Oct. 4, 1927. 1,644,552

G. J. THUST

EXPANDING MILL

Filed July 16, 1925 6 Sheets-Sheet 1

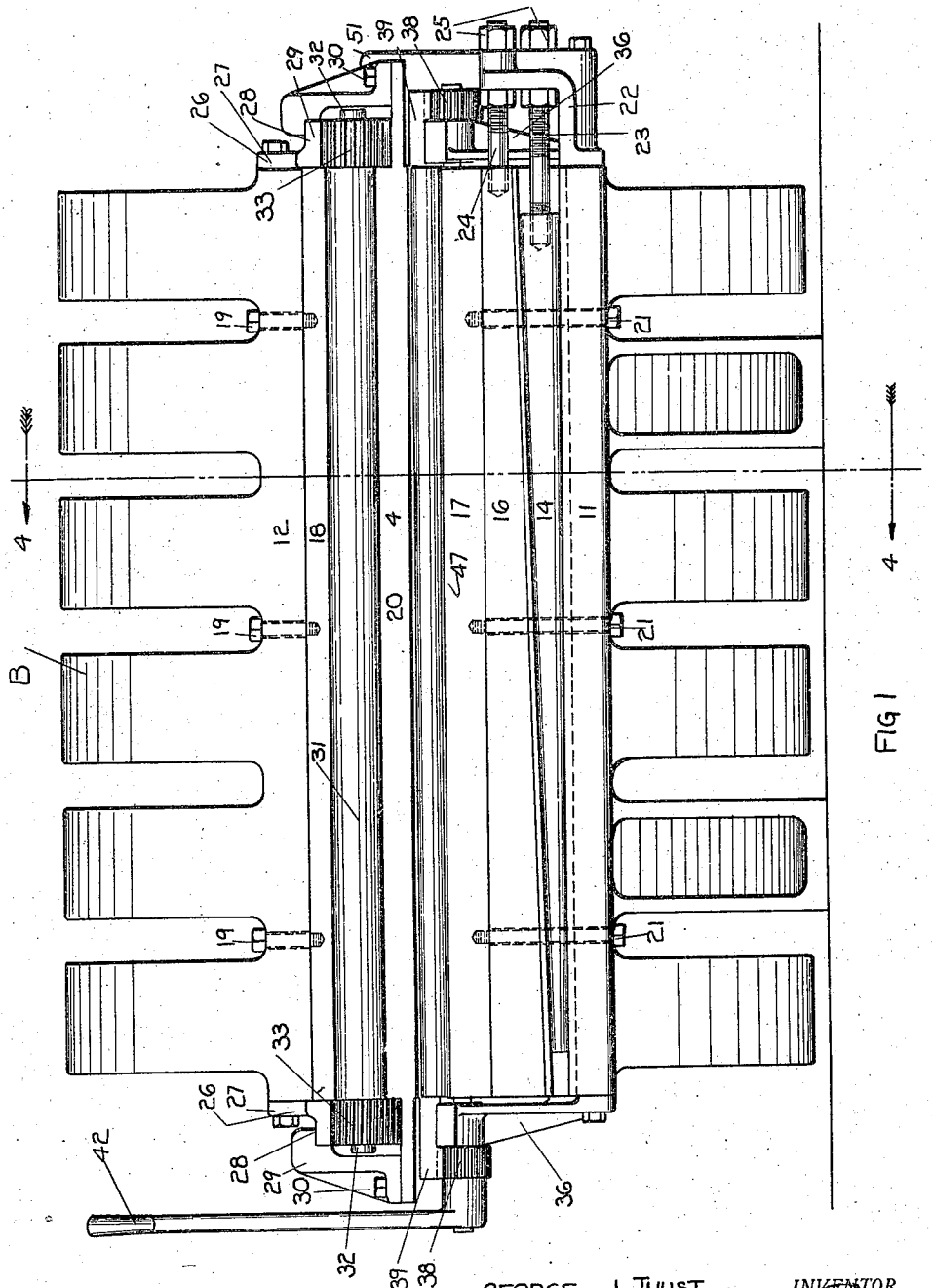


FIG 1

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BY

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Oct. 4, 1927. 1,644,552

G. J. THUST

EXPANDING MILL

Filed July 16, 1925 6 Sheets-Sheet 2

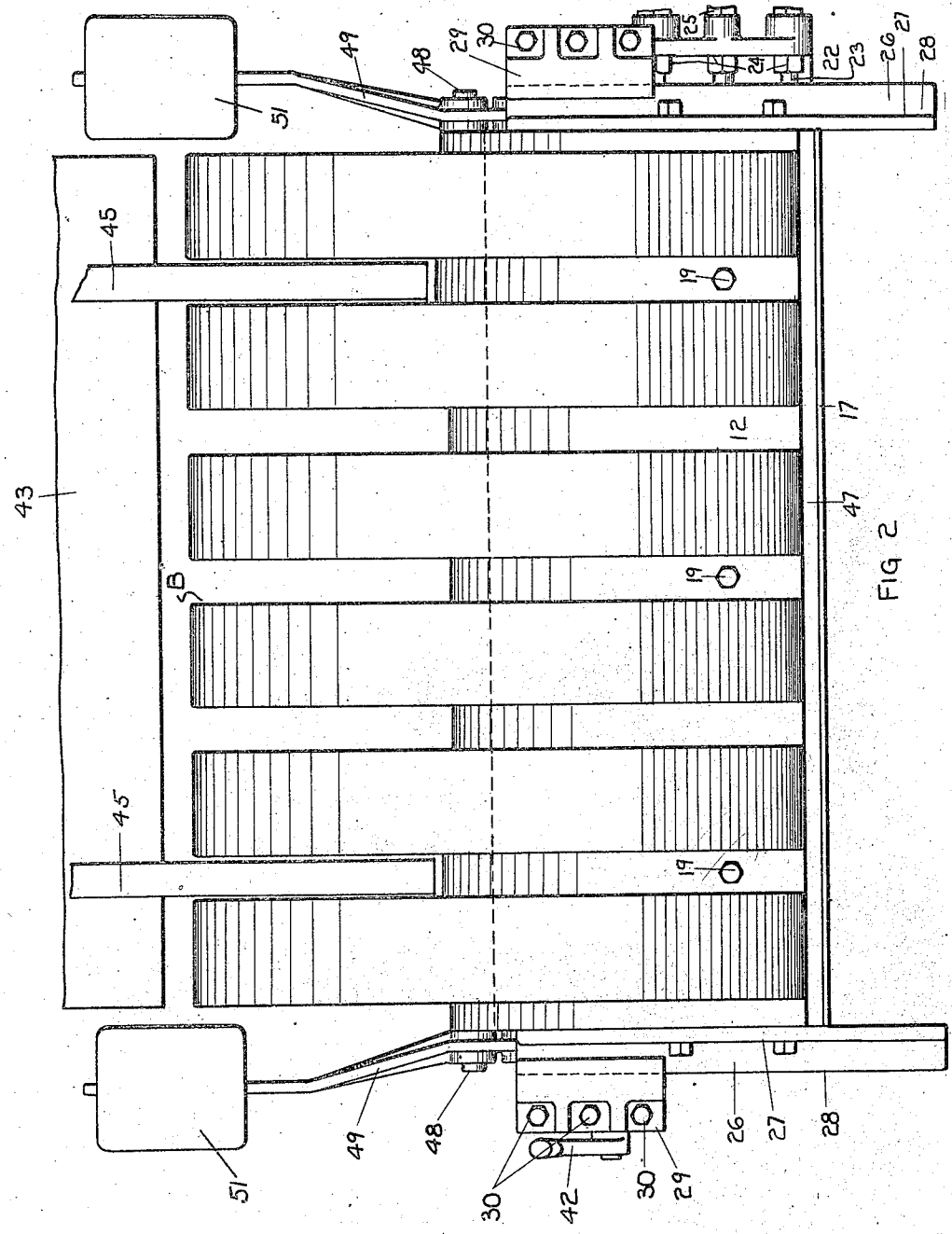


FIG 2

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Oct. 4, 1927. 1,644,552

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EXPANDING MILL

Filed July 16, 1925 6 Sheets-Sheet 3

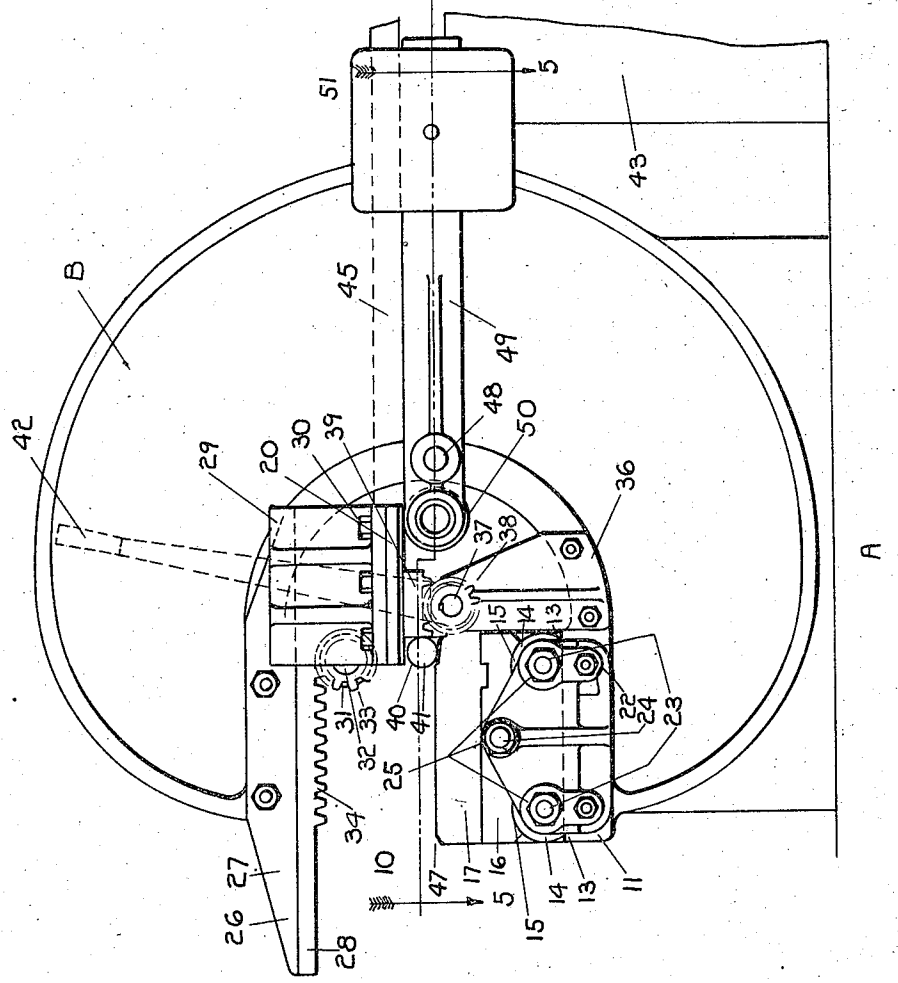


FIG 3

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Oct. 4, 1927. 1,644,552

G. J. THUST

EXPANDING MILL

Filed July 16, 1925 6 Sheets-Sheet 4

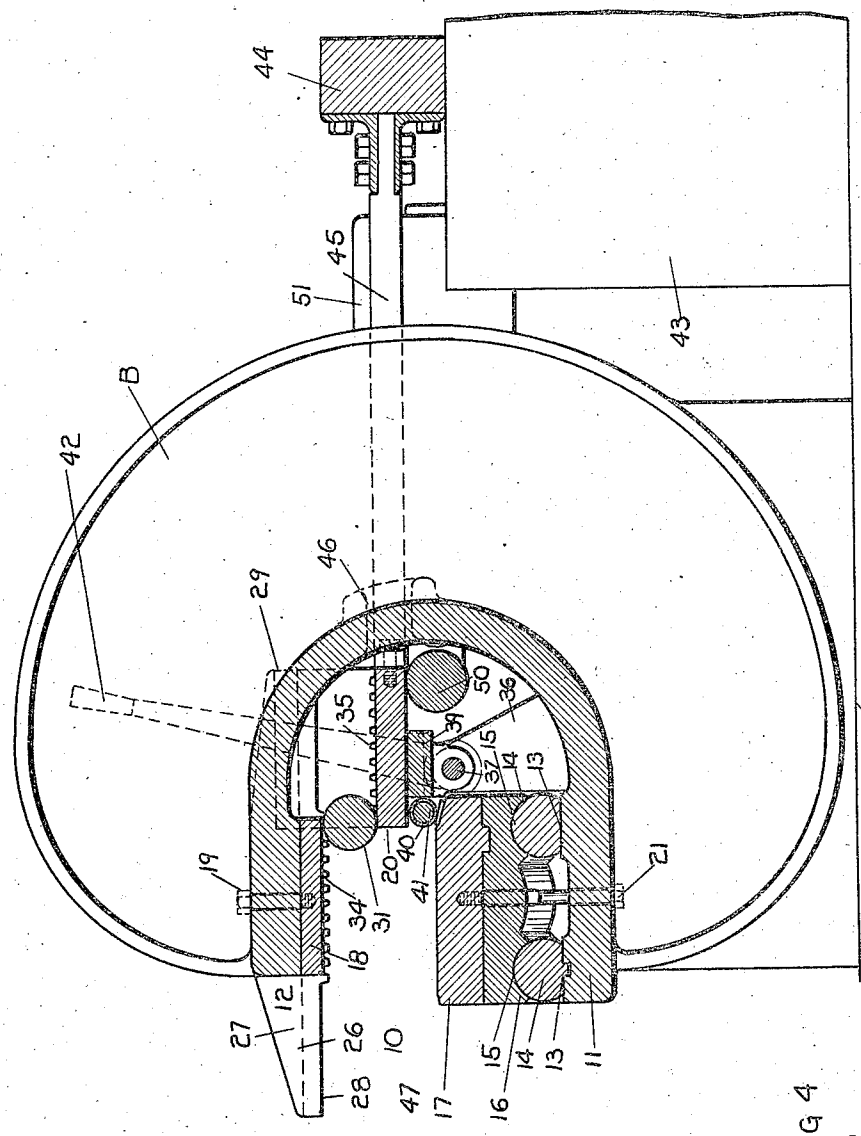


FIG 4

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Oct. 4, 1927. 1,644,552

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EXPANDING MILL

Filed July 16, 1925 6 Sheets-Sheet 5

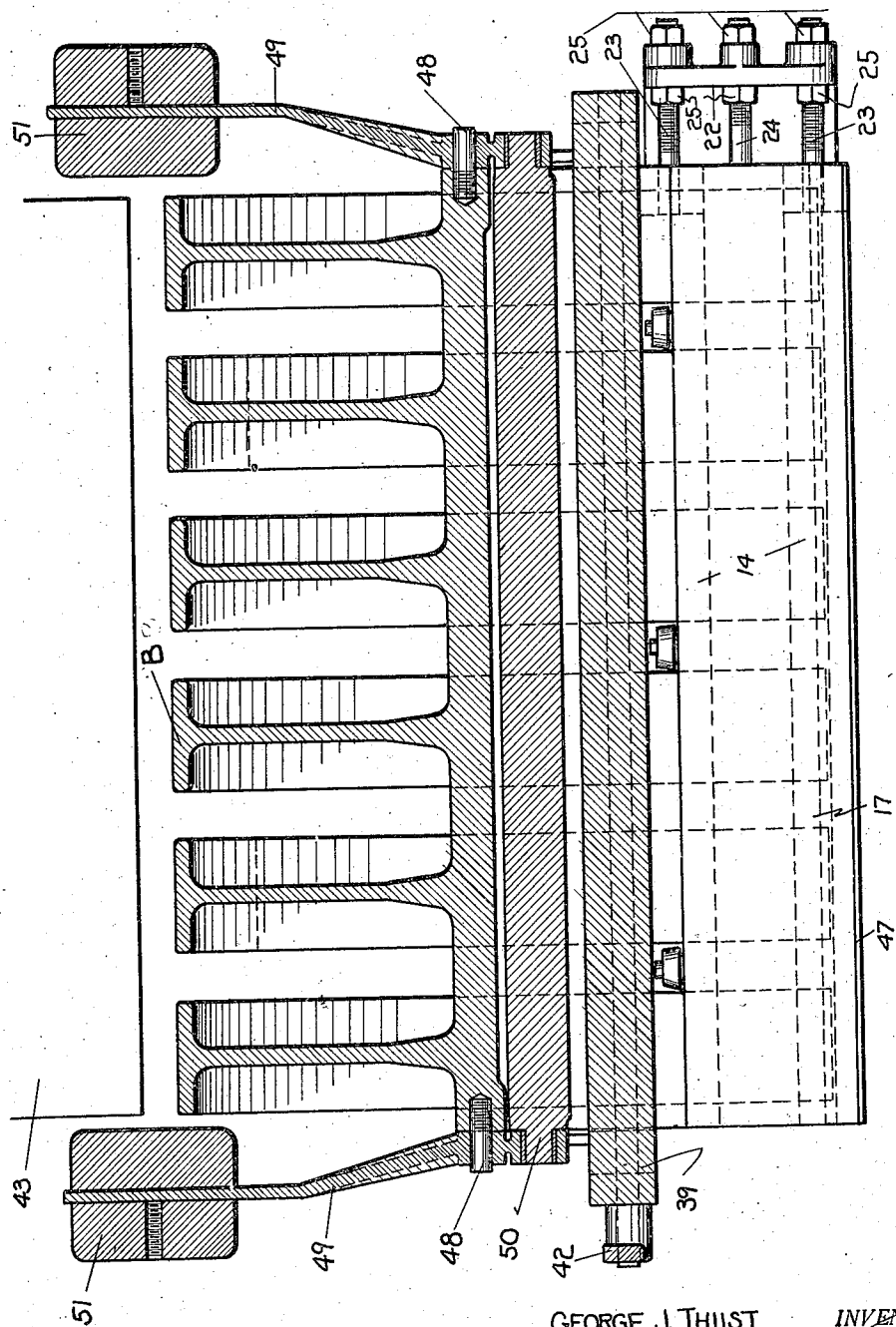


FIG 5

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Oct. 4, 1927. 1,644,552

G. J. THUST

EXPANDING MILL

Filed July 16, 1925 6 Sheets-Sheet 6

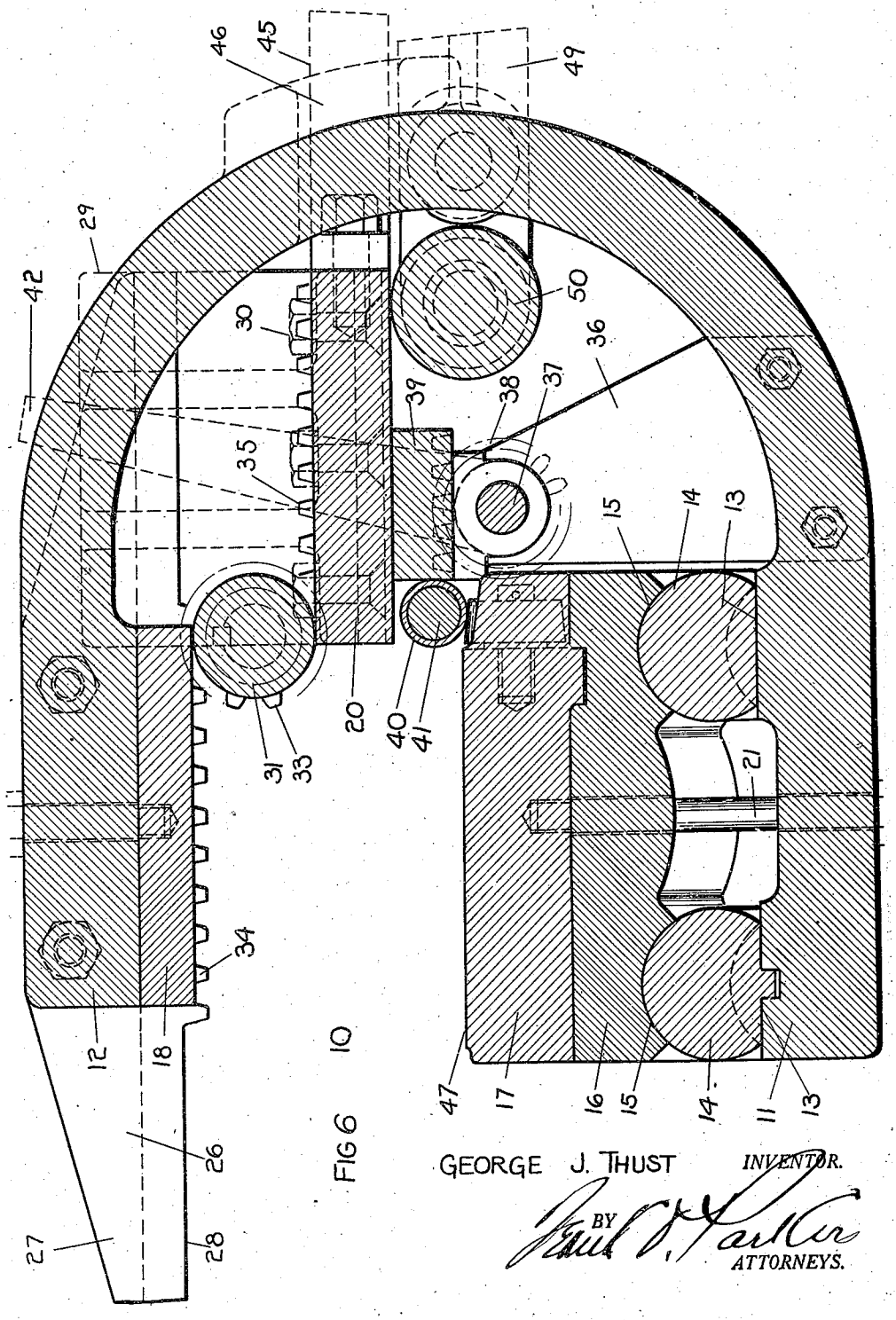


FIG 6

GEORGE J. THUST INVENTOR.

BY Paul J. Parker

ATTORNEYS.

Patented Oct. 4, 1927. 1,644,552

UNITED STATES PATENT OFFICE.

GEORGE J. THUST, OF APPLETON, WISCONSIN.

EXPANDING MILL.

Application filed July 16, 1925. Serial No. 44,034.

The invention relates to an apparatus for removing mandrels from steel tubes, and more particularly to the class of expanding mills for use in steel tube making.

The primary object of the invention is the provision of a mill of this character, wherein the steel seamless tube carrying the mandrel, which is tight therein as received from a reducing mill, is acted upon between superposed platens, by a rolling operation, whereby the said tube is stretched, so that it is freed from said mandrel, the lowermost platen being supported in a novel manner to permit the proper adjustment thereof, while the upper platen is supported and moved in a unique manner, to render the same practically frictionless in its operation.

Another object of the invention is the provision of a mill of this character, wherein the upper reciprocatory platen is suspended in the frame of said mill and guided therein during movement to effect the proper rolling of the tube for the required stretching of the same to free the mandrel therein and expand said tube, while the mounting of the lower platen is such as to permit not only the raising or lowering of the same, but the required inclining thereof or the leveling of the same.

A further object of the mvention is the provision of a mill of this character, wherein the construction thereof in its entirety is of novel form and arrangement to assure the required stretching of the steel tube acted upon thereby with dispatch.

A still further object of the invention is the provision of a mill of this character, which is comparatively simple in its make up, possessing but few parts, thoroughly reliable and efficient in its purpose, strong, durable and inexpensive in manufacture and of installation.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described in detail, illustrated in the accompanying drawings showing the preferred embodiment of the invention, and pointed out in the claims hereunto appended.

In the accompanying drawings:

Figure 1, is a front elevation of the mill constructed in accordance with the invention.

Figure 2, is a top plan view thereof.

Figure 3, is an end elevation.

Figure 4, is a sectional view on the line 4—4 of Figure 1.

Figure 5, is a sectional view on the line 5—5 of Figure 3.

Figure 6, is a fragmentary enlarged detail sectional view.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail, A, designates the bed of the mill, which is of the required size to meet the demand of the latter, and has superimposed thereon the C-shaped frame B, having at its open mouth 10, a lower table 11, and an upper crown 12, these being disposed transversely of the frame B, and are at the required spaced apart relation to one another, while the table 11, has formed thereon longitudinally of the same spaced parallel raised guideways 13, for independently adjustable wedges 14, coacting with reversely inclined seats 15, formed in the under face of an adjustable support 16, of a lower platen 17, for the mill.

On the crown 12, is removably secured an upper plate 18, the same being fastened in place by the bolts 19, while located between this plate 18, and the lower platen 17, is a movable platen 20, the same being of the required thickness and dimensions as may be demanded, and this platen is actuated in a manner hereinafter fully described.

The support 16, and the lower platen 17, are held upon the table 11, through the medium of bolts 21, which are passed loosely through the said table and support and are threaded into the said lower platen, while projecting laterally from one end of the table 11, is a bracket 22, it being fitted with adjusting screws 23, and 24, respectively, each being tapped into the end next thereto of the adjacent wedge 14, and support 16, respectively, so that on adjustment of said screws 23, the wedge acted upon can be moved on the way 13, therefor to regulate the plane of the lower platen 17, as the occasion may require. Each screw 23, and screw 24, carries an adjusting nut 25, which are adapted to work against the bracket 22, to lock the said screws 23, and 24, in adjusted position, and to hold the wedge 14, firm when regulated.

Secured at opposite ends of the upper crown 12, are L-shaped tracks 26, each having the forwardly extending portions 27,

and on the laterally projected track flanges 28, of the same slides a hanger 29, bolted at 30, to each end of the movable platen 20, these hangers 29, serving as safety supports for the latter.

Arranged between the movable platen 20, and the upper plate 18, is a bearing roll 31, having reduced outer ends 32, the latter having keyed thereto rack gears 33, each meshing with upper and lower toothed racks 34, and 35, on the under face of each track flange 28, and the upper face of the movable platen 20, respectively, to hold the roll 31, in its proper relation with the upper plate 18, and said movable platen 20.

Carried on the frame B, rearwardly of the lower platen 17, are vertical bearings 36, in which is journaled a transverse shaft 37, fitted at opposite ends with rack pinions 38, the latter being enmesh with companion rack teeth formed in a block 39, depending from the under face of the platen 20, and this block 39, serves as an abutment for the steel tube 40, and the mandrel 41, held fast therein, when placed in the mill, so as to initially move this unit between the lower platen 17, and the upper movable platen 20, for rolling action therebetween, to stretch said tube 40, for freeing it from the mandrel 41, within the same.

The shaft 37, has fixed to one end a throw lever 42, which is manually operated to actuate the block 39, when the tube 40, is to be placed to be operated upon by the mill. This tube 40 with its mandrel 41, is inserted in the first instance laterally from one end of the mill onto feed rollers *b*, suitably mounted in pockets formed at the rear edge of the lower platen 17, as is clearly shown in Figure 6, of the drawings. It is understood that the abutment block 39, is free of the movable platen 20, and is moved independently of the same, yet it may be moved as a part thereof, should the occasion require.

Located in rear of the frame B, is a bull-dozer 43, the ram 44, of which works upon actuator rods 45, passed through suitable openings 46, in the frame B, and connect with the rear edge of the movable platen 20, these rods 45, being designed to reciprocate the movable platen 20, and when the latter is pushed forwardly it rolls the tube 40, and mandrel 41, therein, outwardly upon the lower platen 17, and when this tube 40, reaches the outer edge 47, of said platen, it is discharged from the mill onto a skid or skids (not shown).

Pivoted at each end of the frame B, as at 48, centrally of the mouth portion 10, is a weighted arm 49, the shorter end of which carries a bearing or friction roller 50, contacting with the under face of the movable platen 20, while the longer end has adjustably mounted thereon a weight 51, and in this manner the said movable platen 20, and roll 31, are held in place during the operation of the mill, and as will appear constitutes a balancing mechanism.

Again with reference to the wedge 14, these will permit the tilting of the support 16, up or down at either the front or rear edges thereof, to compensate for any spring or yield in the frame B, should the same be present at the outer edge 47, of the lower platen 17.

The frame B, is formed with exterior bracing ribs 52, which serve to strengthen the same and minimize the springing or yielding action thereto.

It is of course to be understood that the movable platen 20, may be reciprocated other than from power transmitted through the medium of the bull-dozer 43, so for this, the inventiton is not to be restricted in scope in this respect.

The working faces of the lower platen 17, and the movable platen 20, are flat and smooth, and the latter platen is held in position by a safety hanger or hangers 29, so that it will not fall down in case anything should happen to the weighted levers or arms 49, carrying the friction rollers 50, which have heretofore been described.

What is claimed is:

1. An expanding mill of the character described, comprising upper and lower platens, each having a flat smooth working face, the platens being spaced to receive a tube and its mandrel between the same, means for reciprocating and guiding one of the platens in relation to the other, a crown plate above the movable platen, a roll between the crown plate and movable platen, means for adjusting the stationary platen, and weighted balancing means for sustaining the movable platen and roll in place relative to each other and the crown plate.

2. An expanding mill of the character described, comprising a frame having an open mouth, a lower table at the mouth, an upper crown at the mouth above the table, a plate on the crown, a support above the table, adjustable wedges between the table and support to regulate the plane of the latter, a stationary platen on the support, a movable platen spaced from the stationary platen, a friction or bearing roll between the movable platen and the crown plate, rack gears on the said roll, toothed racks on the movable platen and crown plate and engaging the rack gears, means for reciprocating the movable platen, tracks on the crown, safety hangers on the movable platen and slidable on the tracks, and weighted balancing mechanism acting on the movable platen to sustain the same and the roll in place relative to each other and the crown plate.

3. An expanding mill of the character described, comprising a lower platen, an up-

per movable platen, plural means movable transversely beneath the lower platen to raise, lower and level the same, a substantially C-shaped frame having a mouth at its open side in which are located the platens, rotatable means rearwardly of the lower platen for movably supporting the work when introduced between the platens, tracks on the upper portion of the frame, and extending forwardly of the same, hangers movable over the tracks and carrying the upper platen, rolling means between the upper portion of the frame and said upper platen, and balancing means for the upper platen.

In testimony whereof I affix my signature.

GEORGE J. THUST.