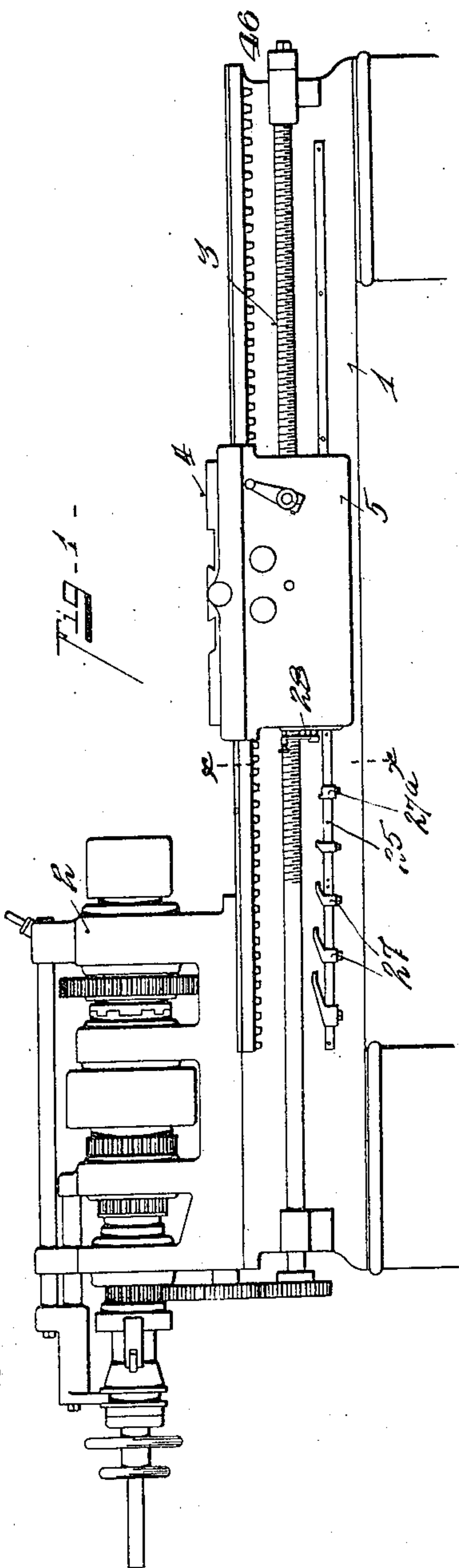


981,915.

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APPLICATION FILED NOV. 22, 1909.

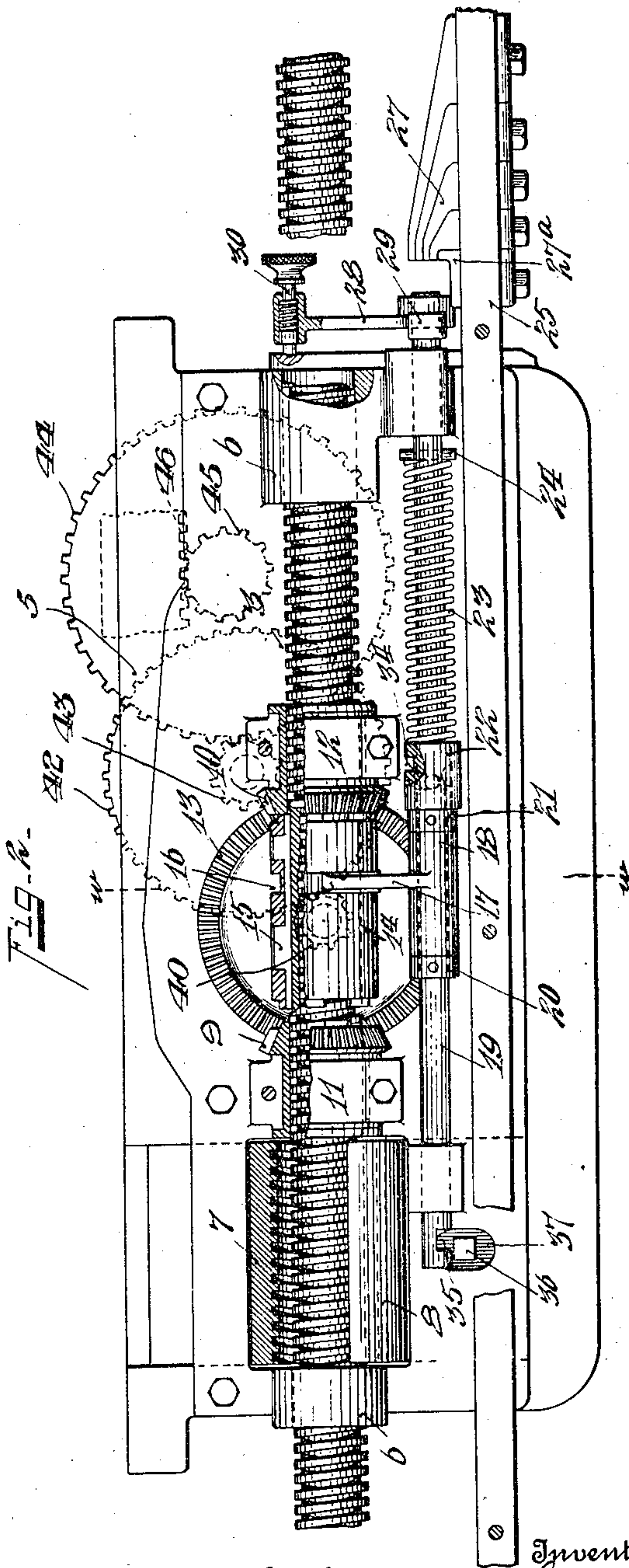
Patented Jan. 17, 1911.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig-3-

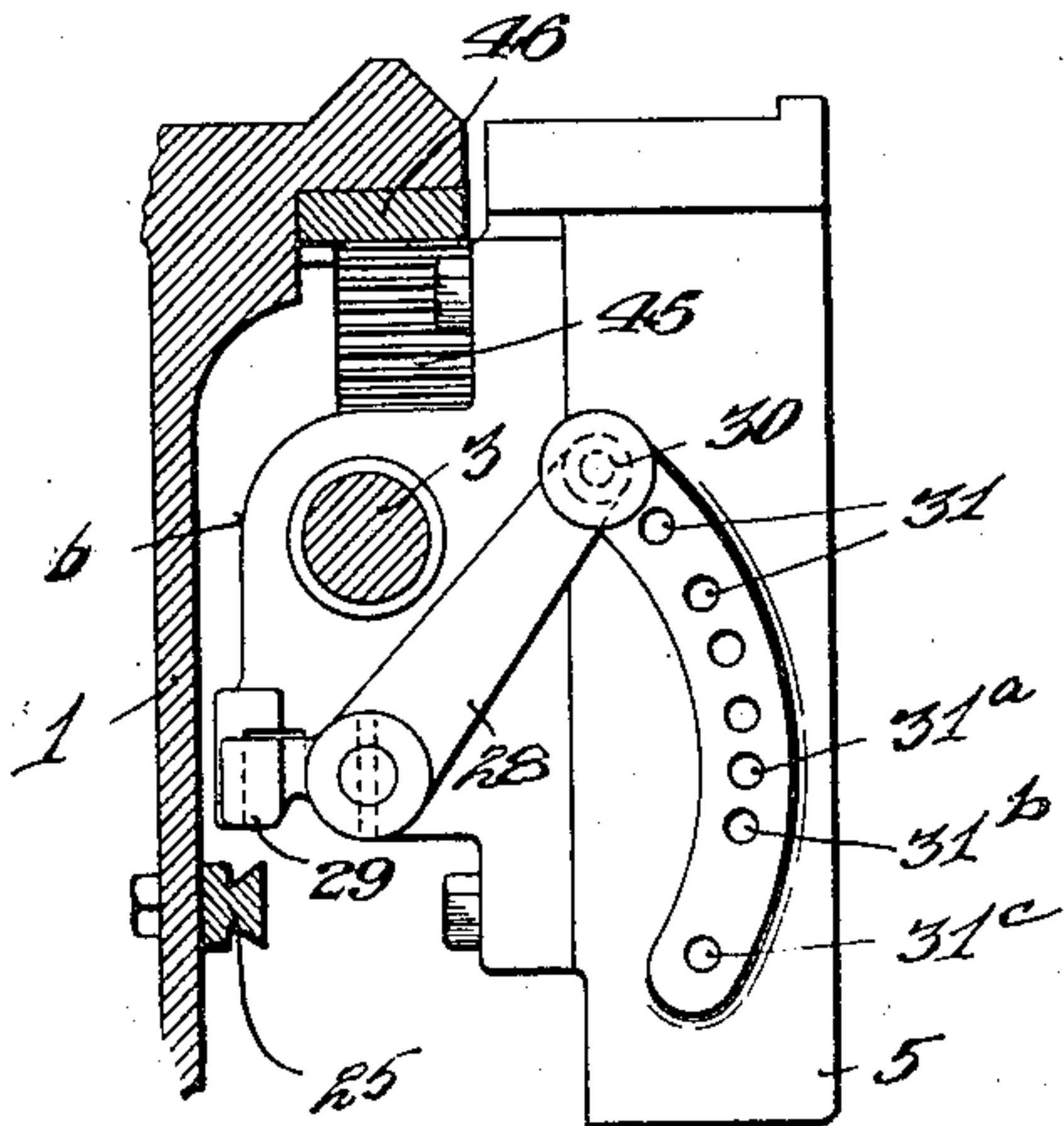


Fig-4-

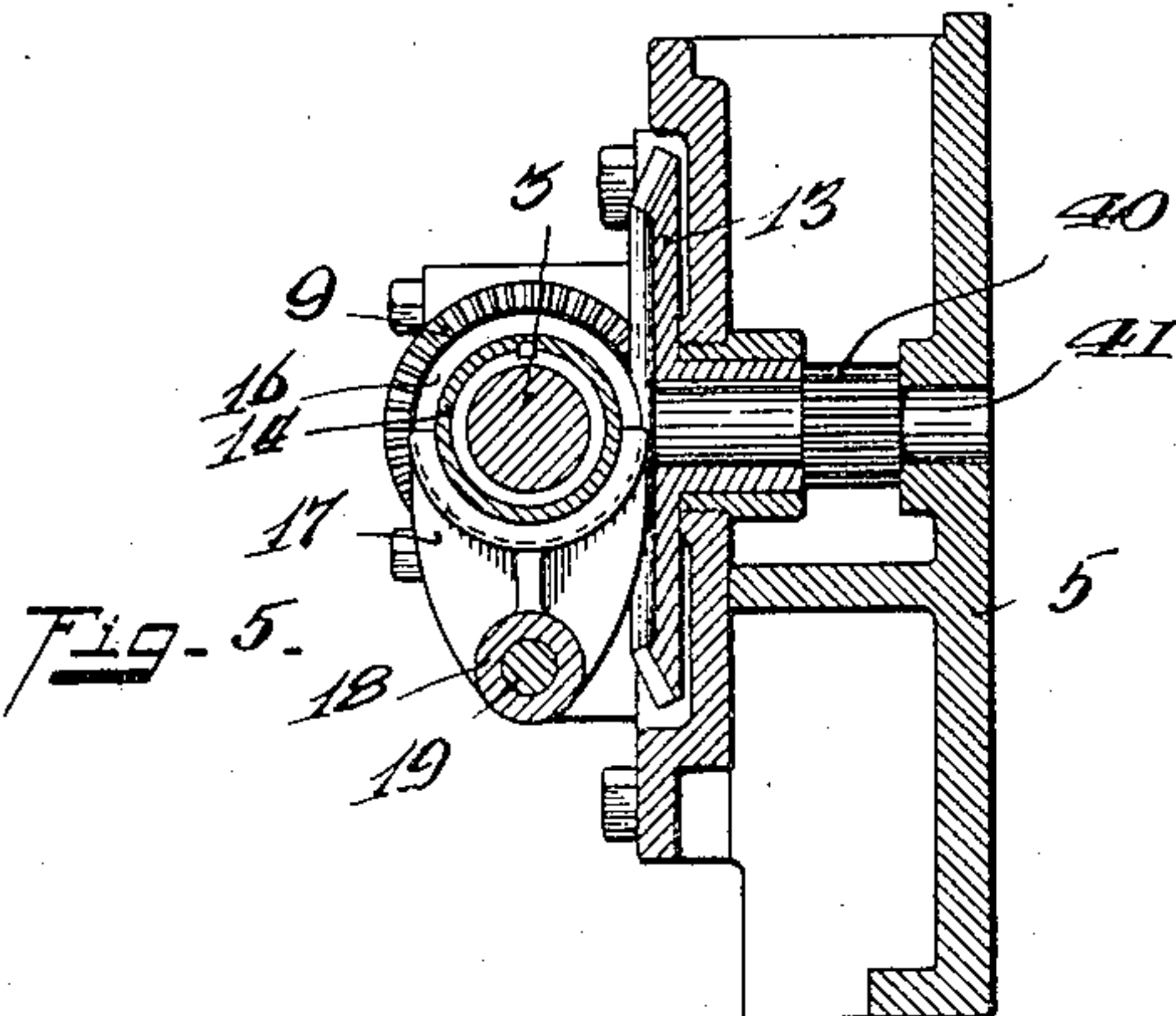
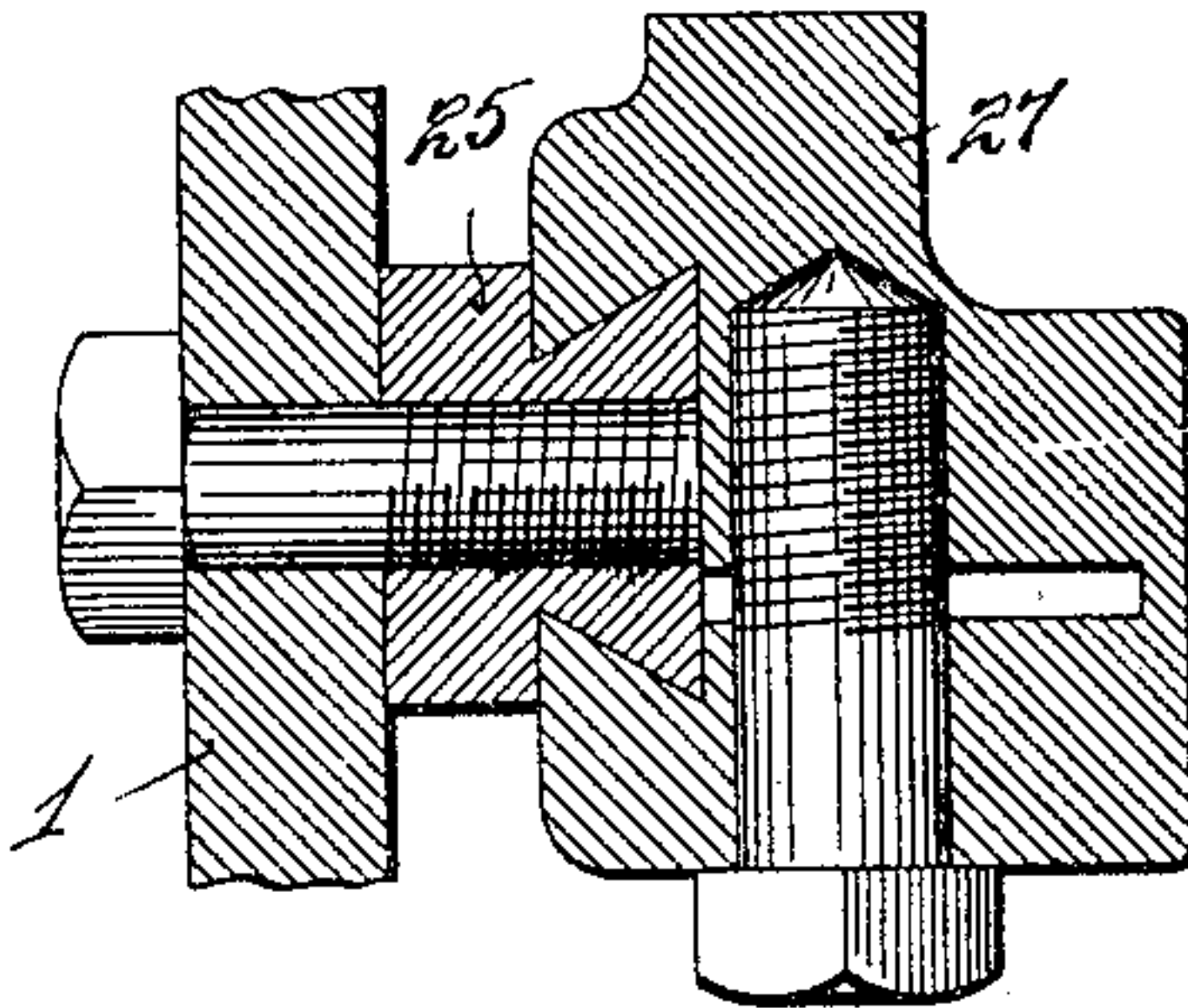


Fig-6-

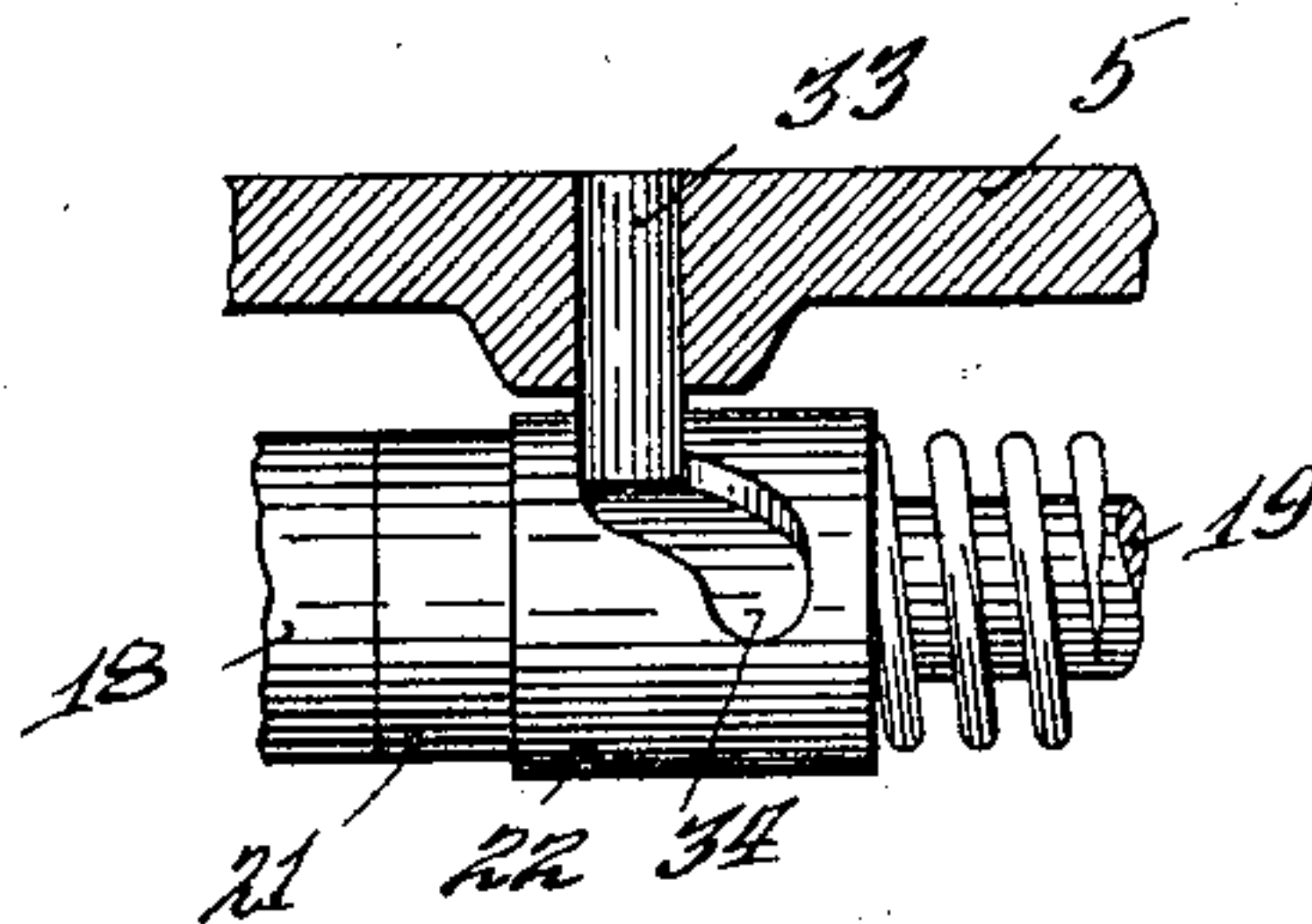
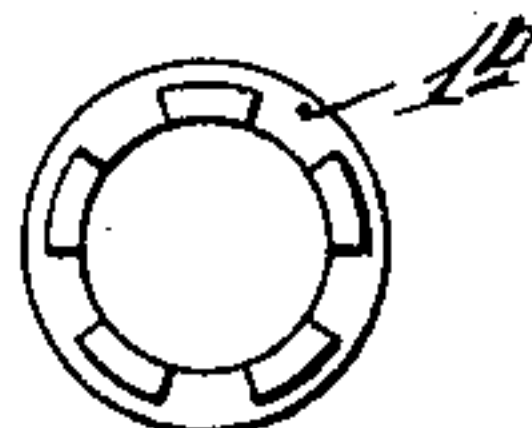


Fig-7-



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UNITED STATES PATENT OFFICE.

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ENGINE-LATHE.

981,915.

Specification of Letters Patent.

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Application filed November 22, 1909. Serial No. 529,232.

To all whom it may concern:

Be it known that I, NICHOLAS D. CHARD, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful improvements in Engine-Lathes, of which the following is a specification.

My invention relates to an improvement in engine lathes, and primarily to the carriage feeding mechanism.

One of the objects of my invention is to provide a carriage on an engine lathe with means adapted to engage one or more stops in its path of travel to automatically disengage the feed driving mechanism.

Another object of my invention is to provide a lathe apron with clutch actuating mechanism for controlling the feed in one direction of its travel, with means adapted to be adjusted to various positions for engaging one of a series of stops, for actuating the clutch mechanism at a predetermined distance of apron travel.

Another object of my invention is to provide clutch controlling mechanism for disengaging the carriage feeding mechanism in one direction of its travel and automatically continuing the carriage feed in adjusting the clutch controlling mechanism to a second position for stop engagement.

The features of the invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:—

Figure 1 is a front elevation of a lathe, illustrating the features of my invention in conventional form. Fig. 2 is a rear elevation of the apron and feed controlling mechanism with some of the parts in section. Fig. 3 is an enlarged section on line *x, x*, Fig. 1. Fig. 4 is an enlarged section through one of the stops adjustable on the lathe bed. Fig. 5 is a section on line *w, w*, Fig. 2. Fig. 6 is a detailed view of the cam collar mounted upon the clutch actuating rod with a portion of the apron illustrated in section, and a pin engaging into the cam groove for shifting the clutch mechanism. Fig. 7 is a detailed view of one end of the clutch sleeve.

1 represents the lathe bed, 2 the head-stock, which may be of any conventional form.

3 represents the feed screw in driven con-

nection with the head-stock in any well-known manner.

4 represents the carriage slidable on ways formed on the bed, and 5 represents the carriage apron depending therefrom.

The general system of gearing and feeding devices carried by the apron may be of any conventional type and only so much of the apron mechanism is herein shown and described as is necessary to disclose the features of my invention.

The feed screw 3 passes through the bearings 6, formed on the rear surface of the apron, as illustrated in Fig. 2, and 7, 8, represent half nuts adapted to be clamped to the feed screw for feeding the apron and carriage for screw-cutting. These half-nuts are simultaneously operated by any well-known means.

9, 10, represent beveled gears provided with sleeve extensions journaling in the bearings 11, 12, respectively, and free from the feed screw 3.

13 represents a beveled gear in mesh with the beveled gears 9, 10, transmitting motion to a system of gearing carried by the apron, not herein illustrated, for feeding the carriage upon the bed, according to which of the gears 9, 10, is clutched to the feed screw 3, to transmit motion to the feeding devices for the tool slide.

14 represents a clutch sleeve splined to the feed screw 3 by means of the key 15, with each end thereof provided with clutch teeth, adapted to alternately engage with clutch teeth formed respectively on gears 9, 10, for alternately engaging said gears in driving connection with the feed screw, for a forward or reverse travel of the carriage on the bed. Said clutch sleeve is provided with a circumferential groove 16, into which a yoke arm 17 engages, projected from a sleeve 18 loosely mounted upon the actuating rod 19 and held in position upon the rod 19 by means of the collars 20, 21, fixed to the rod 19. This permits of a longitudinal movement of the yoke arm 17, for shifting the clutch sleeve, at the same time free rotation of the rod 19.

22 represents a cam collar splined upon the actuating rod 19, the function of which will be hereinafter described, bearing against collar 21 upon one side, with one end of the spring 23 engaging against the oppo-

site side of said cam collar 22. The opposite end of the spring engages against the pin 24, fixed to the actuating rod 19, for normally and automatically engaging the clutch sleeve 14 into engagement with beveled gear 10, provided, however, that the rod 19 is free to move in said direction. To automatically unclutch such driving connection between the clutch sleeve 14 and the beveled gear 10 at various points of apron or carriage travel, the following instrumentalities are provided:—25 represents a rack bar fixed to the front side of lathe bed 1 of dove-tail formation, see Fig. 4, upon which is adjustably mounted a series of dogs 27, having projecting ends adapted to overlap one another, adapted when set together, as illustrated in Fig. 2, to form a single abutment for tripping the clutch sleeve 14, and which construction enables their adjustment individually to the slightest degree from that of the next adjacent dog, enabling a series of automatic stops of carriage feed to be had at any point of the carriage travel. 28 represents a bell crank lever fixed to the actuating rod 19, see Figs. 2 and 3, with the arm 29 of said lever projected, so that it may engage any one of the stops 27 in the path of its travel with the carriage, the opposite arm of the bell crank lever 28 is provided with spring actuated detent 30, adapted to engage into any one of the orifices or notches 31 in the arc of bell crank lever movement, to position the arm 29 to bring the same in the path for engagement of a given dog 27. Thus, when the bell crank lever occupies the position illustrated in Fig. 3, the arm 29 is in position to engage with dog 27^a of the series, which engagement will shift the actuating rod 19, disengaging the clutch sleeve 14 from the beveled gear 10, stopping the feed in that direction; releasing the engagement of the arm 29 with the dog 27^a by swinging the bell crank lever 28 to a second notch or orifice will instantly restore the driving connection between clutch sleeve 14 and beveled gear 10 through the tension of spring 23 against the pin 24, the collar 22 being arrested in longitudinal movement by means of a pin 33 projected from the apron and engaging into a cam groove 34 formed on the periphery of the collar 22, see Figs. 2 and 6. Shifting the lever 28 so as to bring the detent 30 into engagement with the orifice 31^a will swing the arm 29 to a position free from engagement with any of the stops of the series, but with the clutch sleeve 14 maintained in clutching engagement with the gear 10. Bringing the lever 28 to engage detent 30 with the orifice 31^b will rotate the actuating rod 19 and cam collar 22 sufficiently to engage the pin 33 with the angular surface of the cam groove 34, moving the collar 22 and actuating rod 19 in a direction toward the gear 9 to a position intermediate

with the gears 9 and 10 in which position the clutch sleeve 14 is idle. Moving the lever 28 to a position to engage the detent 30 with orifice 31^c will continue the longitudinal action between the pin 33 and collar 22, shifting the clutch sleeve 14 into engagement with the beveled gear 9, for imparting a reverse feed to the carriage and apron.

To prevent a simultaneous connection of half nuts 7 and 8 with the feed screw 3 and the engagement of sleeve 14 with any one of the gears 9 and 10, the following provision is made:—35 represents a notch formed in the actuating rod 19, and 36 represents a lug projected from the half nut 8 through a slot 37 formed in the apron (see Fig. 2), adapted to engage into the notch 35, when the half nut is moved upwardly into engagement with the feed screw 3, and the clutch sleeve 14 occupies its intermediate idle position, in which instance the rod 19 has been moved to align the notch 35 with lug 36. If, however, the clutch sleeve 14 is engaged with any one of the gears 9, 10, it would be impossible to engage the half nuts 7 and 8 with the feed screw 3, in which instance, during such attempt of half nut engagement, the lug 36 will engage against the periphery of the actuating rod 19, and prevent upward movement of the half nut 8, and, as in practice, both half nuts 7 and 8 are connected with each other and moved simultaneously it is impossible to engage either independently. The reverse condition exists if an attempt is made to clutch either one of the gears 9 and 10 in driving connection with the feed screw 3 if the half nuts are engaged therewith by reason of the locking engagement of the lug 36 with the nut 35, preventing any shifting action of the actuating rod 19.

Any type of apron transmission mechanism may be employed common in the art or otherwise. The type illustrated comprises the following instrumentalities:—40 represents a gear (see Figs. 2 and 5) fixed to the shaft 41 journaled in the apron 5. The beveled gear 13 is also fixed to said shaft 41 and driven by the beveled gears 9 and 10, heretofore described. 42 represents a gear in mesh with gear 40 fixed to a stud shaft, and 43 represents a pinion in driving connection with the gear 42, in mesh with a gear 44, fixed to a shaft journaled in the apron, and 45 represents a rack gear in driving connection with the gear 44, with the teeth of said rack gear 45, in mesh with the teeth of a rack 46, fixed to the bed 1 of the lathe. Thus, when the gear 13 is revolved, motion will be transmitted to the train of gears 42, 43, 44 and rack gear 45, feeding the carriage horizontally on the bed.

Having described my invention, I claim:—

1. In a machine of the class described, a bed, a carriage movable thereon, a feed

shaft, an apron carried by the carriage, a pair of beveled gears concentric with the feed shaft, substantially free from contact thereof, each journaled in an independent bearing formed upon the apron, a clutch sleeve splined upon the feed shaft adapted to alternately engage either one of said beveled gears, and clutch actuating mechanism comprising rotative means, cam mechanism carried thereby, for longitudinally sliding said rotative means in its rotative action for alternately shifting said clutch into driving engagement with either one of said beveled gears, and to a neutral intermediate position.

2. In a machine of the class described, a bed, a carriage movable thereon, an apron therefor, a feed shaft, a pair of beveled gears concentric with the feed shaft, substantially free from contact thereof, each journaled in an independent bearing formed upon the apron, a clutch sleeve splined upon the feed shaft adapted to alternately engage either one of said beveled gears, clutch actuating mechanism, cam mechanism carried thereby for longitudinally sliding said clutch actuating mechanism in a rotative action thereof, cam manipulating mechanism fixed to said clutch actuating mechanism, adapted to be locked in various positions of arc travel, whereby the clutch sleeve is alternately shifted into driving engagement with either one of said beveled gears, or to a neutral intermediate position.

3. In a machine of the class described, a bed, a carriage movable thereon, feeding means therefor, transmission devices carried by the carriage, a series of tripping means adjustable on the bed in the path of carriage travel, clutching devices for engaging said transmission devices with the feeding means, clutch actuating mechanism adjustable to engage any one of the series of clutching means for actuating the clutch mechanism at a predetermined distance of carriage travel, to discontinue the carriage travel, and means for automatically continuing the carriage feed upon disengagement of the clutch actuating mechanism from the tripping means.

4. In a machine of the class described, a bed, a carriage movable thereon, feeding means therefor, transmission devices carried by the carriage, a series of tripping means adjustable on the bed in the path of carriage travel, clutching means for engaging said transmission devices with the feeding means, and clutch actuating mechanism adjustable to various positions for engaging any one of the series of tripping means for actuating the clutch mechanism at a predetermined distance of carriage travel, to discontinue the carriage travel.

5. In a machine of the class described, a bed, a carriage movable thereon, a feed shaft, transmission devices mounted on the

carriage for imparting a forward or reverse feed to the carriage, a series of tripping means adjustable on the bed in the path of carriage travel, clutching devices, for engaging said transmission devices with said feed shaft, for alternately driving the same, clutch actuating mechanism adjustable to engage any one of the series of clutching means to discontinue the carriage feed, means for automatically continuing the feed upon disengagement of said clutch actuating mechanism from said tripping means.

6. In a machine of the class described, a bed, a carriage and an apron reciprocating thereon, a feed shaft, apron transmission mechanism adapted to be driven from the feed shaft to propel the carriage, a clutch in the apron for controlling said transmission mechanism, a series of step-like stops in the path of the carriage travel, a stop engaging member on the apron adjustable to engage a selected stop, and connections between said member and the clutch for throwing out the feed.

7. In a machine of the class described, a carriage and an apron reciprocating thereon, a feed shaft, apron transmission mechanism adapted to be driven from the feed shaft to propel the carriage, a clutch in the apron for controlling said transmission mechanism to feed the carriage in either direction, a series of step-like stops in the path of carriage travel, a stop engaging device on the apron, connections between said engaging device and clutch, a manually operated setting device for the stop engaging member, and means adapted to be actuated by the manipulation of said setting device to throw the clutch out or into the opposite direction for reversing the carriage feed.

8. In a machine of the class described, a bed, a carriage and apron reciprocating thereon, a feed shaft, apron transmission mechanism adapted to be driven from the feed shaft to propel the carriage, a clutch in the apron for controlling said transmission mechanism, a series of step-like stops in the path of carriage travel, a stop engaging member on the apron adjustable to engage a selected stop, connections between said member and the clutch for throwing out the feed, and a spring exerting tension on said connections holding the clutch normally in driving position, whereby the adjustment of the stop engaging member to a new position automatically throws in the feed.

9. In a machine of the class described, a bed, a carriage and an apron reciprocating thereon, a feed shaft, apron transmission mechanism adapted to be driven from the feed shaft to propel the carriage, a clutch in the apron for controlling said transmission mechanism and feeding the carriage in

either direction, a series of stops in the path
of carriage travel, a rock shaft adapted to
slide longitudinally, said shaft being con-
nected to the clutch for moving the same in
5 either direction, a spring tending to hold
said shaft at one end of its longitudinal
movement to normally maintain the clutch
in the forward feeding position, a stop en-
gaging member on the end of said shaft,
10 and means for rotating said shaft into dif-
ferent positions to bring the stop engaging
member into alinement with a selected stop.

10. In a machine of the class described, a
bed, a carriage and an apron reciprocating
15 thereon, a feed shaft, apron transmission
mechanism adapted to be driven from the
feed shaft to propel the carriage, a clutch
in the apron for controlling said trans-
mission mechanism and feeding the car-
riage in either direction, a series of stops in
20 the path of carriage travel, a rock shaft

adapted to slide longitudinally, said shaft
being connected to the clutch for moving
the same in either direction, a spring tend-
ing to hold said shaft at one end of its longi- 25
tudinal movement to normally maintain the
clutch in the forward feeding position, a
stop engaging member on the end of said
shaft, means for rotating said shaft into
different positions to bring the stop en- 30
gaging member into alinement with a se-
lected stop, and means adapted to be actu-
ated by the rotation of the shaft to throw
the clutch into neutral position or to re-
verse the feed. 35

In testimony whereof, I have hereunto set
my hand.

NICHOLAS D. CHARD.

Witnesses:

OLIVER B. KAISER,
EMMA SPENER.