rolling mill. In certain respects the invention is an improvement on the apparatus of Patent No. 2,599,846.

An object of the invention is to provide a turner adapted to receive billets moving sidewise thereto, thus overcoming the limitations of such apparatus capable of receiving billets on endwise movement only thereof. These limitations include excessive length of the roller tables or objectionable crowding in the vicinity of the mill stand, in cases where the mill layout is such that the piece is transferred sidewise and its travel reversed between successive series of stands.

In a present preferred embodiment, my turner comprises a pair of spaced housings open at one side, having a tumbler rotatably mounted therebetween. The tumbler has a jaw open on one side and a slide block movable therein serving as a second jaw and cooperating with the tumbler jaw to grip a billet for turning. The tumbler is rotated through a limited angle by power means such as a fluid-pressure cylinder and piston. A connection in the form of a lever pivoted to the piston rod of the cylinder and to the tumbler is effective to actuate the slide block before turning the tumbler in either direction.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment. In the drawings:

FIGURE 1 is a side elevation with parts in section;

FIGURE 2 is a plan view;

FIGURE 3 is an end elevation with parts in section along the plane of line III—III of FIGURE 1; and

FIGURE 4 is a vertical longitudinal section, showing the parts in an alternate position.

Referring now in detail to the drawings, a sub-base **10** having spaced transoms **10***a* extends transversely of and is mounted on the spaced side rails **11** of a roller conveyor **12** composed of rollers journaled in the rails. A split base **13** is gibbed to ways **14** formed on transoms **10***a*, the halves of the base having keyed flanges **13***a* and being secured together by through bolts. Base **13** has lugs **15** depending between rails **10***a*. A fluid-pressure cylinder **16** positioned laterally of conveyor **12** has its piston rod pivoted to lugs **15** whereby the cylinder effects movement of base **13** along ways **14**.

A housing **22** on each half of base **13** includes an upstanding post **23** and a cantilever beam **24** extending laterally therefrom. A tumbler **25** is mounted between the housings for rotation about an axis normal to the paper in the showings of FIGURES 1 and 4. The tumbler is generally of C-shape and has a jaw **27** open on the same side as the housings. Arcuate ribs **28** on the sides of the tumbler fit in arcuate grooves **29** in the inner faces of the housings and these slide bearings permit rotary movement of the tumbler through about 90° from the position shown in FIGURE 1 to that shown in FIGURE 4. Base **10** is provided with an opening **30** between its ends to admit the lower portion of the tumbler.

The top of tumbler **25** has a vertical T-slot **31** therein which accommodates a slide block **32** fitting snugly therein. Block **32** cooperates with jaw **27** in clamping a billet B therebetween. In order to operate the block and tumbler, a fluid-pressure cylinder **33** is mounted on brackets

34 extending laterally from posts **23**. A lever **35** pivoted to the tumbler by a pin **36** has a rounded end **35***a* fitting in a notch **32***a* in block **32**. The other end of the lever is pivoted to the piston rod of cylinder **33** and **37**.

A guide plate **38** secured to the top of tumbler **25** determines the normal or retracted position of block **32** and the piston rod of cylinder **33**. When a billet has moved sidewise partly across the rollers **12**, cylinder **16** is energized to advance base **13** so that the tumbler jaw **27** embraces the billet. Next, operating fluid is admitted to the outer end of cylinder **33** and causes its piston rod to advance. The initial advance of the piston rod tilts lever **35** clockwise, causing block **32** to descend and clamp billet B against jaw **27**. Thereafter continued advance of the piston rod causes rotation of the tumbler through an angle of 90°, i.e., until a bumper plate **39** on the tumbler engages a stop block **40** on base **13**, thus turning the billet through 90° about one of its corners, leaving the parts in the positions shown in FIGURE 4.

Reverse operation of the piston rod of cylinder **33** first causes counterclockwise tilting of lever **35** until block **32** engages plate **38**, thereby withdrawing block **32** from clamping engagement with the billet. Thereafter, the tumbler is turned back to its original position. The billet is not disturbed during reverse rotation of the tumbler and may be advanced to the next mill stand as soon as it has been turned.

It will be evident that the turner of my invention has a marked advantage in being able to receive billets approaching sidewise, e.g., over skids connecting a roller table on the exit side of one mill stand with the roller table on the entrance side of the next stand. In addition, the structure is positive in operation yet simple and sturdy so maintenance is not a problem. The clamping action applied by the slide block on the billet is exerted automatically by the power means which effects turning, and the release on reversal thereof, all as part of the same operation.

Although I have disclosed herein the preferred embodiment of my invention, I intend to cover as well any change or modification therein which may be made without departing from the spirit and scope of the invention.

I claim:

A billet turner comprising a base, a pair of housing spaced apart thereon, each housing including an upstanding post portion and a cantilever beam portion extending laterally therefrom, arcuate grooves in the adjacent faces of said housings, a generally C-shaped tumbler having a jaw formed therein open at one side, said tumbler being mounted on and between said housings and having arcuate ribs slidable in said grooves for rotation of the tumbler about an axis normal thereto, the top of said jaw having a slot therein, a block slidable in said slot cooperating with said jaw to clamp a billet therebetween, a lever pivoted between said housings, one end of said lever pivotally engaging said block and a fluid-pressure motor pivoted to the other end of said lever and mounted on said housings off center relative to the pivotal axis of said lever, whereby energization of said motor first causes angular movement of the lever and then rotation of said tumbler.

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