No. 642,884. Patented Feb. 6, 1900.

A. SWASEY & H. M. LUCAS.

ROLLER FEED FOR SCREW MACHINES.

(Application filed Aug. 18, 1899.)

(No Model.) 2 Sheets—Sheet 1

Fig. 1.

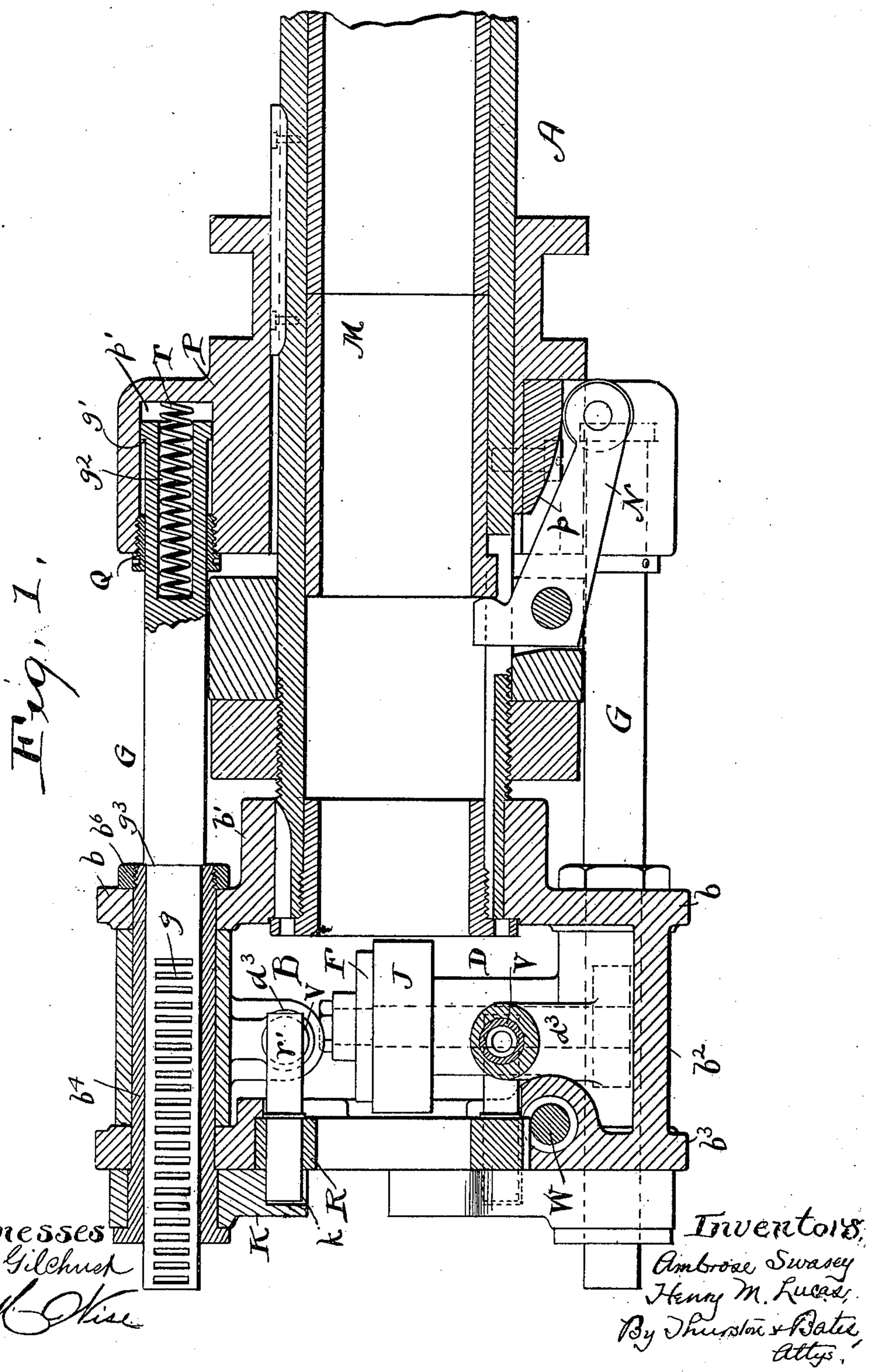

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Fig. 2

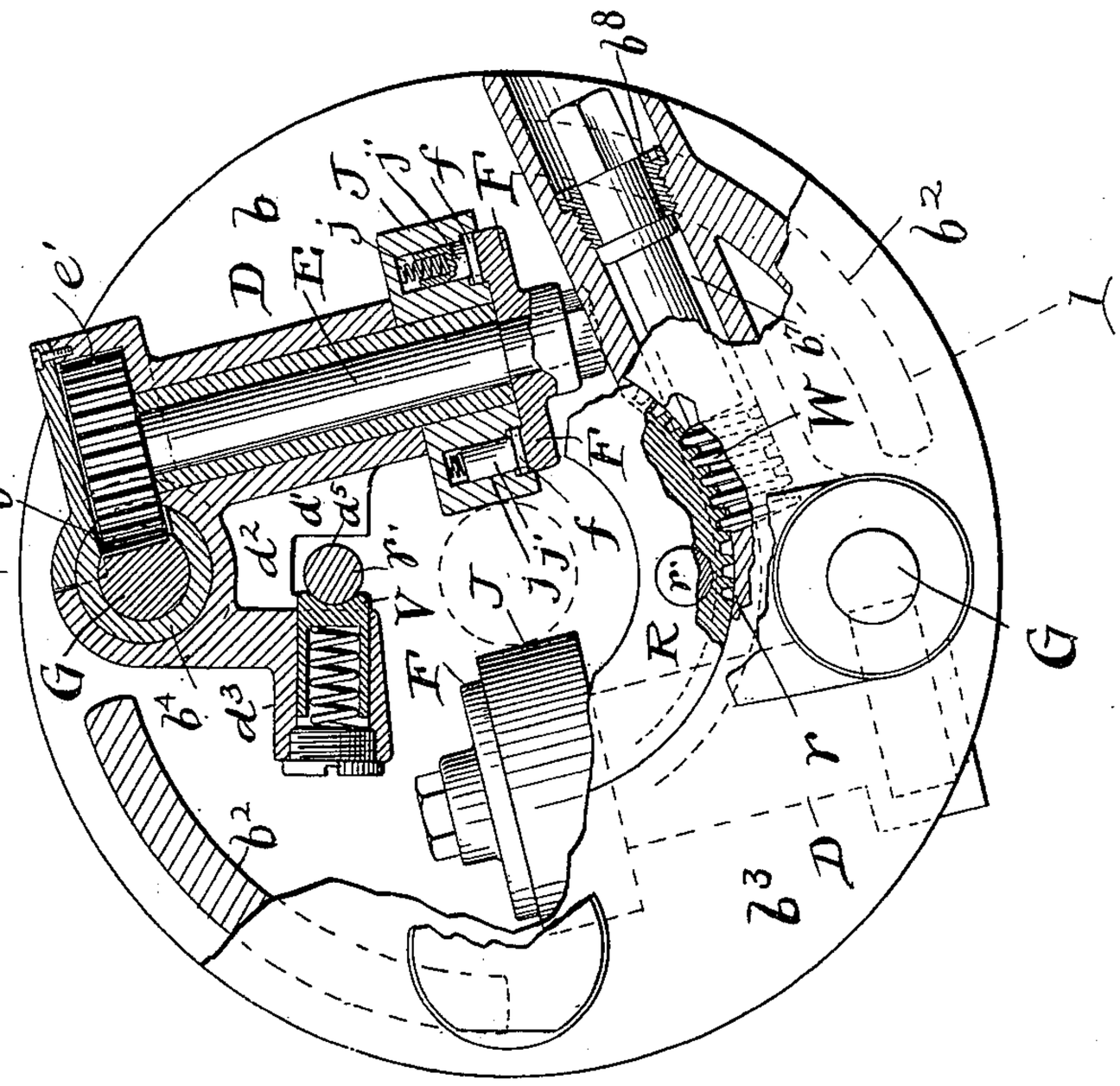
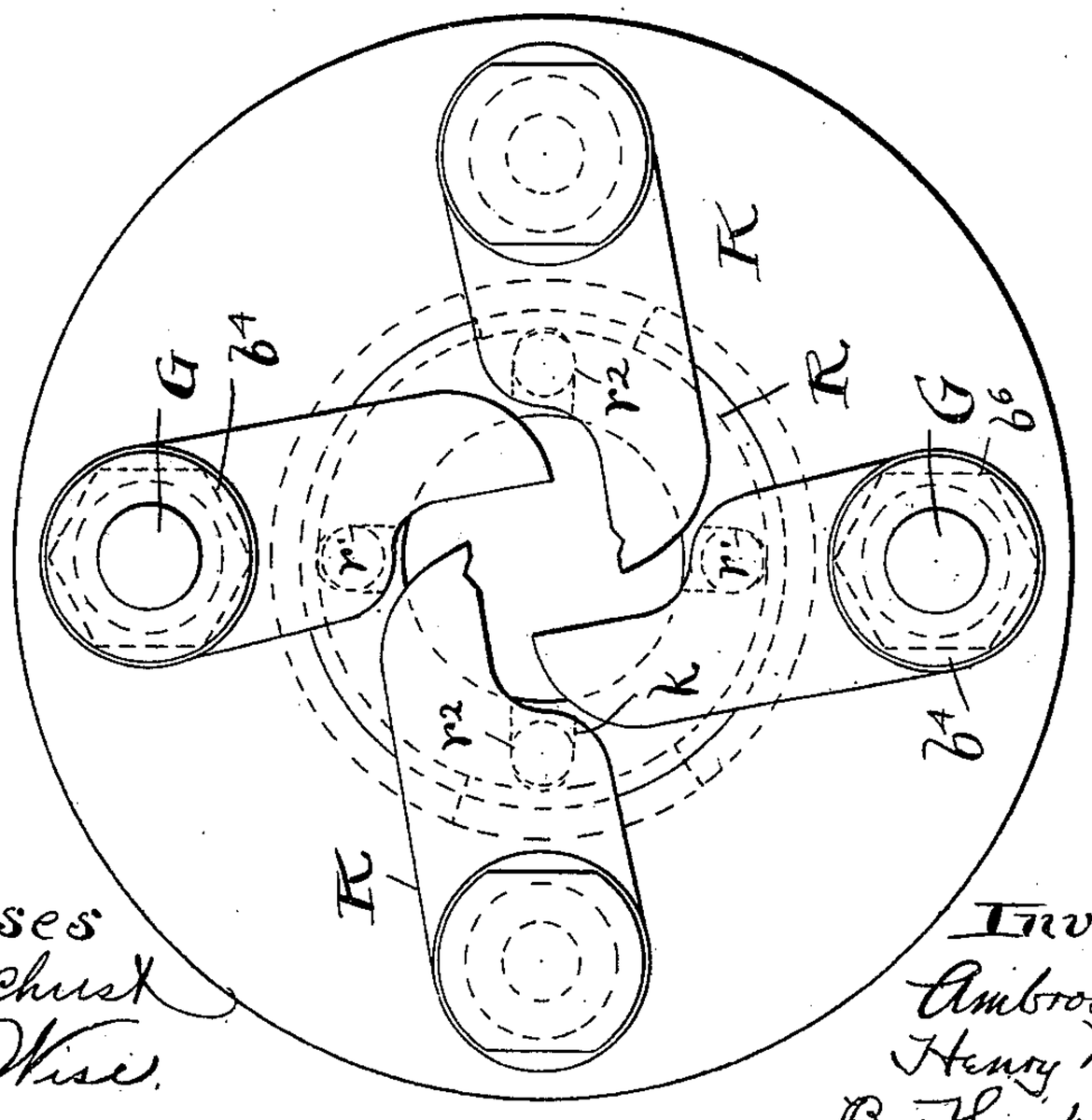


Fig. 3.



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UNITED STATES PATENT OFFICE.

AMBROSE SWASEY AND HENRY M. LUCAS, OF CLEVELAND, OHIO, ASSIGNORS TO WARNER & SWASEY, OF SAME PLACE.

ROLLER-FEED FOR SCREW-MACHINES.

SPECIFICATION forming part of Letters Patent No. 642,884, dated February 6, 1900.

Application filed August 18, 1899. Serial No. 727,629. (No model.)

To all whom it may concern:

Be it known that we, AMBROSE SWASEY and HENRY M. LUCAS, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Roller-Feeds for Screw-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to screw-machines and other lathes having a tubular live-spindle through which a stock-rod passes and in which it is held by a chuck when being worked upon, and particularly to the roller-feed mechanism for feeding the stock-rod forward without stopping its rotary movement in unison with the spindle.

One object of the invention is to provide novel means whereby without subjecting the mechanism to any shock or strain the feed-rolls may be rotated so as to feed the stock-rod forward as far as desirble while the spindle and stock-rod continue their rotary movement.

Another object is to provide novel means for simultaneously adjusting all of the feed-rolls relative to the axis of the spindle, whereby said rolls are capable of acting upon stock-rods of various diameters.

Another object of the invention is to provide centering-arms and means for adjusting all of said arms simultaneously and in unison with the feed-rolls.

In the drawings, Figure 1 is a longitudinal sectional view on the line indicated by 1 1 in Fig. 2. Fig. 2 is an end view, partly in section, of a head which is connected with the rotary spindle and of the mechanism contained therein. Fig. 3 is an end view of the head.

Referring to the parts by letters, A represents the rotary tubular spindle of a screw-machine or other lathe. M represents the plunger therein which operates a spring-chuck. N represents one of the fingers which are pivoted to the spindle and engage with the end of said plunger to move it forward, and P represents a sliding sleeve having conical surfaces p, which engage with said fingers to operate them. The parts above mentioned are of ordinary construction. Wherefore it is believed that it is unnecessary to show or describe them more specifically or to show or describe the bearings for said spindle or the means whereby the spindle is rotated.

A chambered head B is formed upon or secured to the rear end of the spindle. In the particular construction shown this head consists of a disk b, having a hub b', which embraces and is made fast to the rear end of the spindle, and two or more rearwardly-extended flanges b^2, and an end plate b^3, which is made fast to said flanges by tubular bolts b^4 and their nuts b^6. Upon each of these bolts a swinging frame D is mounted, the hub of said frame lying between the disk b and the end plate b^3. In each swinging frame a shaft E is mounted, the shafts E lying on opposite sides of the axis of the spindle A. A pinion e' is secured to the outer end of each shaft E. This pinion extends through a longitudinal slot b^5 in the tubular bolt b^4 and engages with the teeth g on a rack-bar G, which is movable endwise in the tubular bolt. The front end of this rack-bar is suitably connected with the sliding sleeve P, which operates the chuck. The connection between the sliding rack-bar and said sliding sleeve should be such that the sleeve may have sufficient movement forward to release the chuck before it begins to move the rack-bar in the feeding direction. In the construction shown, which is the best now known to us, the front end of this rack-bar enters a socket p' in the sliding sleeve P. Said rack-bar is provided with an external annular flange g', which fits said socket. A sleeve Q, which surrounds the rack-bar, is screwed into the outer end of this socket and is adapted to be engaged by the annular flange g' on the rack-bar. In the end of the rack-bar is a recess g^2, which contains an expansible coiled spring T, which exerts its force to move the rack-bar rearward.

On the inner end of each one of the shafts E a ratchet F is secured. The teeth f of this ratchet are on its inner face. A feed-roll J is loosely mounted on each shaft E between this ratchet and the inner end of the swinging frame D. Spring-pawls j', movable in sockets j in the feed-rolls, are adapted to engage with the teeth on the ratchet, whereby

the rotation of the shaft in one direction only will cause a simultaneous rotation of the feed-roll. The rearward movement of the sliding sleeve (which is the movement which causes the chuck to close) does not cause the rotation of the feed-rolls; but when said sliding sleeve has been moved forward so far that the chuck releases its hold on the stock-rod the sleeve Q engages with the annular flange g' on the rack-bar. The further movement of the sliding sleeve in this direction causes a like movement of the rack-bars, which, through the pinions e', rotate the shafts E, and this movement is transmitted through the ratchets and pawls, before explained, to the feed-rolls J. After the sleeve has been moved far enough out of engagement with the fingers said sleeve may be moved backward and forward without operating the chuck, but with the result of operating the feed-wheels, for when the sleeve P is moved rearward the spring T is compressed, and it moves the rack-bar rearward a short distance and until the annular flange g' engages with the sleeve Q, provided the annular shoulder g^3 does not sooner touch the disk b. As the sliding sleeve P is again moved forward it draws the rack-bar with it and causes a consequent rotation of the feed-rolls in the feeding direction. When the sleeve P is moved rearward far enough to begin to close the chuck, the shoulder g^3 on the rack-bar engages with the disk b, whereby the rack-bar remains stationary, while the sleeve continues its rearward movement. The result is that this sleeve P must be moved forward far enough to release the chuck before the sleeve Q engages with the flange g' on the rack-bar, and consequently before there will be any movement of the rack-bar in the feeding direction.

Mechanism is provided by which both feed-rolls are simultaneously adjusted toward or from the axis of the spindle, whereby they are adapted to operate upon stock-rods of various diameters, which mechanism is constructed as follows:

A disk R, having an axial hole, is mounted axially with respect to the spindle in a circular recess in the end plate b^3 of the head and is adapted to be turned upon its axis. On the inner face of this disk are two pins r', which project forward through an opening d^2 in the web d', which is a part of the swinging frame D. This frame has an arm d^3, in which is mounted a spring-actuated buffer-block V, which engages with one of these pins. On the periphery of the disk a few worm-wheel teeth r are cut, and with these a worm W engages, which worm is mounted in a tubular socket b^7 in the end plate b^3. The end of the worm-stem passes out through a bushing b^8, the projecting end of said stem being squared to receive a wrench. By turning this worm, therefore, the disk is rotated in one direction, the pins thereon engaging with the spring buffer-blocks V to cause the swinging frames to turn upon their axes and thereby to move the feed-rolls nearer the axis of the spindle. The rolls are therefore yieldingly held against the stock-rod. The turning of the disk in the contrary direction causes the pins to strike the shoulders d^5 on the swinging frame and thereby to move it to carry the rolls away from the axis of the spindle.

Centering-arms K, of which there may be four, are mounted on bearing-bolts which project rearward from the outer face of the end plate. Two of said bearings are the tubular bolts b^4, while the other two are pins G', which screw into plate b^3. These arms being held upon said bolts and pins by the heads thereof serve to hold the disk R in the end plate b^3. These arms extend toward the axis of the spindle, their inner ends lying equal distances therefrom, whereby they may serve to guide and support the stock-rod. Each of these centering-arms has upon its inner face a slot k, and into which slot a pin r^2 on the oscillating disk R projects. The turning of this disk therefore not only moves each feed-roll toward and from the stock-rod, but at the same time moves these centering-arms and moves them all simultaneously and equal distances.

Having described our invention, we claim—

1. In a lathe in combination, the tubular live-spindle, a head thereon, two swinging frames hung in said head on axes which are parallel with the axis of the spindle, but are on opposite sides thereof, means for adjusting said frames about their axes, feed-roll shafts mounted in said swinging frames at right angles substantially to said axes, feed-rolls operatively connecting with the inner end of said shafts, a sliding sleeve upon the spindle, operative mechanism intermediate of the sliding sleeve and feed-roll shafts for transforming the rectilinear motion of the former into rotary movements of the latter, and ratchet devices which form parts of said intermediate mechanism whereby the feed-rolls are rotated only when the sleeve moves in one direction, substantially as and for the purpose specified.

2. In a lathe in combination, the tubular live-spindle, a head thereon, two swinging frames hung in said head on axes which are parallel with the axis of the spindle, but are on opposite sides thereof, means for adjusting said frames about their axes, feed-roll shafts mounted in said swinging frames at right angles substantially to said axes, feed-rolls operatively connecting with the inner end of said shafts, pinions secured to said shafts, and sliding sleeve, and rack-bars connecting with said sleeve and engaging with said pinions, substantially as and for the purpose specified.

3. In a lathe in combination, the tubular live-spindle, a head thereon, two swinging frames hung in said head on axes which are parallel with the axis of the spindle, but are on opposite sides thereof, means for adjusting said frames about their axes, feed-roll

shafts mounted on said swinging frames at right angles substantially to said axes, feed-rolls operatively connecting with the inner end of said shafts, pinions secured to the outer end of said shafts, a sliding sleeve, rack-bars engaging with said pinions, and shoulders on the rack-bars and sleeve which are arranged to permit an independent movement of the sleeve in either direction and to then engage with each other to compel the rack-bars to move with the sleeve, substantially as and for the purpose specified.

4. In a lathe, in combination, the tubular live-spindle, a head thereon, two swinging frames hung in said head on axes which are parallel with the axis of the spindle but are on opposite sides thereof, means for adjusting said frames about their axes, feed-roll shafts mounted on said swinging frames at right angles substantially to said axes, feed-rolls operatively connecting with the inner end of said shafts, pinions secured to the outer ends of said shafts, a sliding sleeve having sockets parallel with the axis of the spindle, rack-bars which engage with said pinions and enter said sockets, springs in said sockets, and flanges at each of the rack-bars in the said sockets, and a sleeve which embraces each rack-bar and screws into its socket, substantially as and for the purpose specified.

5. In a lathe, the combination of a tubular live-spindle, a head thereon, tubular bolts secured in said head parallel with its axis, said bolts having each a longitudinal slot, swinging frames mounted upon said bolts, feed-roll shafts mounted in said swinging frames, pinions secured to the outer ends of said shafts and passing into the slot in said tubular bolts, feed-rolls operatively connected with the inner ends of said shafts, a sliding sleeve, and rack-bars which move through said tubular bolts in engagement with the pinions and are operatively connected in said sliding sleeve, substantially as and for the purpose specified.

6. In a lathe, in combination, a tubular live-spindle, a head thereon, swinging frames mounted in said head, feed-rolls mounted on said swinging frames, mechanism for turning said feed-rolls, and means for simultaneously moving said swinging frames upon their pivots whereby the feed-rolls are simultaneously moved toward or from the axis of the head, substantially as and for the purpose specified.

7. In a lathe, in combination, a tubular live-spindle, a head thereon, swinging frames mounted in said head on axes which are parallel with the axis of the spindle, feed-rolls mounted on said swinging frames, mechanism for turning said feed-rolls, centering-arms pivoted to said head on axes which are parallel with the axis of the spindle, and means for simultaneously adjusting all of said centering-arms and swinging frames upon their axes toward and from the axis of the spindle, substantially as and for the purpose specified.

8. In a lathe, the combination, of the tubular live-spindle, a head thereon, two swinging frames hung in said head on axes which are parallel with the axis of the spindle which swinging frames are adapted to support the feed-roll shafts, a disk axially mounted on the head having forwardly-projecting pins, a shoulder on each of said swinging frames engaging with one side of one pin, and a spring buffer-block mounted in each of said swinging frames for engagement with the other side of its said pin, substantially as and for the purpose specified.

9. In a lathe, the combination of the tubular live-spindle, a head thereon, swinging frames hung in said head on axes which are parallel with the axis of the spindle, which frames have one arm in which is the bearing for the feed-roll shaft and another arm d^3 and have between said arms a slotted web, a spring buffer-block mounted in last-named arm of said swinging frame, a disk axially mounted on the head and having pins which project forward in the slots in the webs of said swinging frames, and into engagement with said buffer-block, substantially as and for the purpose specified.

10. In a lathe, in combination, the tubular live-spindle, a head secured thereon, swinging frames hung in said head, means for adjusting said frames about their axes, feed-roll shafts mounted in said frames, means for rotating said shafts, feed-rolls loosely mounted on said shafts, a ratchet and pawl carried by each of said feed-rolls and feed-roll shafts respectively, substantially as and for the purpose specified.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

AMBROSE SWASEY.
HENRY M. LUCAS.

Witnesses:
WM. E. READ,
E. B. GILCHRIST.