Dec. 1, 1925. 1,563,669

S. SNYDER

EXTENSIBLE CRANK ELEMENT

Filed Jan. 17, 1924

Fig. 1.

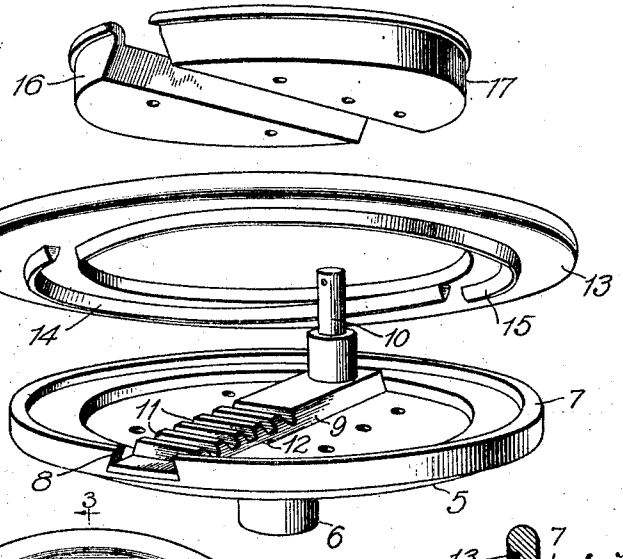


Fig. 2.

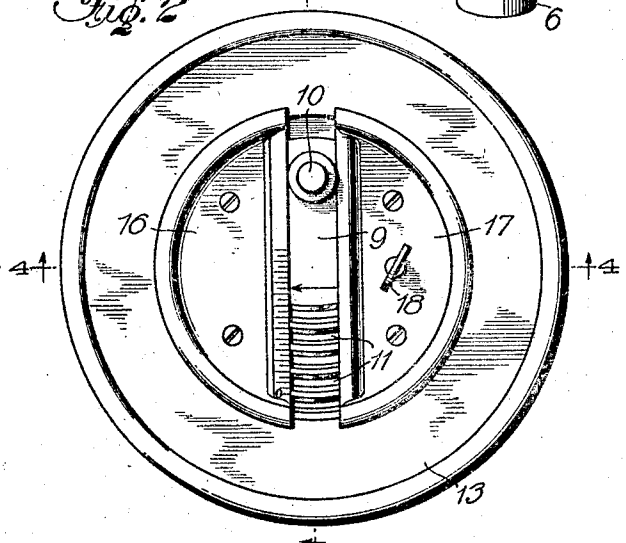


Fig. 3.

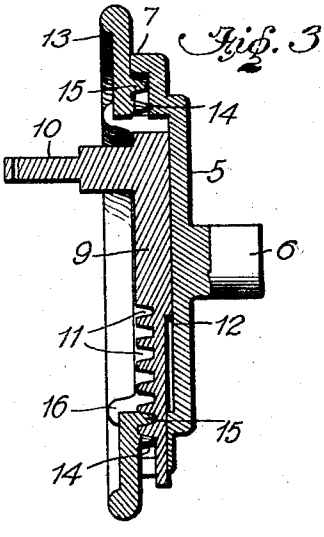
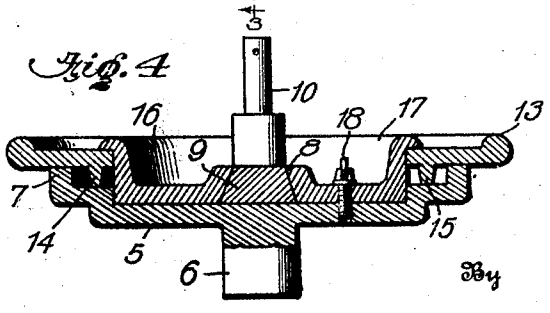


Fig. 4.



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UNITED STATES PATENT OFFICE.

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EXTENSIBLE-CRANK ELEMENT.

Application filed January 17, 1924. Serial No. 686,921.

To all whom it may concern:

Be it known that I, SIMON SNYDER, a citizen of the United States, residing at Muncy, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Extensible-Crank Elements; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machine elements and more particularly to variable eccentrics or extensible cranks used in connection with milling machinery or other mechanisms for which it may be desirable to increase or decrease the thrust or stroke of a pitman.

The principal object of the invention is to provide an extensible crank element of novel and simplified construction, which may be readily adjusted to effect a desired pitman stroke without interrupting the operation of the mechanism with which it may be associated.

Another object is to provide a device of the character referred to, which will be durable, convenient and efficient in use and inexpensive in manufacture.

The invention will first be hereinafter more particularly described with reference to the accompanying drawings which are to be taken as a part of this specification and then pointed out in the claims at the end of the description.

In said drawings, Fig. 1 is a perspective view of the disassembled device, showing the relation of its several parts,

Fig. 2 is a plan view of the assembled device,

Fig. 3 is a sectional side elevation of the device, taken on the line 3—3 of Fig. 2, and:

Fig. 4 is a sectional side elevation of the same, taken on the line 4—4 of Fig. 2.

Referring to the drawings in which like reference numerals are used to designate corresponding parts throughout the several views, 5 denotes a main or basic circular plate formed on one side with an axial hub 6 and on its other side with an annular central depression or recess and an axially extending circumferential or peripheral flange 7, providing a comparatively narrow raised annular surface between said flange and said recess.

A tapering recess or dove-tailed groove 8 is also formed radially through the flange 7 and a portion of the raised annular surface above mentioned, within which a correspondingly formed diametrical crank-arm or block 9 is slidably fitted and through which one end of the latter is adapted radially to extend, said block being provided on its inner end with a shouldered crank-pin 10 projecting at substantially right angles therefrom, and with a rack portion or spaced series of transverse tapering arcuate grooves 11 along the top surface of its outwardly extensible end, the bottom surface thereof being cut away or recessed slightly to provide a heel or shoulder 12 (shown in Figs. 1 and 3) adapted to abut the inner edge of the raised annular surface and prevent the block from extending outwardly with its crank-pin 10 beyond the axis of the plate 5 and the shaft upon which it is revolubly mounted.

A peripherally rounded ring-plate 13 is adapted to rest over the recessed plate 5, the former being formed or provided with substantially semi-circular flanges or ribs 14 and 15 of beveled or tapering form in cross-section arranged diametricaly opposite each other on the lower surface of said plate in semi-oval or eccentric relation to the annular opening therethrough and bearing lightly upon the narrow raised annular surface of the latter plate, said ribs being adapted alternately to engage with the series of grooves 11 in the block 9 and cause the latter to move inwardly or outwardly across the plate 5 when the ring-plate 13 is relatively revolved in either direction thereon.

It will be noted by reference to Fig. 1 that a gap (equal substantially to the width of the grooves 11) is provided between the respective adjacent extremities of ribs 14 and 15, the inner edge at one end of each rib being flush, at diametrically opposite points, with the annular opening through the plate and correspondingly receding therefrom toward their respective opposite ends.

Segmental top plates 16 and 17 formed with opposed beveled edges or surfaces engaging upon the correspondingly beveled sides of the diametrical block 9, and with peripherally rounded flanges overlapping the ring-plate 13, are adapted cooperatively to fit within the annular opening through

the latter and hold the same in position against the main plate with said block freely movable therebetween.

Holes are preferably provided in each of said top plates through which removable fastening screws or bolts may be extended in threaded engagement with underlying corresponding orifices in the main plate for securing the several parts together as a unit. A clamp-screw or bolt 18 adapted to threaded engagement with corresponding holes through the main plate and one of the top plates, is also provided for the purpose of clamping or frictionally binding the two parts together with a pressure sufficient to prevent relative rotation of the ring-plate 13 over the main plate 5.

Graduation marks corresponding with an indicative mark on the adjacent movable crank-arm, are also provided along the edge of one of the top plates for convenience in determining the radial extension of the crank-pin from the axis of the main plate.

The operation and use of my improved crank element is as follows:

The various parts of the device are assembled together in the manner above described after which it is mounted as a unit upon the end of a driven shaft; the hub 6 being provided for such purpose. The end of a pitman may then be connected with the crank-pin 10 to render the device ready for use in actuating the same.

Should the operator of the machine or mechanism with which the device is associated, desire to decrease or increase the reciprocal thrust of the pitman, he need only loosen the clamp-bolt 18 sufficiently to relieve the pressure upon the respective plates and grasp or retard the relative rotation of the ring-plate 13, whereupon the ribs 14 and 15 in alternate engagement throughout their lengths with the grooves in block 9 will exert a gradual continuous longitudinal pressure thereupon and cause the latter to extend outwardly or recede between the plates, thus drawing the crank-pin 10 toward the axis of the main plate and its driven shaft or extending the same radially therefrom, depending upon the direction in which the main plate revolves with respect to said ring-plate. In the form shown, block 9 will be drawn outwardly with its crank-pin toward the axis of the main plate when the latter is rotated in a counter-clock-wise direction with respect to the ring-plate, and will be drawn in the opposite direction when the main plate is rotated in a relatively clock-wise direction.

After the block has been drawn with its crank-pin in a position where the latter will describe a circle of the desired radius as the main plate is rotated with its shaft, the operator merely retightens the clamp-bolt to hold the parts in fixed position. It may here be noted that operations of the mechanism need not be interrupted in order to effect desired adjustments of the extensible crank-pin. With such purpose in view, the clamp-bolt 18 may be screwed into place from the opposite side of the assembled device, or inverted from the positions shown in Figs. 2 and 4 of the drawings.

Since various changes may be made in the details and arrangement of parts without departing from the spirit and scope of my invention, I do not desire to be limited by the appended claims to the specific structure hereinbefore illustrated and described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. An extensible crank element comprising separable recessed plates, one of said plates having oppositely and eccentrically disposed substantially semi-circular ribs confronting another plate provided with a hub for mounting on the end of a shaft and a crank-arm diametrically disposed and guided between said plates having grooves within which the ribs of said first named plate are adapted alternately to engage and move said crank-arm when said plates are rotated in relatively opposite directions.

2. An extensible crank element comprising separable recessed plates, one of said plates having oppositely and eccentrically disposed substantially semi-circular ribs opposed to another plate, the latter having a hub for mounting on the end of a shaft and a crank-arm diametrically disposed and guided between said plates, said crank-arm being radially movable through the periphery of one of the plates and having grooves within which the ribs of the first named plate are adapted alternately to engage and cause the extension or retraction of said crank-arm when one of the plates is rotated in either direction.

3. An extensible crank element comprising a recessed plate, having a hub for mounting on the end of a shaft and a recess in the periphery thereof, a multiple-grooved crank-arm extensibly disposed diametrically of said plate through the recess therein and a second recessed plate having oppositely and eccentrically disposed ribs opposed to said first named plate adapted alternately to engage with the grooves in said crank-arm and cause the latter to project or recede toward or away from the axis of the plates, when the later are rotated in relatively opposite directions.

4. An extensible crank element comprising a recessed plate having a hub for mounting on the end of a shaft and a radially disposed recess in its periphery, a crank-arm disposed diametrically of said plate with its end extensibly fitted in said recess, and having a series of grooves formed in its

extensible end, a crank-pin carried by said arm, a second plate resting upon said first named plate having substantially semi-circular ribs on one side thereof disposed opposite each other and in eccentric relation to the plate adapted alternately to engage with the grooves in said crank-arm and move the same toward or away from the axis of the plates when the latter are rotated in relatively opposite directions, together with segmental plates securable to said first named plate with the second named plate therebetween adapted normally to hold the parts together.

5. An extensible crank element comprising a main annular recessed plate having a hub portion and a recess in its periphery, a multiple-grooved sliding block carrying a crank-pin disposed diametrically of said plate with one end radially extensible through the recess therein, a ring-plate resting upon said main plate having oppositely disposed ribs in eccentric relation thereto engageably adapted to move said block diametrically of the plates when the latter are relatively rotated in opposite directions, together with segmental plates over-lapping said ring plate and securable to the main plate for frictionally holding the parts in fixed position.

6. An extensible crank element comprising separable plates, one of said plates being recessed to receive the other plates and formed with a hub portion and a radially disposed groove through its periphery, a transversely multiple-grooved crank-arm disposed diametrically of said plate and radially extensible through the peripheral groove therein, an intermediate plate having diametrically opposed arcuate ribs formed on one side thereof in eccentric relation to its axis opposed to said recessed plate and adapted to alternate engagement with the grooved end of said crank-arm by which the latter will be moved longitudinally with its crank toward or away from the axis of the plates when the latter are rotated in relatively opposite directions, together with flanged segmental plates overlapping said intermediate plate and securable to the first named plate adapted frictionally to hold the parts in fixed relation.

7. An extensible crank element comprising an annular recessed plate having a hub portion and a radially disposed recess in its periphery, a crank-arm disposed diametrically of said plate with one end extensibly fitted in said recess and having a series of arcuate grooves formed transversely in its extensible end, a crank-pin carried by said crank-arm, a ring-plate resting upon said recessed plate having substantially semi-circular ribs on one side thereof disposed diametrically opposite each other and in eccentric relation to the circumference of the plate adapted alternately to engage with the grooves in said crank-arm and move the same with its crank-pin toward or away from the axis of the united plates when the latter are rotated in relatively opposite directions, together with segmental plates securable to said recessed plate with the ring-plate therebetween adapted normally to hold the parts together.

8. An extensible crank element comprising an annularly recessed and counter-recessed plate having a hub portion and a radially disposed groove through its periphery, a crank-arm disposed diametrically of said plate with one end extensibly fitted in said groove and having a series of arcuate grooves transversely formed in its extensible end, a crank-pin carried by said crank-arm, a ring-plate resting upon said recessed plate having substantially semi-circular ribs diametrically opposite each other and in eccentric relation to the circumference of the plate adapted alternately to engage with the arcuate grooves in said crank-arm and longitudinally move the same with its crank-pin toward or away from the axis of the united plates when one of the latter is rotated with respect to the other, together with flanged segmental plates overlapping said ring-plate and securable to said recessed plate with the ring-plate therebetween, adapted normally to hold the parts in fixed position.

9. An extensible crank element comprising an annularly recessed peripherally flanged main-plate having a hub portion for mounting on the end of a shaft and radially disposed groove through its periphery, a sliding crank-arm disposed diametrically of said plate with one end correspondingly fitted in said groove and having a series of arcuate grooves transversely formed in its extensible end, a crank-pin carried by said crank-arm, a ring-plate resting upon said main plate having substantially semi-circular ribs formed on one side thereof diametrically opposite each other and in eccentric relation to the circumference of the ring plate adapted alternately to engage with the arcuate grooves in said crank-arm and longitudinally slide the same with its crank-pin diametrically toward or away from the axis of the united plates when one of the latter is rotated with respect to the other, together with marginally flanged segmental plates overlapping said ring-plate and securable to said main plate with the crank-arm therebetween adapted normally to hold the parts in fixed position.

10. An extensible crank element comprising an annularly and peripherally flanged main-plate having a radially disposed groove through its periphery, a sliding crank-arm disposed diametrically of said plate with one end correspondingly and extensibly fitted in said groove and having a series of equi-

spaced arcuate tapering grooves formed transversely in its extensible end, an intermediate ring-plate resting upon said main-plate having substantially semi-circular beveled ribs formed on one side thereof diametrically opposite each other and in eccentric relation to the circumference of said ring-plate adapted alternately to engage with the arcuate grooves in said crank-arm and effect a gradual, continuous movement of the same with its crank-pin diametrically toward or away from the axis of the united plates when one of the latter is rotated in either direction with respect to the other, together with marginally flanged segmental plates opposingly fitted within the annular opening through said ring-plate overlapping the edge of the latter and securable to the main-plate with the crank-arm therebetween adapted normally to frictionally hold the several parts in fixed position.

In testimony whereof I affix my signature.

SIMON SNYDER.