

G. REYHER.  
MILLING AND LIKE MACHINE.  
APPLICATION FILED MAY 24, 1907.

911,841.

Patented Feb. 9, 1909.

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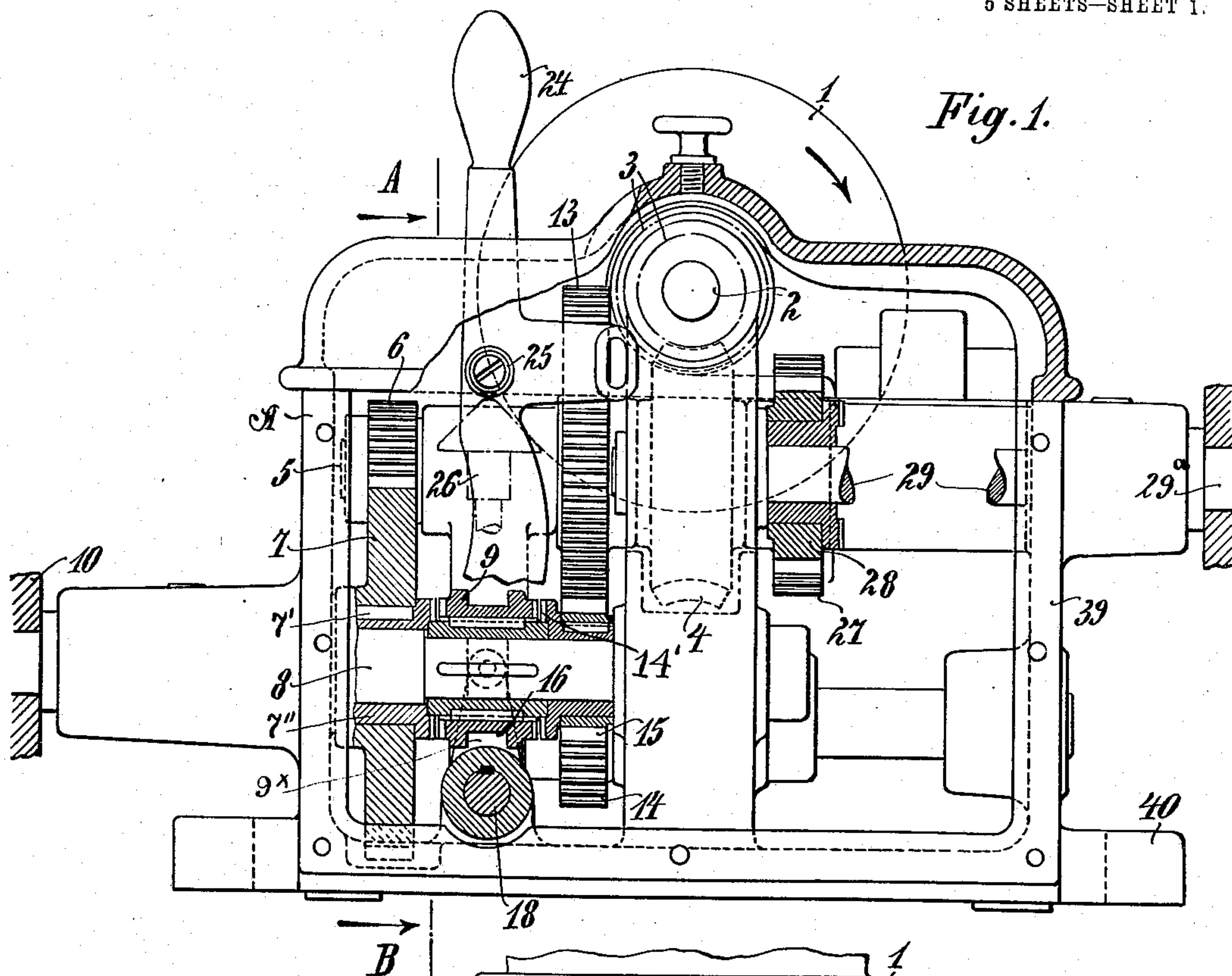


Fig. 1.

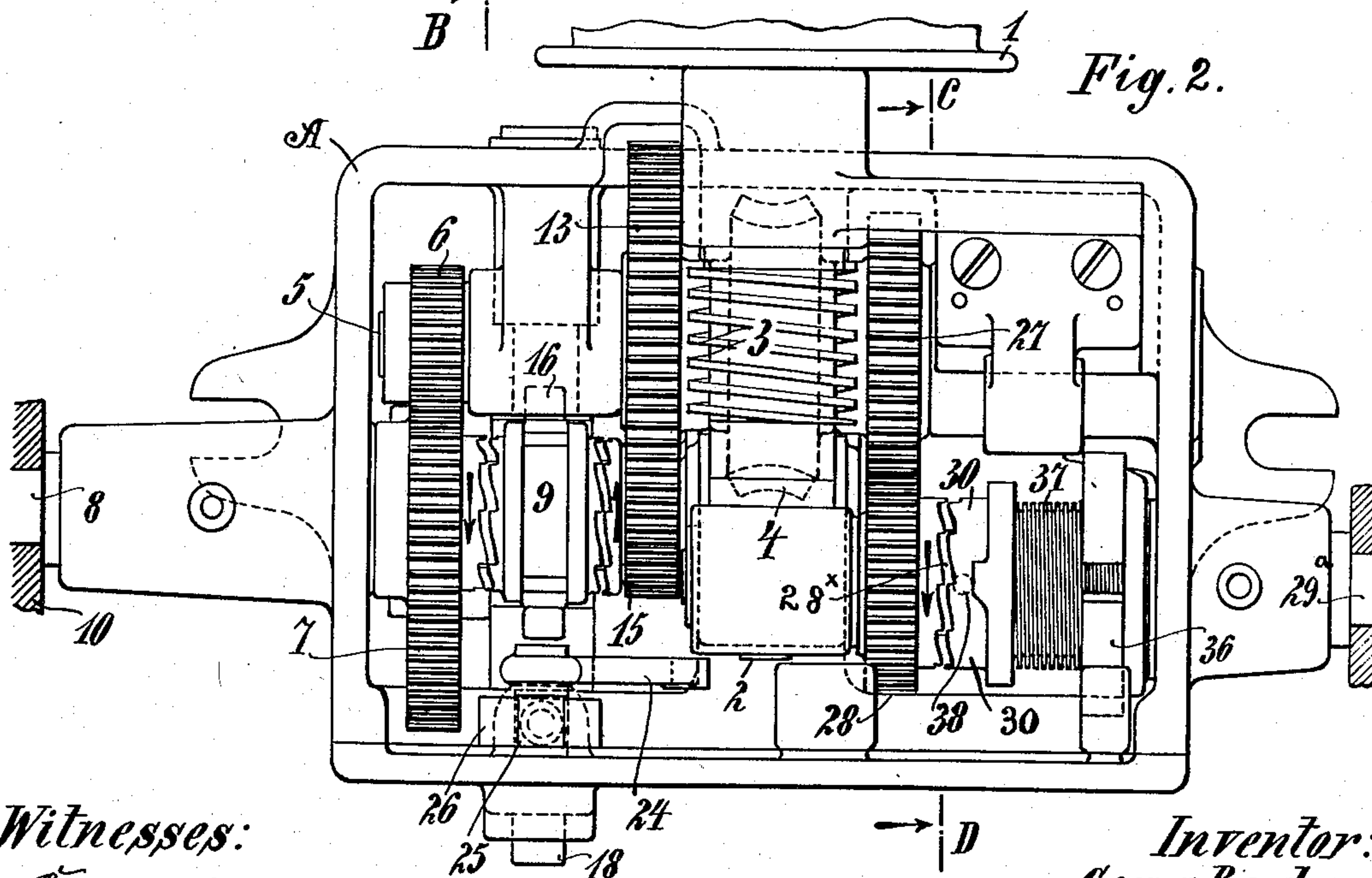


Fig. 2.

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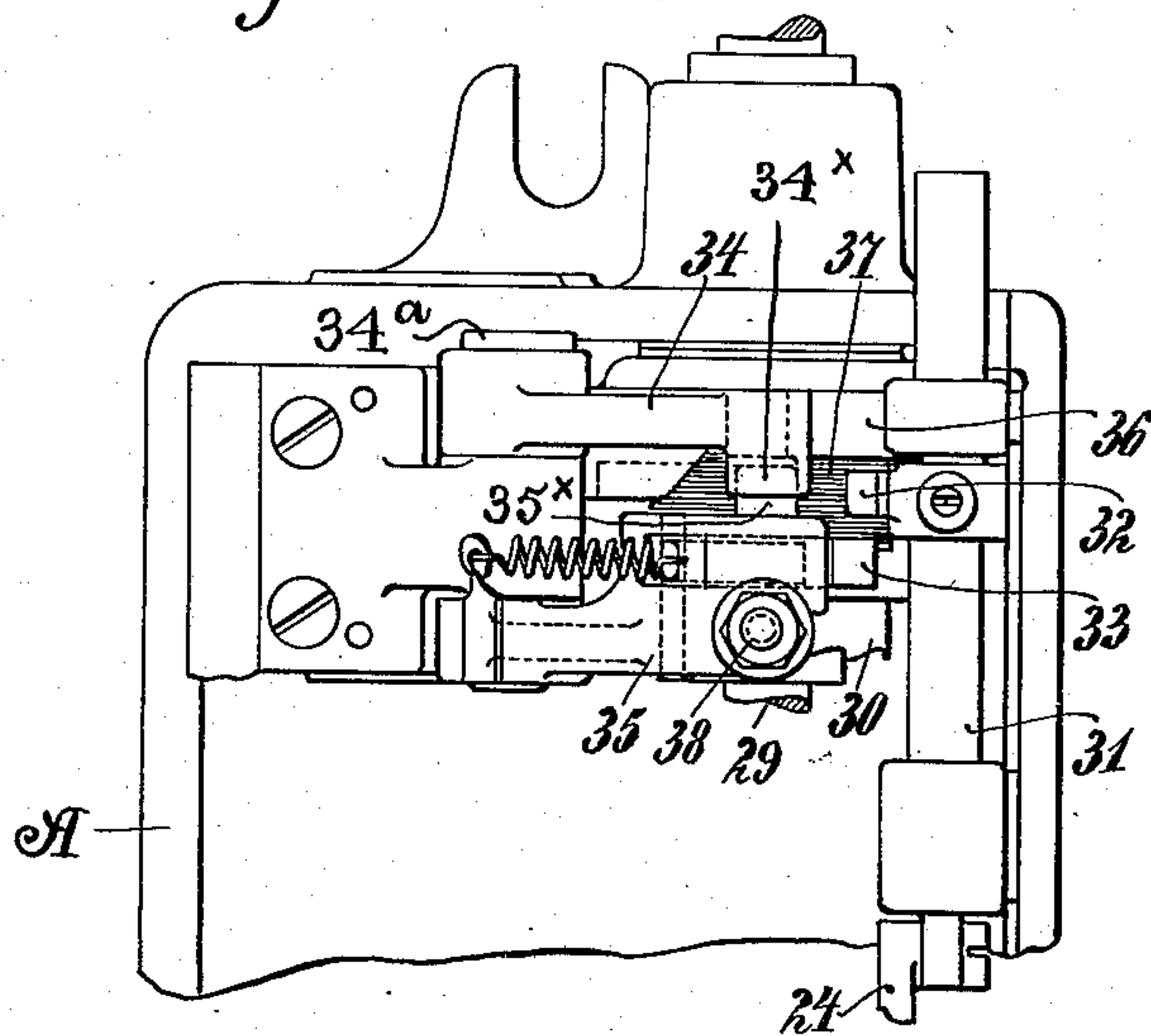
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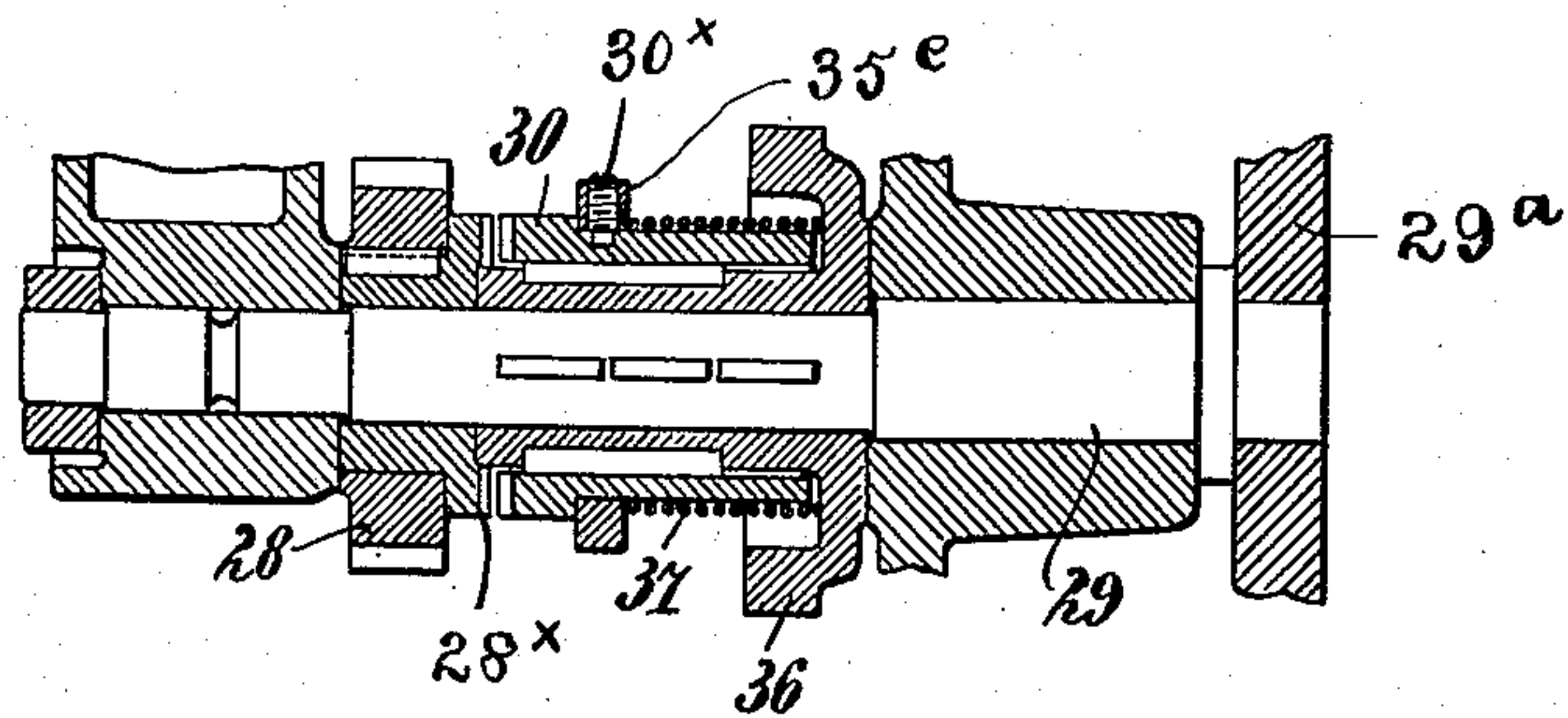
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5 SHEETS—SHEET 3.

*Fig. 5.*



*Fig. 6.*



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5 SHEETS—SHEET 4.

Fig. 7.

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5 SHEETS—SHEET 5.

Fig. 8.

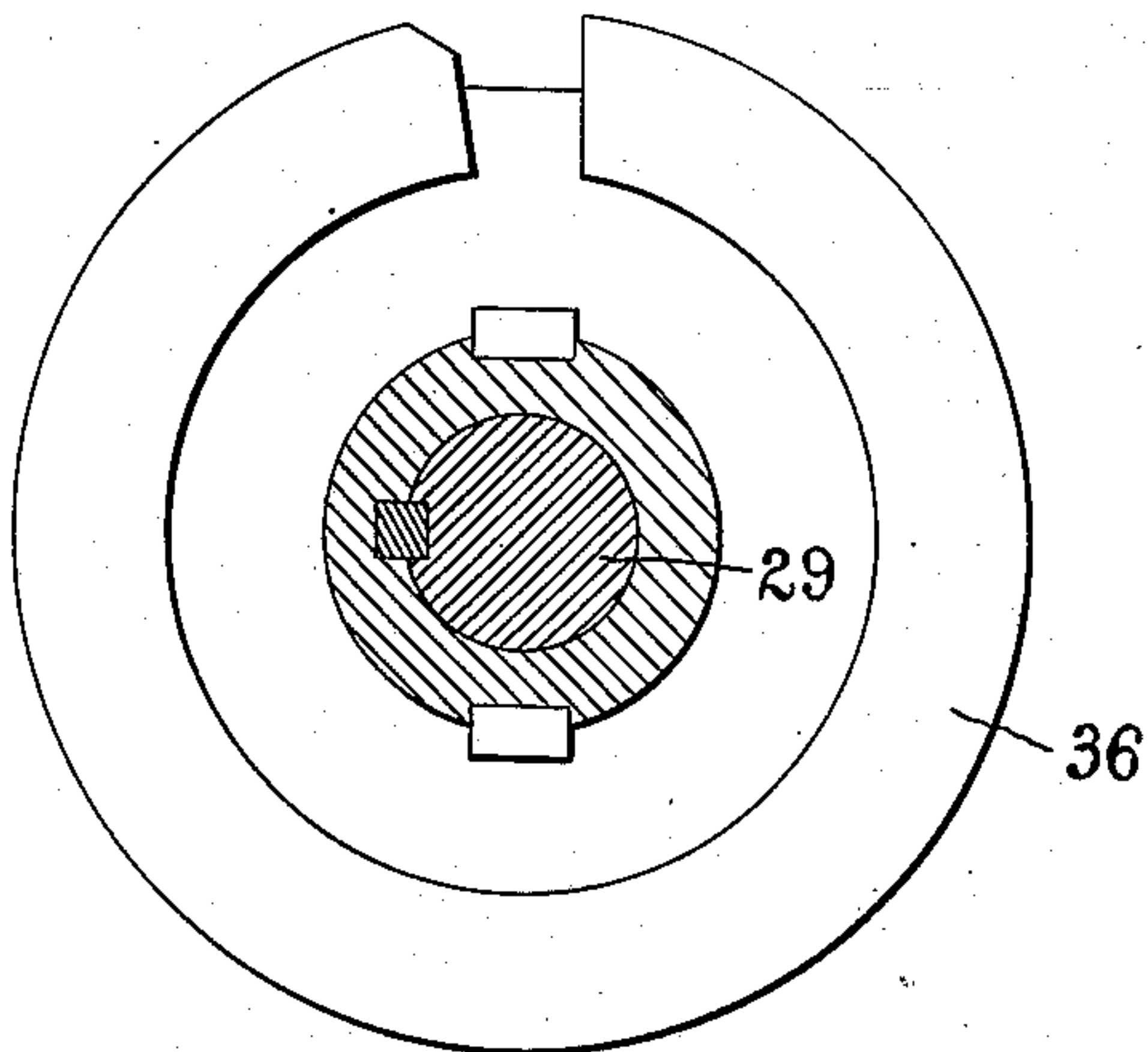


Fig. 9.

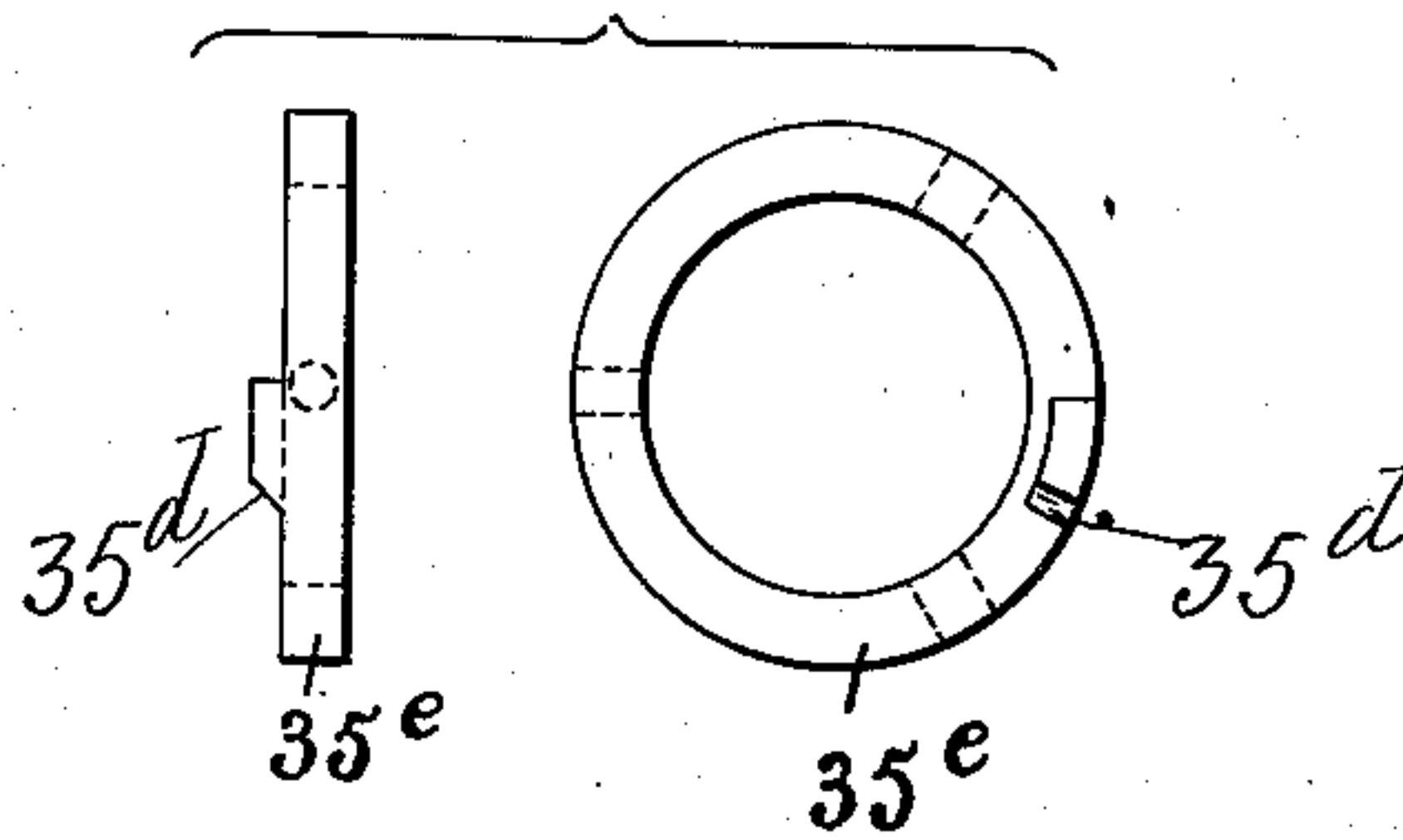


Fig. 10.

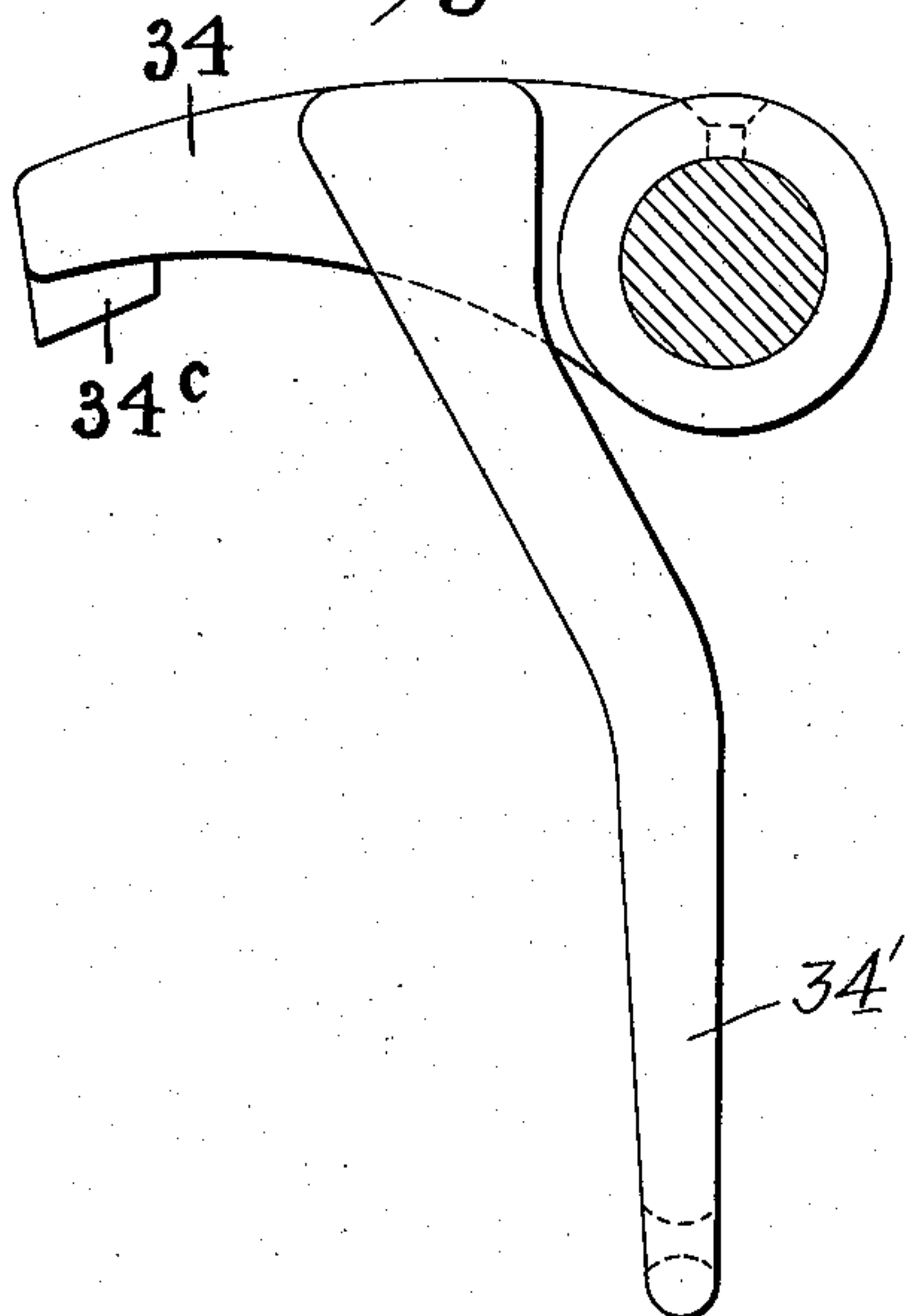
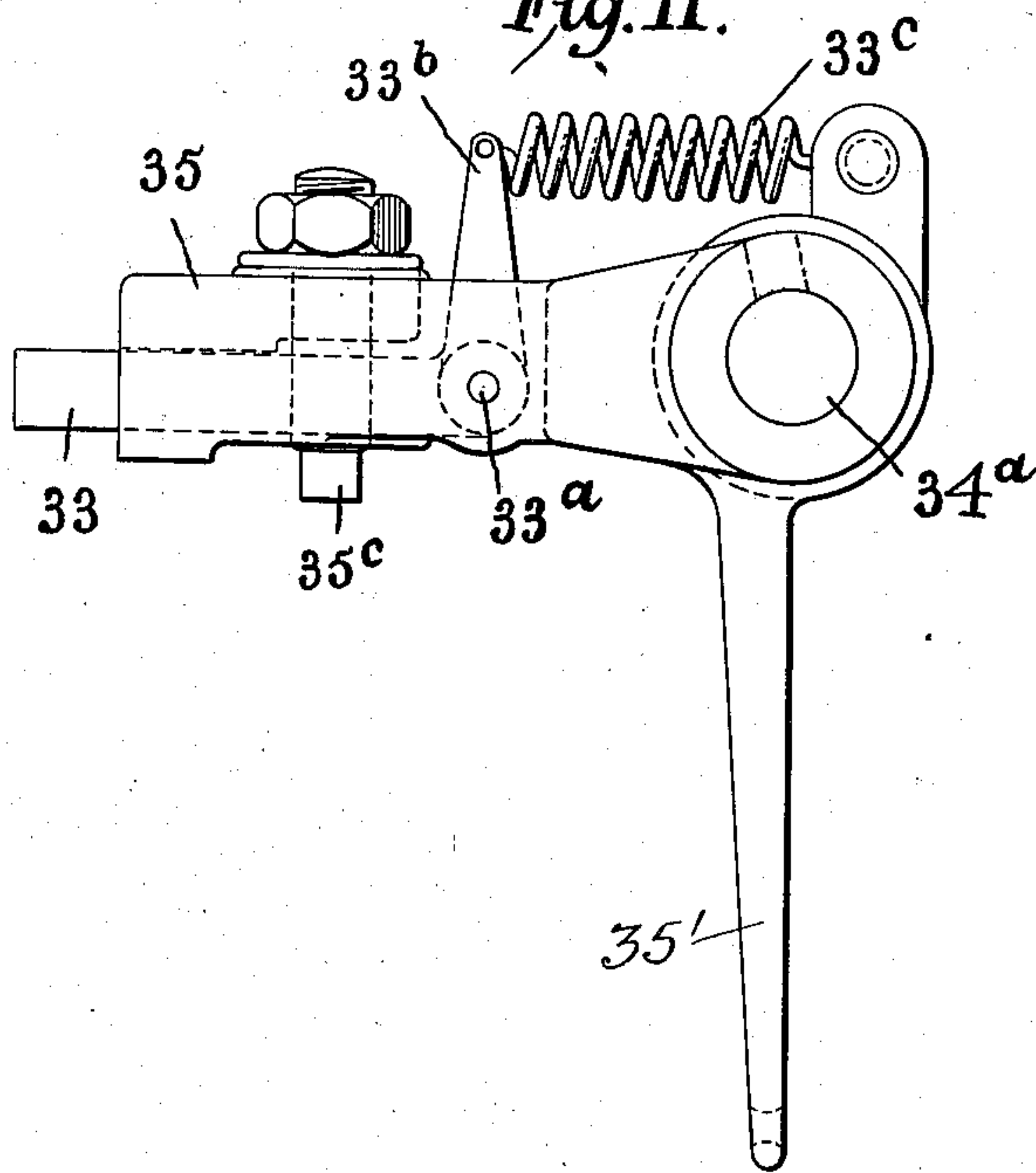


Fig. 11.



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# UNITED STATES PATENT OFFICE.

GEORG REYHER, OF BERLIN, GERMANY.

## MILLING AND LIKE MACHINE.

No. 911,841.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed May 24, 1907. Serial No. 375,541.

*To all whom it may concern:*

Be it known that I, GEORG REYHER, a subject of the King of Saxony, and resident of No. 23 Emdenerstrasse, Berlin, Germany, have invented new and useful Improvements in Milling and Like Machines, of which the following is a description.

This invention relates to an attachment to milling machines arranged in a special casing to be attached to or detached from the reciprocating table and is intended for effecting the automatic forward and backward motion of the milling or like machine table and the simultaneous automatic operation of the dividing head, which supports the piece or material to be operated on, after the backward movement of the milling or like machine table has been effected.

The attachment is to be used with a milling machine of a known kind, and being placed on the working or reciprocating table of the machine effects by means of gears and clutches inclosed in it, and by means of shaft ends projecting from the casing and change wheels on the main portion of the known machine the entire automatic forward and backward movement of the table as well as the step by step movement of the dividing head which holds the piece to be worked.

By the use of this attachment the management of the known machine as for instance any existing universal milling or like machine is greatly simplified and the operator is enabled to look after a number of machines simultaneously.

The dividing head may be adjusted to any angle so that with the machine converted into an automatic machine the most varied work of shaping with the exception of spiral shaping can be carried out.

The invention is of special importance in shops where in consequence of insufficient employment therefor, the setting up of special machines would not prove remunerative.

After the supplementary apparatus has been removed the machine can be worked again in the ordinary way.

The invention is illustrated by way of example in the accompanying drawings.

Figure 1 is a front elevation of the supplementary apparatus partly in section. Fig. 2 is a plan with the cover of the casing removed. Fig. 3 is a section through A B in Fig. 1. Fig. 4 is a section through C D in

Fig. 2. Fig. 5 is a plan of Fig. 4. Fig. 6 is a horizontal section through the engaging coupling. Fig. 7 is a general view of a milling machine fitted with the supplementary apparatus. Figs. 8, 9, 10 and 11 are views of details.

The reciprocating table of the ordinary milling machine is shown at *a*.

At *b* I show the cutting tool of any form; *c* is the piece being cut and *d* the dividing head by which the work piece is held and adjusted step by step, all of these parts being well known.

My attachment comprises a casing A detachably fixed to the table *a* in any suitable manner, said casing carrying the mechanism which I will now describe.

The driving pulley 1, which is rotated by any preferred source of power, is fixed on the shaft 2 seated in the box or casing A and carrying the worm 3. This worm engages with a worm wheel 4 on the shaft 5, from which, for moving the table *a* forward, the motion is transmitted through the medium of the spur wheels 6, 7 to the shaft 8. The spur wheel 7 is keyed at 7' to a clutch member 7'' loose on the shaft 8. This clutch member is adapted to be engaged by a clutch 9 splined on the said shaft 8. On the shaft 8 is also fixed the spur wheel 10, which either directly or through the medium of an intermediate spur wheel engages with the spur wheel 11 which is held on the outer end of the table spindle 12. On the shaft 5, moreover, a tooth wheel 13 is fixed, which acts on the loose spur wheel 15 on the shaft 8 by means of a wheel 14. This wheel 15 has clutch teeth at 14' adapted to be engaged by the clutch 9 when reversed to thus bring about the backward movement of the table.

The reversing of the coupling 9 is effected by means of a fork 16 (Fig. 3) by which it is embraced and which engages with its rollers or pins in a central groove 9<sup>x</sup> in this coupling. The fork 16 is seated on a shaft 18 which carries outside the casing, the double arm lever 17. The lever 17 is connected by means of a pin 19 with the lever 20, which is connected with the controlling or shifting rod 21. The pin 19 is screwed into the lever 20 and engages with a certain play in a suitable hole 17<sup>a</sup> in the lever 17. It can be screwed in the other hole 17<sup>b</sup> of the lever 17 in order to transmit the movements of the lever 20 to the one or other arm of the



lever 17 according to the direction in which the machine is working; that is, if the work piece lies to the left of the cutting tool the pin is placed in the hole 17<sup>a</sup> but if the work  
 5 piece is at the right of the cutting tool and the cutting is done on the leftward stroke of the table the pin is placed in the hole 17<sup>b</sup>. On the engaging rod 21 adjustable adjusting rings 22 are provided for shifting the rod by  
 10 striking extension 23 which is fixed to the lower part of the carriage of the shaping frame.

In order that the reversing action commenced through the stop 23 may be reliably  
 15 carried out to the end, an adjusting lever 24 fixed on the shaft 18 is furnished with a roller 25, against which a vertically arranged spring rod 26 lies, the upper part of which that contacts with the roller 25 is of a wedge  
 20 shape. As soon as the movement of the lever carries the roller 25 slightly to one side of the vertical center of the spring bar the said bar is forced upwards under the action of the spring 25<sup>x</sup> that surrounds it so that the  
 25 adjusting lever 24 is forced to complete its movement, which movement is communicated through the shaft 18 to the fork 16, and is great enough to effect the reversing of the coupling 9. It will also be easily seen  
 30 that a reversal of the clutch 9 can also be effected independently of the stop 23 by turning the lever 24 by hand.

Besides the automatic control of the back and forth movement of the table by the de-  
 35 scribed apparatus forming the attachment, the necessary movement of the dividing head for the exact adjustment of the piece of work is effected from the shaft 5. For this purpose a spur wheel 27 (Fig. 2) is fixed on  
 40 the shaft 5, and meshes with a loose wheel 28 on a shaft 29. The hub of the wheel 28 is provided with clutch teeth 28<sup>x</sup> to be engaged by a coupling part or clutch 30 seated in front of it and splined to the shaft 29 as  
 45 shown in Fig. 6. On the outer end of the shaft 29<sup>a</sup> a spur wheel 29 is keyed, which with the assistance of suitably chosen change wheels transmits the movement of the shaft  
 50 5 to the dividing head when the coupling 30 is connected with the clutch teeth of the gear 28 and thus to the desired extent, the dividing head carrying the work piece. For this purpose, the lever 24 is connected with a connecting rod 31 (Fig. 5) which carries a cam  
 55 projection 32 to lift a lever 35 by engaging a projection 33 thereon. This lever has a projection 35<sup>x</sup> which engages from below a projection 34<sup>x</sup> on a lever 34 pivoted to the frame at 34<sup>a</sup> (see Figs. 4 and 5). These  
 60 levers normally hold respectively the clutch 30 out of operation and a disk 36 against movement. The disk 36, Figs. 6 and 8, is keyed to the shaft 29 and so long as it (the disk) is held by the pawl lever 34 and the  
 65 clutch 30 is held back by the pawl lever 35

out of engagement with the clutch teeth of the gear 28 the shaft 29 will be held immovable and consequently also the dividing head and work piece will be held against adjusting movement, but when the levers 35, 70 34 are raised the clutch 30 is thrown into action by its spring 37 Fig. 6 and the movement of the gear 28 is transmitted to the shaft 29 and thence through any suitable gearing of which the gear 29<sup>a</sup> forms a part, 75 to the dividing head and work piece.

The operating of the rod 31 by the lever 24 and the consequent release of the levers 34, 35 (Figs. 4, 5, 10 and 11) takes place  
 80 when the movement of the table has been completed in one direction and therefore the movement of the shaft 29 takes place to adjust the dividing head and work piece one step forward to present a new part of the  
 85 work piece to the tool to be operated on thereby. The levers 34 and 35 each have a depending arm as 34' and 35', Fig. 4, connected with springs, one of which is shown at 34'' and by these springs the levers are  
 90 drawn down into operative position to engage the clutch 30 and the disk 36 to hold the parts inactive and the dividing head at rest. The lever 34 has a projection 34<sup>c</sup>, Fig. 4, which engages a suitable notch or recess in the periphery of the disk 36 to hold  
 95 it against movement, as shown in Fig. 4, and the lever 35 has a depending pin 38 to engage a cam shoulder 35<sup>d</sup> on a ring 35<sup>e</sup>, Figs. 4 and 9, fixed to the clutch member 30 by a screw 30<sup>x</sup>, Fig. 6. By the contact of  
 100 this inclined cam shoulder with the pin 35<sup>c</sup> the clutch 30 is drawn back out of engagement with the clutch teeth 28<sup>x</sup> of the gear 28 and at the same time the projection 34<sup>c</sup> of lever 34 engages the notch in the disk 36  
 105 to hold the parts against movement until the next backward movement of the table is about completed, when these parts are again released to cause the adjustment of the dividing head. The clutch 30 is forced  
 110 forward when released from the pin 38 of the lever 35 by its spring 37.

The projection 33, Figs. 4 and 11, consists of an arm of a lever pivoted at 33<sup>a</sup> to the lever 35 and having an upwardly extending  
 115 arm 33<sup>b</sup> under tension of the spring 33<sup>c</sup> which holds the projection 33 up with a yielding pressure. When the projection 32 strikes the projection 33 on one stroke it lifts the same together with the lever 35 for  
 120 performing the operation above described, but when the rod 31 moves in the reverse direction the projection 32 can ride over the projection 33 because the spring 33<sup>c</sup> will permit said projection to yield downwardly.  
 125

I claim as my invention:—

1. An attachment for universal milling and like machines having a dividing head mounted thereon for converting said machine into an automatic machine consisting  
 130



of a casing or support having means for detachably connecting it with the reciprocating table of the milling machine, a driving member, and driving connections supported thereon for giving a forward and backward movement to the table, and driving connections also carried by said detachable support for giving a step by step movement to the dividing head of the milling or like machine, the two sets of driving connections being relatively timed to perform their functions in predetermined order substantially as described.

2. An attachment for universal milling and like machines for converting said machine into an automatic machine consisting of a casing or support having means for detachably connecting it with the reciprocating table of the milling machine, a driving member and driving connections supported thereon for giving a forward and backward movement to the table, and driving connections also carried by said detachable support for giving a step by step movement to the dividing head of the milling or like machine, the driving connections first mentioned comprising gearing for giving the forward movement to the table, gearing for giving a backward movement thereto, a

clutch with means for operating it to throw into action either one gearing or the other, means for controlling said clutch from the movement of the work table, and the driving connection last mentioned comprising gearing and a clutch operated at a certain point to cause said gearing to move the dividing head with means for throwing said clutch out of operation automatically when the dividing head is adjusted, substantially as described.

3. An attachment for universal milling and like machines for converting said machines into an automatic machine, consisting of a casing or support having means for detachably connecting it with the work table of the milling machine, a driving member and driving connections supported thereon for giving the work table a forward and an accelerated backward movement, driving connections for giving a step by step movement to the dividing head, and a clutch for each driving connection with means for operating said clutches in proper order.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORG REYHER.

Witnesses:

WOLDEMAR HAUPT,  
HENRY HASPER.