W. H. ROBINSON.

MACHINE ELEMENT.

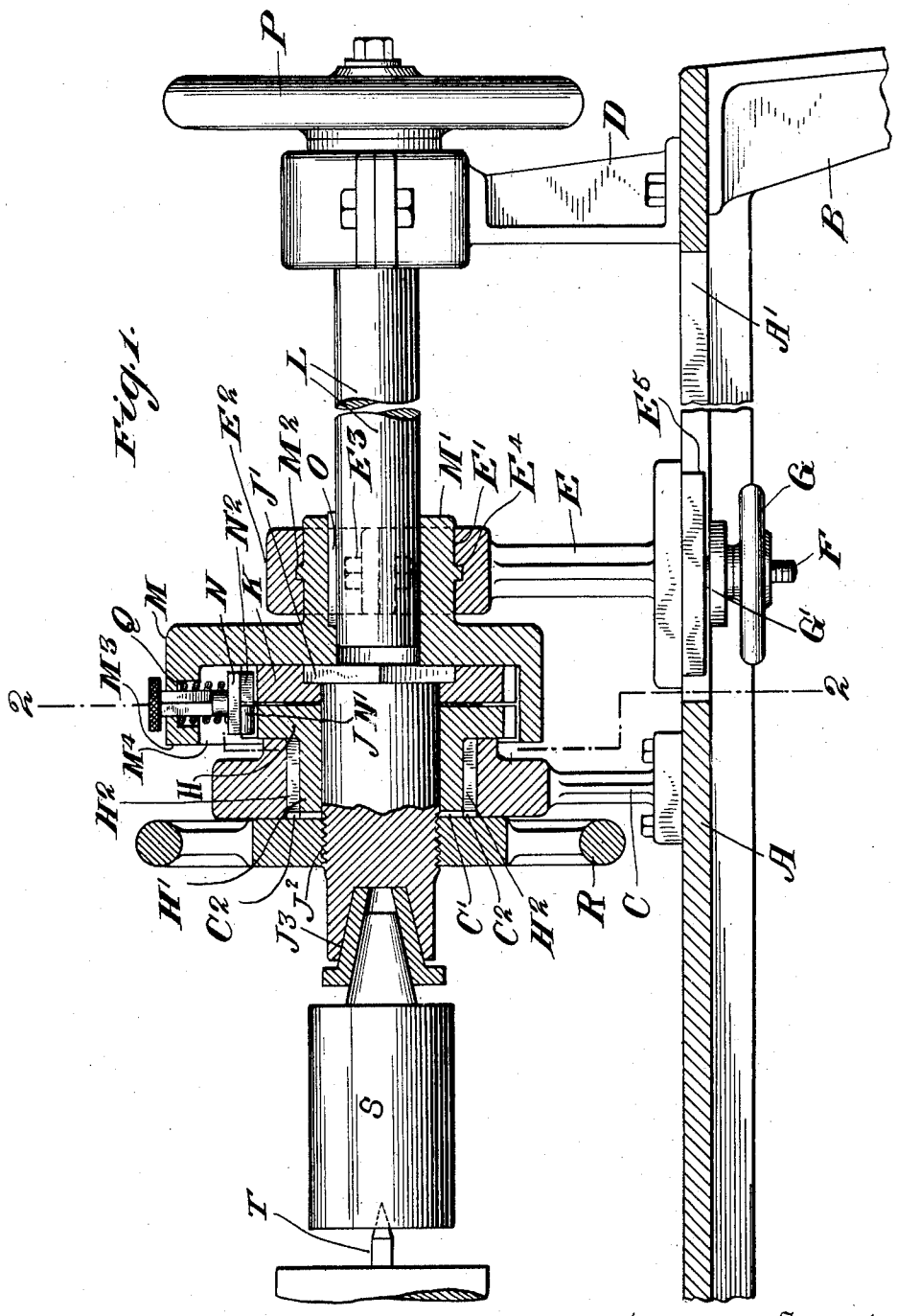
APPLICATION FILED SEPT. 18, 1911.

1,036,720.

Patented Aug. 27, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

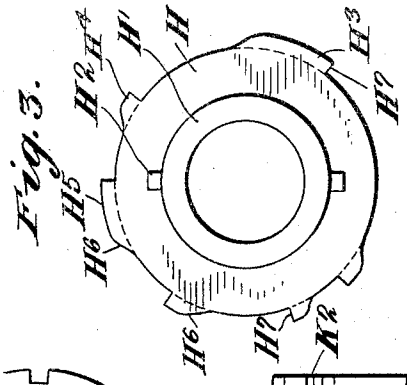


Fig. 4.

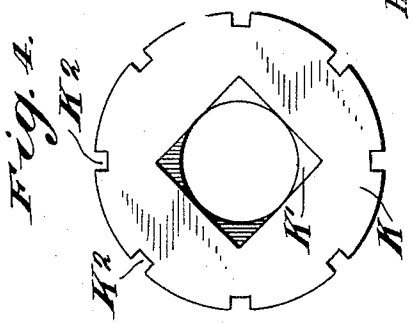


Fig. 5.

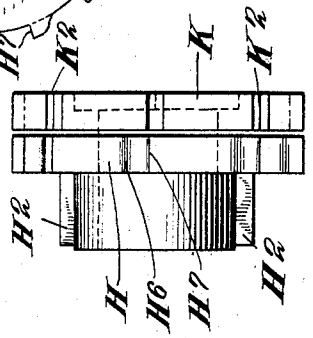
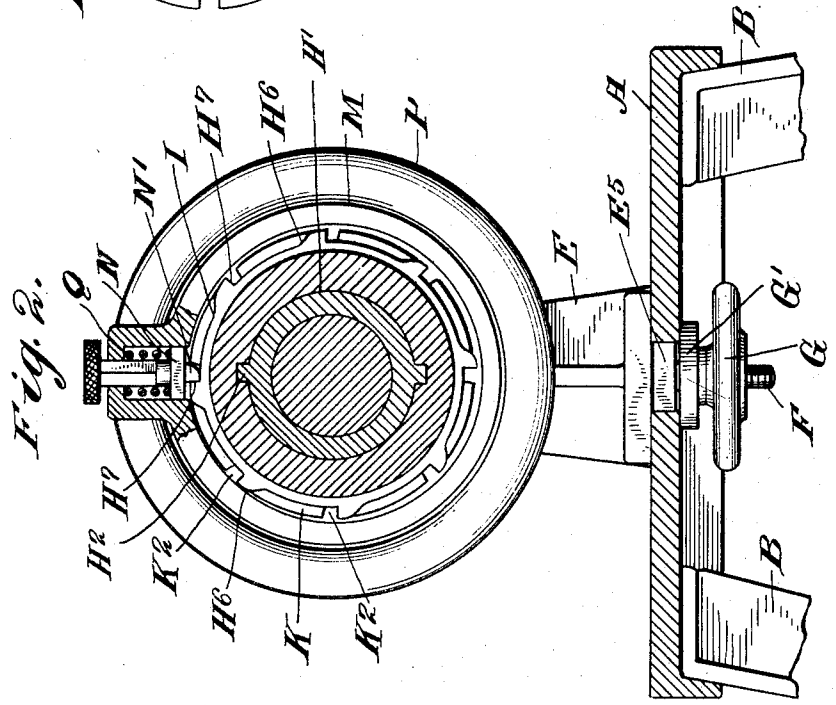


Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM HOWARD ROBINSON, OF NEW YORK, N. Y.

MACHINE ELEMENT.

1,036,720. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed September 18, 1911. Serial No. 649,904.

To all whom it may concern:

Be it known that I, WILLIAM H. ROBINSON, a citizen of the United States, and a resident of New York city, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machine Elements, of which the following is a specification.

The present invention relates to machine elements and the object of my invention is to provide a machine by means of which a shaft which is continuously rotating may transmit an intermittent rotary movement to a driven element, which intermittent movement may be of even degree or may be varied in the degree of its movement and in which the time periods of the movement may also vary.

In the drawings provided herewith, I have disclosed a machine by means of which the chuck element which holds the work may be rotated by means of a rod and the driven element may be stopped intermittently while the driving element is turning constantly. By means of said drawings I will point out how the chuck portion may be turned a predetermined distance before coming to a stop and may be caused to rotate through arcs of various degrees between the stops.

The further objects and novelty of my invention will be pointed out in the description of the machine and claims.

Referring to the drawings, Figure 1 is a longitudinal side view of my machine embodying my invention shown partly in section. Fig. 2 is a cross sectional view on lines 2—2 of Fig. 1, looking toward the right. Fig. 3 is a face view of the spacing ring by means of which the degree of movement of the detent ring is governed. Fig. 4 is a face view of the detent ring. Fig. 5 is a side view of the detent ring and spacing ring arranged adjacent to each other in the relative positions in which they are located when operating in the machine.

A, indicates the base frame which is supported by the legs B—B, etc., which legs may be of short length and adapted to be bolted to the movable bed plate of a milling machine or planer bed.

C, indicates a pillar block provided with a central cylindrical bore C′ and is provided with key ways C^2—C^2 located diametrically opposite to each other.

D, indicates a pillar block provided with a central cylindrical bore, the axis of which is in alinement with the axis of the bore C′ in the pillar block C.

E, indicates a pillar block provided with a central cylindrical bore E′, the axis of which is also in alinement with the bore C′ and is provided with a cap E^2 which is bolted to the lower portion by means of set screws E^3 indicated in dotted lines and disposed on opposite sides of the center, as will be readily understood. Formed in the bearing or bore of the block E is an annular groove E^4. The bed A is provided with a longitudinally extending slot A′ and the pillar block E is provided with a longitudinally extending guide portion E^5, which has the same width as that of the slot A′ and serves to guide the pillar block E longitudinally on the bed A and to keep the axis of the bore E′ in alinement with the axis of the bore C′. Connected to the guide portion E^5 and extending through and below the slot A′ is a threaded rod F on which is mounted in engagement with said thread, a hand wheel G by means of which a flange G′ is clamped against the under side of the bed A to hold the pillar block E in its adjusted position; the pillar block E being capable of movement longitudinally along the bed A corresponding to the length of the slot A′ formed therein.

Supported by the pillar block C is a spacing ring H having an annular ring portion H′ which is located in the bore C′ and is provided with feathers H^2—H^2 which are firmly secured to said ring portion and slidingly engage the key ways C^2—C^2 thereby preventing the spacing ring H from rotating in the bore C′. The periphery of the spacing ring H, taken on the dotted lines shown in Fig. 3, is circular and projecting from said periphery are raised portions H^3, H^4, H^5, etc., one side of each of which is curved as illustrated at H^6—H^6, etc., and the opposite side of which is formed with sharp abutments indicated by H^7—H^7, etc. The spacing ring I shown in Fig. 2 is of the same construction as that of H shown in Fig. 3, except that the projecting portions H^4, H^5, etc., of Fig. 3 are spaced at unequal distances from each other and the outer cir-

cular surfaces of which are also of unequal lengths, whereas the said surfaces of the ring I are all of equal length and are spaced at even distances.

Held in the bore of the spacing ring H is a short circular shaft J, shaping at its rear end into the form of a square as illustrated at J′ and mounted on said shaft J is the indent wheel K, which wheel is provided with a recess of square shape indicated by K′ to fit the square shaped end of the shaft J and adapted to be rotated in unison with said shaft. The indent wheel K is provided with indents K^2 which may be spaced at equal distance apart around the periphery or may be spaced at unequal distances, the spacing being determined by the movements that it is desired to convey to the shaft J during one revolution of the driving rod L as will be more fully pointed out hereinafter.

Supported by the pillar E is a cup shaped element M provided with an annular portion M′ which is supported in the bore E′, and also provided with a projecting circular guiding flange M^2 which projects into the annular groove E^4 formed in the pillar block E. The element M is provided with an annular longitudinally extending flange M^3 which forms a depression M^4 of sufficient depth to permit the flange M^3 to extend over the spacing ring H and indent wheel K and located in one side of said flange and carried by said flange is a pawl N, one side indicated by N′ being formed to seat accurately in the indents K^2 of the wheel K and the opposite side N^2 being formed at one side with a curved face to correspond with the curved portions H^6 of the spacing ring and cause the pawl to lift the portion N′ out of the indents K^2 when the spacing ring K is rotated to carry said pawl in contact with said surfaces H^6. The element M is rotated through the instrumentality of the shaft L which is keyed to the element M by the key O, the shaft L being rotated by the hand wheel P in the present instances, but it being understood that where the shaft J is to transmit the intermittent movements continuously, the wheel P could be replaced by a belt driven wheel or gear wheel and arranged to be continuously rotated. The pawl N is at all times under pressure of the spring Q which acts to force the pawl into the detents K^2, when the pawl is in position to be forced therein which position is governed by the spacing ring.

The shaft J is provided with a threaded portion J^2 and a hand wheel R is threaded to screw thereon, the object of this construction being to clamp the detent wheel K in fixed position in case the work to be performed, indicated by S, would tend to move the shaft J from its adjusted position. The shaft J in this instance is provided with a cone shaped recess J^3 serving as a friction chuck by means of which the work S may be turned to proper position to have the cutters of a milling machine or planer act thereon.

T, indicates the usual center piece by means of which the work is mounted in a lathe or milling machine and serves to support the work S in proper position.

Having thus described the parts, I will now describe the operation of the machine.

Assuming the legs B to be bolted firmly to the bed plate of a milling machine of the usual construction and the cylindrical bar S being in position to be acted upon by a milling cutter and it is desired to convert the bar S into a reamer by cutting longitudinal flutes therein, the operator would rotate the wheel R to release the indent wheel K and then turn the hand wheel P thus rotating the element M until the pawl came opposite a depression in the spacing wheel I (see Fig. 2) when the spring would force the pawl downward into one of the detents K^2 and in case the rotation of the wheel P had carried the indent wheel slightly forward beyond the abutments H^7, the wheel P would be reversed in its direction of rotation thereby bringing the pawl N′ back against the abutment H^7 and at the same time bringing the indent wheel K back into perfect position, when the hand wheel R would be screwed firmly against the face of the pillar block C and the indent wheel K thereby clamped in firm fixed position. The milling machine cutter would then cut the first flute in the cylindrical bar S and after having cut the flute, the hand wheel R would again be loosened and the hand wheel P again turned past the next abutment H^7 carrying the indent wheel K in its movement by reason of the end of the pawl N^2 being engaged with the indent K^2, and rotating said wheel and bar S a predetermined degree until the pawl N contacts with the curved surface H^6 and lifts said pawl out of engagement with the detent K^2 when further movement of the wheel P will carry the pawl forward over the outer surface of the indent wheel K and spacing ring H until the pawl again comes to a position where the depression in the spacing wheel H and indent in the wheel K are in alinement, thus permitting the pawl N to again be seated in position to rotate the indent wheel K, as will be readily understood. Now, if the hand wheel R is screwed to a proper tension against the face of the pillar block C, the indent wheel K can be held in position sufficiently firm by friction, so that the operator can stop the rotation of the hand wheel P the instant that the pawl N drops into position when it engages with one of the detents K^2 and thereby prevent the necessity of any backward rotation of the

hand wheel P to have the bar S stop in the exact position required, and unless the cut of the reamer is located at one side of the center of the bar S whereby the pressure of the cutter would tend to rotate the work, the hand wheel R would not necessarily have to be tightened each time that the work was set in position. If instead of a reamer being formed it was desired to transmit an intermittent movement to a gear wheel or to other mechanism and the hand wheel P was rotating continuously, the hand wheel R in this event would be screwed just tight enough to afford a proper frictional engagement to permit the indent wheel K to be moved smoothly from one position to the next as controlled by the spacing ring.

It is obvious that the spacing ring may have any number of projections thereon and that they may be spaced evenly or otherwise depending on the degree of movement and the number of movements it is desired to give to the indent wheel for each revolution of the hand wheel P, and it is also evident that the indent wheel can be provided with detents spaced evenly apart or that these indents may be spaced unevenly at predetermined distances, so that the desired degree of movement and number of movements can be given to the shaft J per revolution of the hand wheel P. When it is desired to change a spacing ring or detent wheel, the hand wheel G is loosened and the pillar E and element M carried thereby is forced to the right, the shaft L sliding through the bearings in the pillar D, thereby exposing the spacing ring and indent wheel which can be quickly removed after the hand wheel R is unscrewed from the shaft J and other indent wheels and spacing rings may be substituted so that any number of intermittent movements, each of which may vary in the degree of the arc through which it may be carried, may easily be obtained.

Having thus described my invention, I claim as new:

1. In combination, a rotatable element, a stationary spacing ring provided with one or more depressions in its periphery, an indent wheel provided with a plurality of indents in its periphery and arranged to aline with the depressions in said spacing ring, a pawl carried by said rotary element and adapted to enter the depressions in said spacing ring and the indents in said indent wheel, means by which said rotary element may be rotated on its axis and transmit motion to said indent wheel, and means for supporting said elements in coöperative relation with each other.

2. In combination, a rotatable element, a stationary spacing ring provided with one or more depressions in its periphery, an indent wheel provided with a plurality of indents in its periphery and arranged to aline with the depressions in said spacing ring, a pawl carried by said rotary element and adapted to enter the depressions in said spacing ring and the indents in said indent wheel, means by which said rotary element may be rotated on its axis and transmit motion to said indent wheel intermittently during a single revolution of said rotary element, and means for supporting said elements in coöperative relation with each other.

3. In combination, a rotatable element, a stationary spacing ring provided with one or more depressions in its periphery, an indent wheel provided with a plurality of indents in its periphery and arranged to aline with the depressions in said spacing ring, a pawl carried by said rotary element and adapted to enter the depressions in said spacing ring and the indents in said indent wheel, means by which said rotary element may be rotated on its axis and transmit motion to said indent wheel, means for supporting said elements in coöperative relation with each other, and means for locking said indent wheel in fixed relation to said spacing ring.

4. In combination, a rotatable element, a stationary spacing ring provided with one or more depressions in its periphery, an indent wheel provided with a plurality of indents in its periphery and arranged to aline with the depressions in said spacing ring, a pawl carried by said rotary element and adapted to enter the depressions in said spacing ring and the indents in said indent wheel, means by which said rotary element may be rotated on its axis and transmit motion to said indent wheel intermittently during a single revolution of said rotary element, means for supporting said elements in coöperative relation with each other, and means for locking said indent wheel in fixed relation to said spacing ring.

5. In combination, a rotatable element, a stationary spacing ring provided with one or more depressions in its periphery, an indent wheel provided with a plurality of indents in its periphery and arranged to aline with the depressions in said spacing ring, a pawl carried by said rotary element and adapted to enter the depressions in said spacing ring and the indents in said indent wheel, means by which said rotary element may be rotated on its axis and transmit motion to said indent wheel, means for supporting said elements in coöperative relation with each other, and a shaft rotatably mounted and driven by said indent wheel.

6. A rotatable element adapted to be continuously rotated, a pawl carried by said rotatable element, a spacing ring provided with a plurality of depressions, an indent wheel located adjacent said spacing ring and

provided with a plurality of indents, means by which said rotary element may be rotated on its axis and driven through the instrumentality of said pawl and transmit motion to said indent wheel intermittently a predetermined distance as designed and under the control of said spacing ring, substantially as set forth, for each revolution of said rotary element, and means for supporting said elements in coöperative relation.

7. A rotatable element adapted to be continuously rotated, a pawl carried by said rotatable element, a spacing ring provided with a plurality of depressions, an indent wheel located adjacent said spacing ring and provided with a plurality of indents, means by which said rotary element may be rotated on its axis and driven through the instrumentality of said pawl and transmit motion to said indent wheel intermittently a predetermined distance as designed and under the control of said spacing ring, substantially as set forth, for each revolution of said rotary element, means for supporting said elements in coöperative relation, and a shaft detachably connected with said indent wheel and adapted to be rotated thereby.

8. In combination, a rotatable element, a stationary spacing ring provided with one or more depressions in its periphery, an indent wheel provided with a plurality of indents in its periphery and arranged to aline with the depressions in said spacing ring, a pawl carried by said rotary element and adapted to enter the depressions in said spacing ring and the indents in said indent wheel, means by which said rotary element may be rotated on its axis and transmit motion to said indent wheel, means for supporting said elements in coöperative relation with each other, and means for moving said rotary element away from said spacing ring and indent wheel to permit the removal of same from the supporting elements.

9. In combination, a toothed stationary element, said teeth having a gradual incline on one side and an abrupt shoulder on the other side, a notched rotary wheel mounted adjacent to the stationary member, and a rotary member having a pawl adapted to cooperate with the teeth of the stationary member and the notches of the rotary wheel, said pawl being adapted to be raised out of the notches of the rotary wheel by the inclined sides of the teeth of the stationary member, continuous rotation of the rotary member thus producing intermittent rotary motion of the notched wheel.

10. In combination, a toothed stationary element, said teeth having a gradual incline on one side and an abrupt shoulder on the other side, there being spaces formed between the teeth, a notched rotary wheel mounted adjacent to the stationary member, and a rotary member having a pawl adapted to coöperate with the teeth of the stationary member and the notches of the rotary wheel, said pawl being adapted to be raised out of the notches of the rotary wheel by the inclined sides of the teeth of the stationary member, there being spaces between the teeth of the stationary member permitting reverse rotation of the notched wheel to bring said notches in alinement with said abrupt shoulders.

11. In combination, a bearing, a shaft adjustably mounted in said bearing, a notched wheel mounted on said shaft and secured to rotate therewith, a toothed wheel mounted on said shaft and secured to a relatively stationary member, a rotatable member, a pawl on said member, and adapted to engage said notched and toothed wheels and to adjust them relatively to each other, and means for clamping said shaft against said bearing to hold said shaft in adjusted position.

12. In combination, an adjustable shaft, a notched wheel mounted on said shaft, a rotary shaft mounted in alinement with said shaft, a longitudinally slidable member mounted on said rotary shaft, a pawl carried by said member and engaging the notched wheel, and means for moving said slidable member longitudinally on the shaft to disengage it from the notched wheel, and means for releasing the adjustable shaft for removing the same from its bearing and the notched wheel therefrom.

13. In combination, a pillar block, a toothed wheel having a sleeve, said sleeve extending into the pillar block and keyed thereto, a shaft adjustably mounted in said sleeve, a notched wheel mounted on said shaft adjacent to the toothed wheel, means for clamping said wheel in adjusted position against the pillar block, and a rotary member mounted in alinement with said shaft, and having a pawl adapted to simultaneously engage both of said wheels and adapted to adjust the shaft in proper position relative to the stationary teeth.

Signed at New York city, in the county of New York and State of New York this 5th day of September A. D. 1911.

WILLIAM HOWARD ROBINSON.

Witnesses:
MARY F. E. BLACKER,
ALFRED LUST.