

973,716.

O. A. SMITH.  
CROSS DRILLING ATTACHMENT.  
APPLICATION FILED MAR. 25, 1908.

Patented Oct. 25, 1910.  
2 SHEETS—SHEET 1.

FIG. 2.

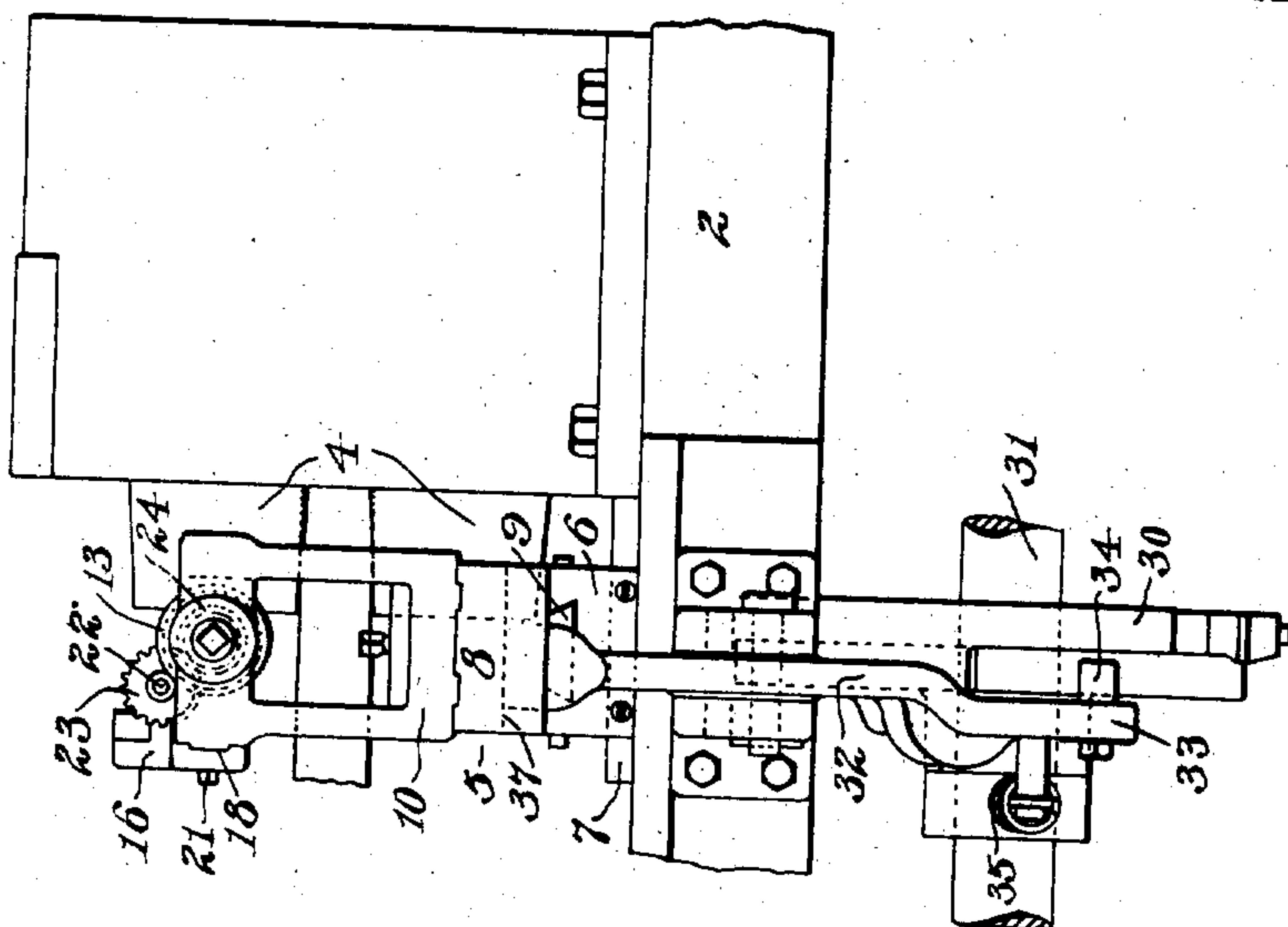
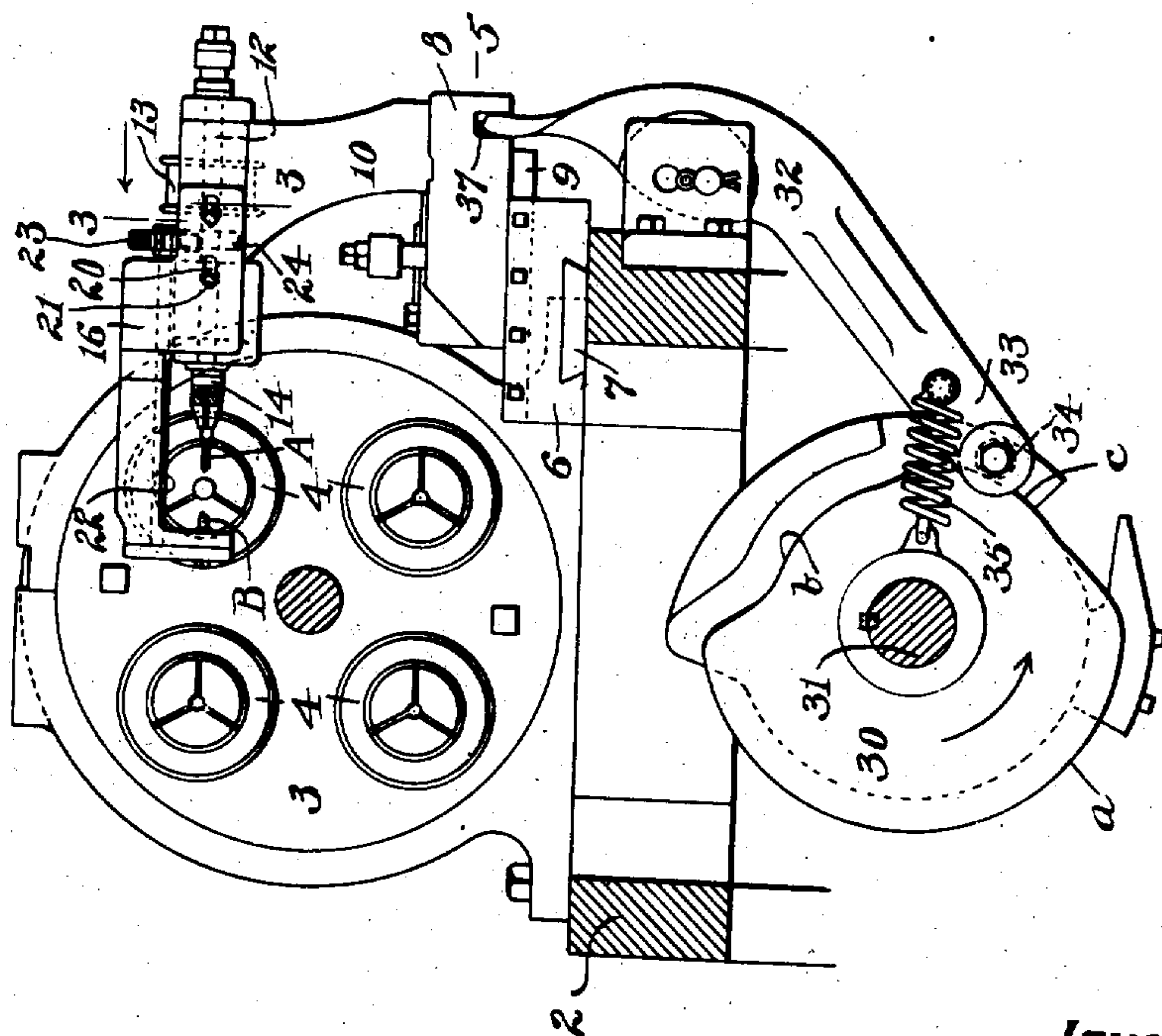


FIG. 1.



Witnesses.

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2 SHEETS—SHEET 2.

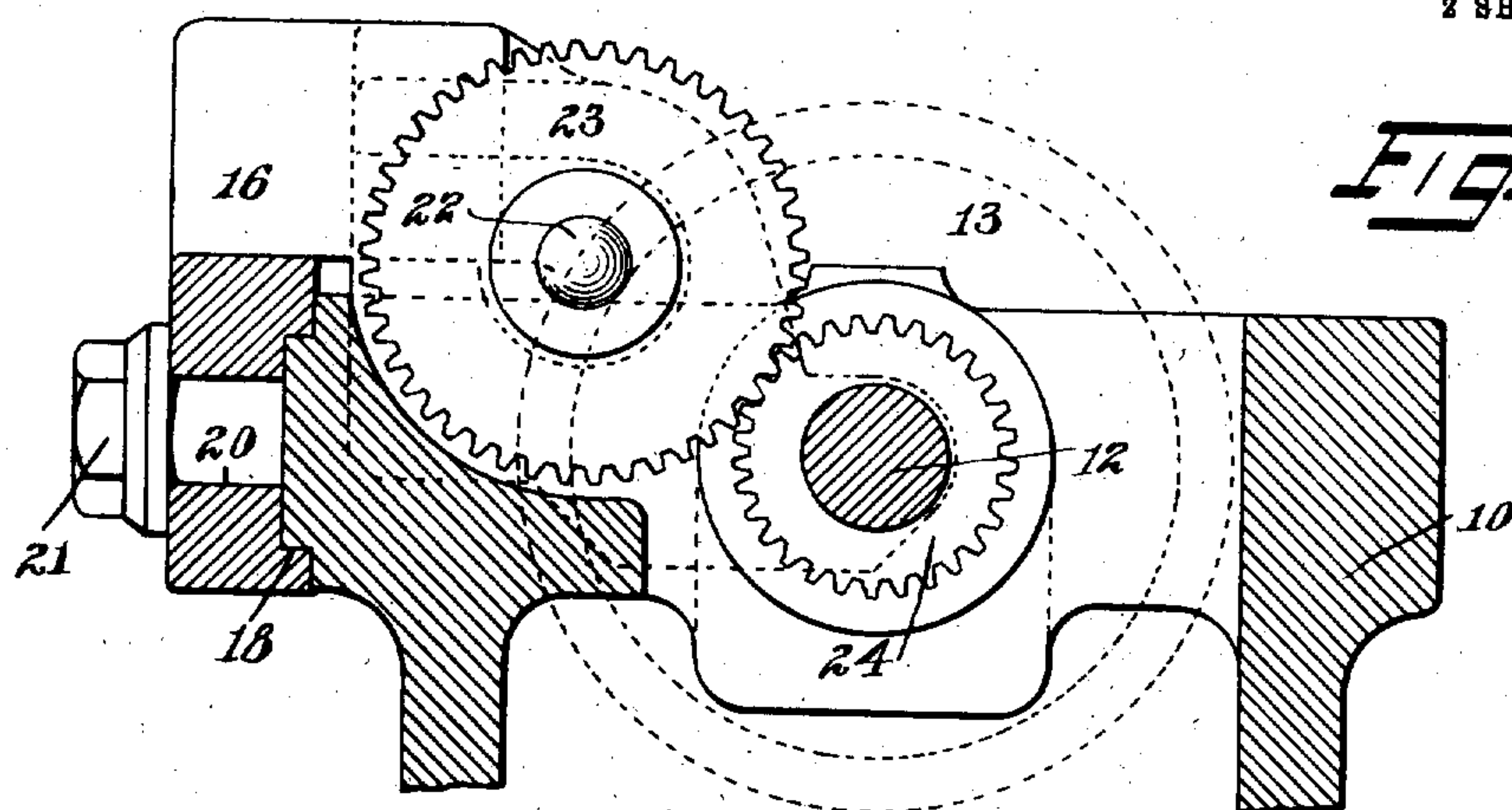


FIG. 3.

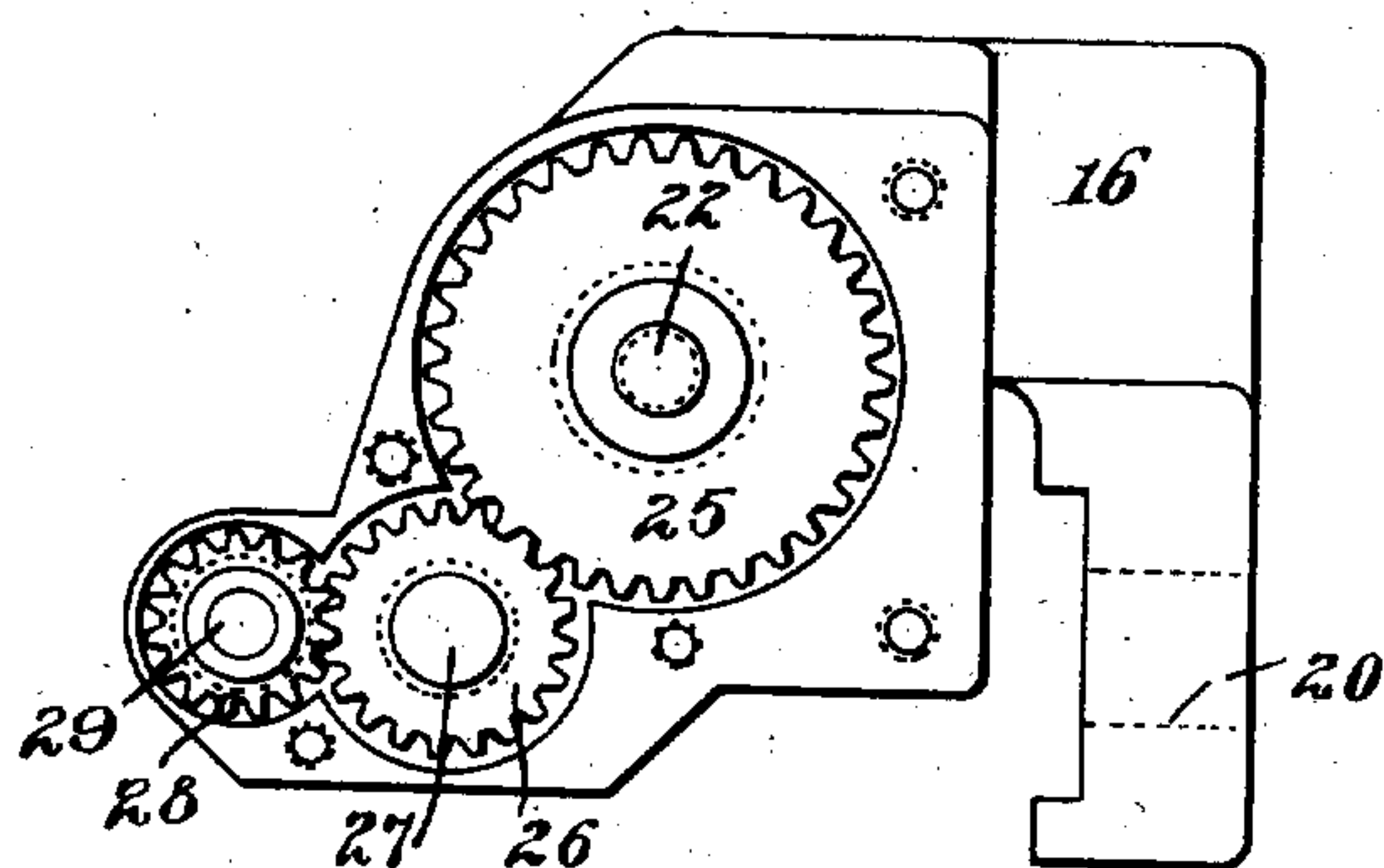


FIG. 4.

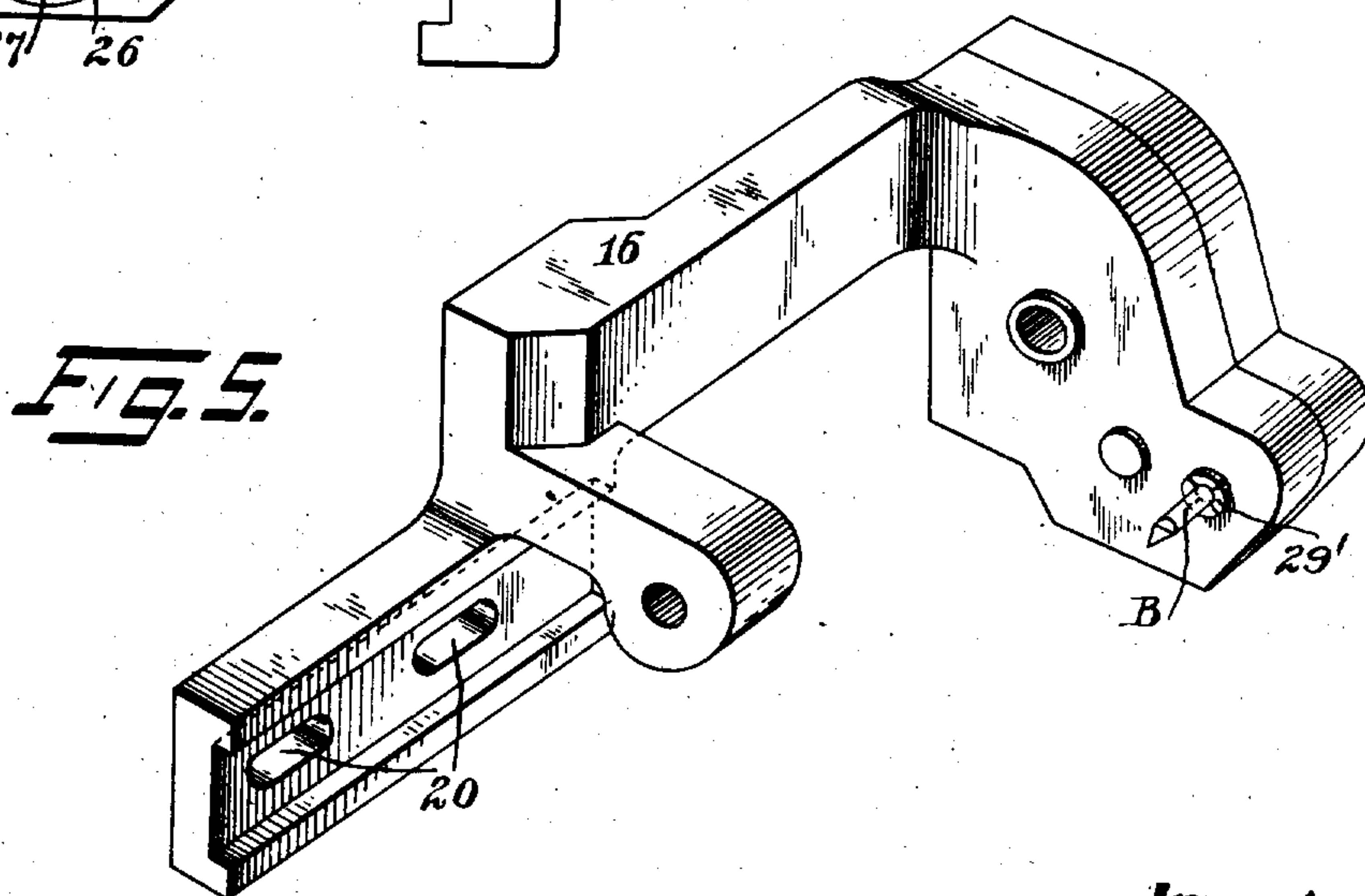


FIG. 5.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## CROSS-DRILLING ATTACHMENT.

973,716.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed March 25, 1908. Serial No. 423,193.

*To all whom it may concern:*

Be it known that I, OSCAR A. SMITH, a citizen of the United States, residing in Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Cross-Drilling Attachments, of which the following is a specification.

The present improvement relates to an automatic attachment for screw machines, and especially multiple screw machines, the object of the invention being to provide an improved means for countersinking, facing, counterboring or drilling both ends or sides of the stock or work carried by the spindle or spindles of such a machine by means operating on both ends or sides of the work, whereby both ends of a cross-drilled hole may be countersunk, faced or counterbored without the necessity of rotating the stock.

In the drawings accompanying and forming part of this specification, Figure 1 is a side view of this improved attachment in position on a multiple screw machine and its means for shifting it into position to perform its work, the work turret and one of the cams of such machine, however, only being shown; Fig. 2 is a view looking from right to left in Fig. 1; Fig. 3 is a cross sectional enlarged view taken in line 3—3, Fig. 1; Fig. 4 is a detail view of one part of the driving mechanism for one of the tools of the attachment; and Fig. 5 is a perspective view of a part of the frame work for carrying one of the tools.

Similar characters of reference indicate corresponding parts throughout the different figures of the drawings.

In one embodiment of the present improvement the frame work 2 of the machine, carrying some suitable form of turret mechanism, shown herein as a turret 3 having four stock spindles 4, is provided with a compound slide support 5, one member, or the base member of which, as 6, is supported on the turret frame-work by means of a suitable track 7 to move toward and from the turret in the plane of the axis of the spindles to properly position the tools herein-  
after described, while the other member, comprising a bracket having a base plate 8, is shiftable on such base member 6 transversely of the axis of the spindles and therefore toward and from the work to bring the  
tools into proper position to perform their

operation, and for this purpose the plate 8 of the bracket is supported on the base member 6 by means of a dovetailed track 9, said member 8 being connected with suitable cam mechanism hereinafter described.

The bracket 10 carries a suitable cross-drilling tool A rotated from a suitable source of power. For this purpose a spindle 12 is journaled in the bracket and carries a pulley 13 for rotating the same. The outer end of this spindle is provided with some suitable tool holding means or chuck 14 for the reception of the tool A. For carrying the opposed tool B of the attachment, located in alinement with the tool A, a suitable supplemental shiftable bracket 16 is provided, which is clamped to the bracket 10 at one side thereof, and for this purpose the pair of brackets are provided with a suitable guideway 18, by means of which the supplemental bracket is adjustable on the main bracket 10. To bring the opposed tool B into proper working position the supplemental bracket is provided, in the embodiment shown, with a pair of elongated openings 20 through which clamping bolts 21 extend. Carried by this supplemental bracket, which is shown as of substantially U-shaped form so as to properly support the opposed tool B in such position that it will be in axial alinement with the tool A but at the opposite side of the stock or work, is a shaft 22 carrying on its inner end a gear 23 in mesh with a gear 24 secured to the pulley shaft. On the outer end of this shaft 22 is a gear 25 meshing with a gear 26 carried on a stub shaft 27, which latter gear in turn meshes with a gear 28 fixed to a spindle 29 having some suitable holding means or chuck 29' for the reception of the desired form of tool B. That end of the supplemental bracket which carries the gears 26, 27 and 28 is shown in the form of a housing, whereby these gears are entirely inclosed, and for this purpose the bracket is provided with a plate fitting over the chamber or recess in which these gears are located.

By means of this attachment it will be observed that the stock to be operated upon is located between two opposed tools, both of which are operated from the same source of power, such tools being located in axial alinement one on the outer side of the stock and the other on the inner side thereof to work on such stock transversely thereof,



whereby both ends of a cross-drilled hole or opening may be worked, as faced or counter-bored, without the necessity of rotating the stock. To accomplish this suitable means is provided for automatically shifting the opposed tools successively into position to perform their work, and this means, in the present instance, comprises cam mechanism consisting of a cam 30 mounted on a driving shaft 31 and provided in the present instance with three cam surfaces *a*, *b*, *c*. Co-operating with this cam is a lever 32 pivoted to the frame-work with its lower end 33 provided with a stud or roll 34 held in engagement with the cam faces by a suitable spring 35, the upper end 36 of this lever fitting a groove 37 in the base of the bracket 10, whereby, on the rotation of the cam, the bracket will be shifted toward and from the stock or work.

In the present improvement the cam is so formed that the bracket 10 will be first moved to bring the cross-drilling tool A into position to cross-drill the work and face or countersink one end of such drilled opening when the tool is formed to accomplish this, the placing of the tool A into its proper position being accomplished by means of the cam face *a*, subsequent to which, as the cam face *b* comes into position, the bracket is shifted backwardly to carry the cross-drilling tool A out of and away from the work and to bring its opposed tool B into position to perform its work on the opposite end of the opening made by the cross-drilling tool A. As the opposed tool B completes its work the cam face *c* comes into position and carries this opposed tool away from the work and, together with the cross-drilling tool, into a neutral position, at which time the turret may be rotated to bring a new piece of work into position to be cross-drilled and finished. It is understood, of course, that during the cross-drilling and finishing of the stock the rotation of the particular spindle carrying such stock is stopped, although the others may continue to rotate, some suitable means being provided for this purpose, and that the cam mechanism is so timed that the several operations of the opposed tools will be automatically accomplished upon the successive pieces of work as the same are brought into position on the rotation of the turret, thus avoiding the necessity of rotating the work in its spindle after one end of a cross-drilled

opening has been faced, to bring the opposite end thereof into position to be similarly worked.

I claim as my invention:

1. The combination with work supporting means, of a cross-drilling attachment comprising a pair of opposed rotary drills mounted on a common support and located one at each side of the work whereby they are adapted to work on opposite sides of such work, means for rotating said drills, and means for shifting said common support into position to enable the drills to work successively on opposite sides of the work.

2. The combination with work supporting means, of a cross-drilling attachment comprising a pair of opposed rotary drills mounted on a common support and located one at each side of the work whereby they are adapted to work on opposite sides of such work, means for rotating said drills, means for shifting said common support into position to enable the drills to work successively on opposite sides of the work, and means for effecting an adjustment of one of the rotary drills toward and from the other.

3. The combination with work supporting means carrying a work holder, of a cross drilling attachment comprising a pair of opposed axially aligned rotating tools located one at each side of the work carried in said holder whereby they are adapted to work on opposite sides of the work and mounted on a common support, means for shifting said common support into position to permit the tools to successively work on opposite sides of the work and timed to carry each of such tools successively into a neutral position, and means for rotating both of said tools.

4. The combination with work supporting means having a work holder, of a cross drilling attachment comprising a pair of rotary tools supported in opposition on a common support, one part of such common support comprising a bracket overhanging the work holder and carrying one of said tools, means for rotating both of said tools, and means for shifting said common support thereby to carry the tools toward and from the work.

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Witnesses:

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