No. 803,669. PATENTED NOV. 7, 1905.

H. J. COOK.

BIT BRACE.

APPLICATION FILED SEPT. 22, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

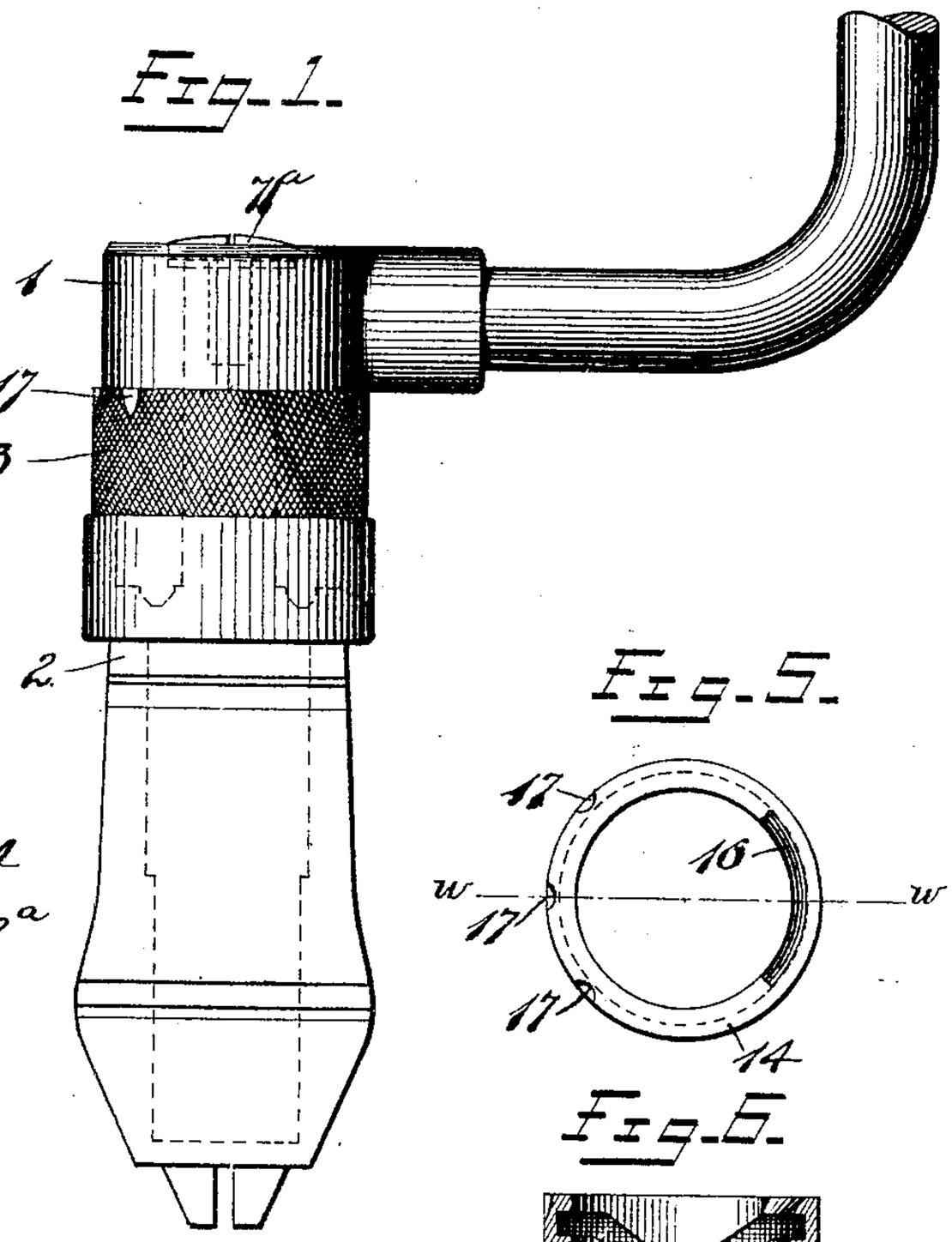


Fig. 4.

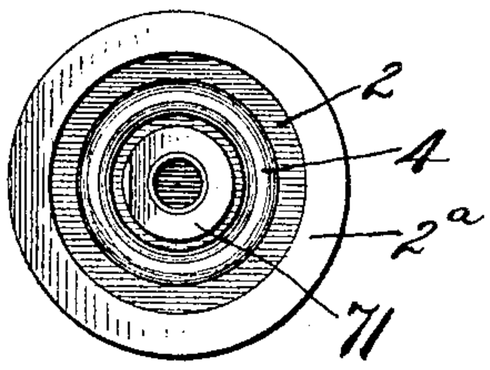


Fig. 5.

Fig. 6.

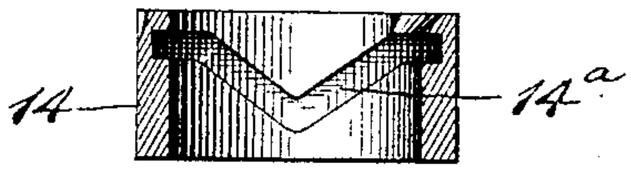


Fig. 2.

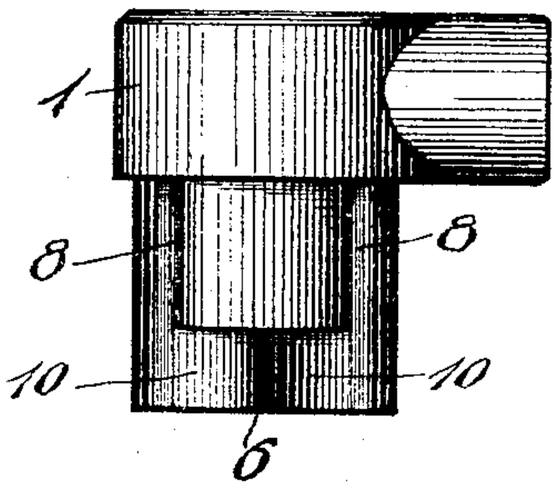
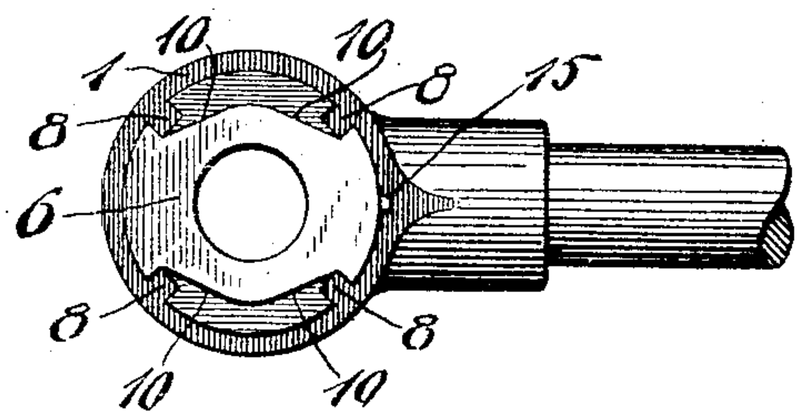


Fig. 3.



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No. 803,669. PATENTED NOV. 7, 1905.

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2 SHEETS—SHEET 2.

Fig. 8.

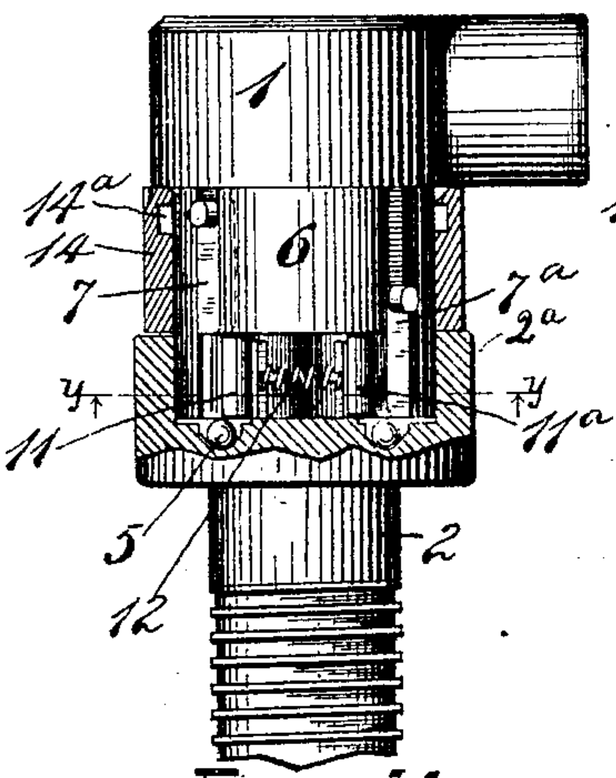

Fig. 11.

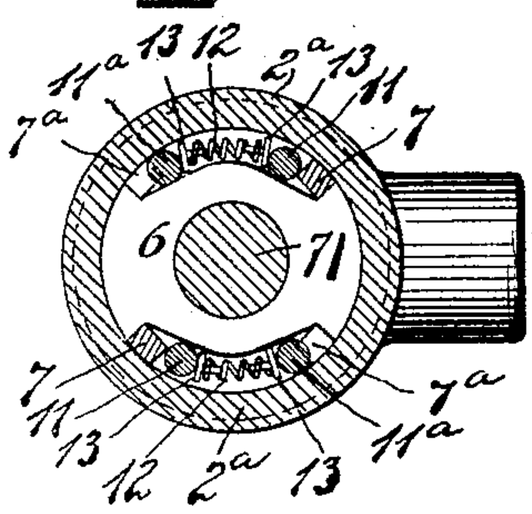

Fig. 7.

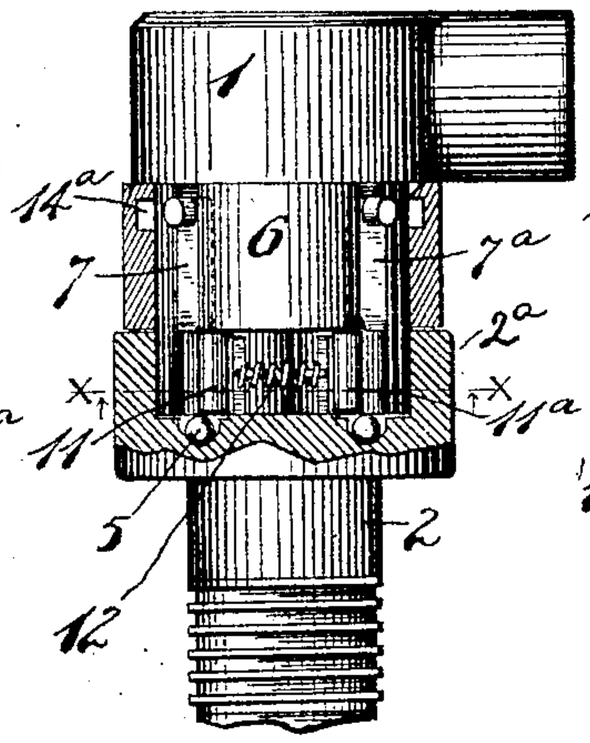

Fig. 10.

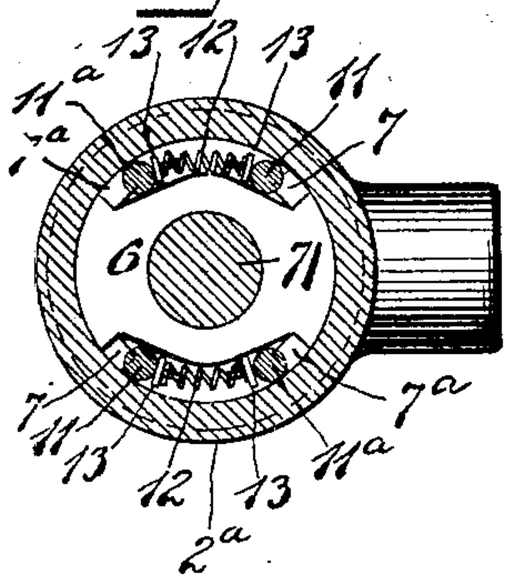

Fig. 9.

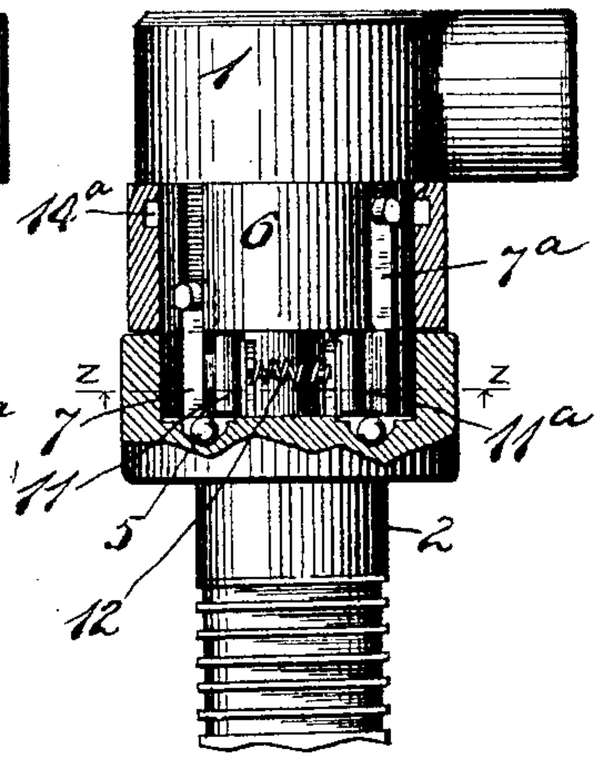

Fig. 12.

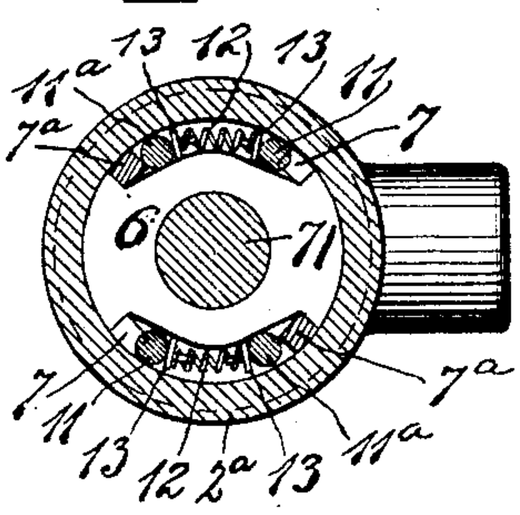

Fig. 13.

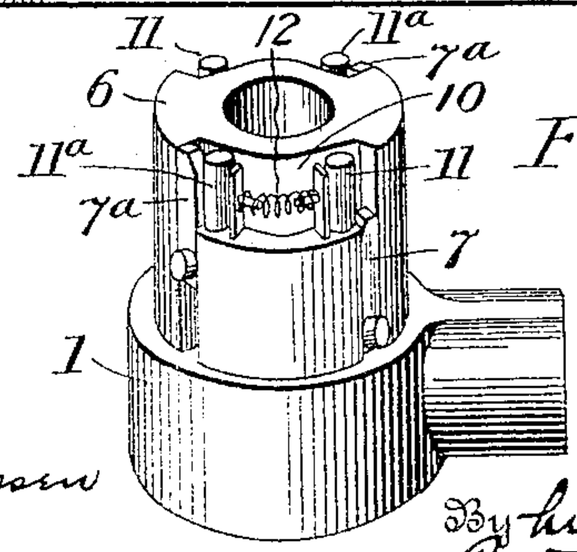

Fig. 14.

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UNITED STATES PATENT OFFICE.

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BIT-BRACE.

No. 803,669. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed September 22, 1904. Serial No. 225,435.

To all whom it may concern:

Be it known that I, HARRIS J. COOK, a citizen of the United States, residing at New Britain, in the county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Bit-Braces, of which the following is a full, clear, and exact description.

My invention relates to improvements in bit-braces and similar tools.

The object of the invention is to provide simple and effective means whereby a driving part may be coupled with a driven part so that the latter may be rotated with and by the former irrespective of the direction of rotation and whereby the driving part may be coupled to the driven part so that the latter will be driven by the former in either direction, said parts rotating freely in an opposite direction.

In the accompanying drawings, Figure 1 is a side elevation of my invention as applied to a bit-brace, although it is by no means confined to this specific use. Fig. 2 is a side elevation of the driving part detached. Fig. 3 is a view of the lower side of the part illustrated in Fig. 2. Fig. 4 is a plan view of the driven part detached. Fig. 5 is a plan view of a detail. Fig. 6 is a section on the line *w w*, Fig. 5. Fig. 7 is a side elevation, partly in section, of the several parts of the clutch mechanism, the latter being in a position wherein the driving and driven parts are interlocked against independent rotation. Fig. 8 is a similar view, the clutch mechanism being shown in a position wherein the driving part will be interlocked with the driven part only when the former is rotated clockwise. Fig. 9 is a similar view, the clutch mechanism being shown in a position wherein the driving part will be interlocked with the driven part only when the former is rotated in a reverse direction. Fig. 10 is a section on the line *x x* of Fig. 7. Fig. 11 is a section on the line *y y* of Fig. 8. Fig. 12 is a section on the line *z z* of Fig. 9. Fig. 13 is a development of the controlling-sleeve, showing the inner side thereof. Fig. 14 is a perspective view illustrative of the driving part and the associated clutch-pieces, said parts being inverted, although in the same position as shown in Fig. 9.

1 is a driving part.

2 is the driven part.

3 is the controlling-sleeve.

4 is a raceway in a driven part in which may be located antifriction-balls 5, upon which the hub 6 of the driving part may bear, whereby pressure applied to the driving part toward the driven part will impart the least possible resistance.

71 is a spindle on the driven part, the said spindle passing through the driving part and held by a screw 71^a or equivalent means. The middle portion of the hub 6 of the driving part is provided with longitudinal grooves 8 8, in which movable pieces 7 7^a, which I will term herein "spacers" or "blocking-out devices," are located. These spacers are best seen in Figs. 7 to 12, inclusive. The opposite sides of the lower end of the hub 6 are cut away to form double cam-surfaces 10 10, the lowest point of these cam-surfaces being midway between two of the longitudinal grooves 8 8. Within the space between these cam-surfaces and the annular wall 2^a of the driven part 2 are located rollers 11 11^a. In the drawings I have shown two sets of rollers; but obviously the number of sets employed is immaterial. Between these rollers is located suitable means to normally press them apart so as to cause the same to wedge between the higher parts of the cam-surfaces 10 10 and the surrounding annular wall 2^a of the driven part. (See, for example, Figs. 7 and 10.) The particular means to press these rollers apart so that they will wedge is immaterial, although in the preferred form it comprises a spring 12, carrying at each end a plate 13 13, which bear flatwise against the adjacent sides of two of said rollers. The normal tendency of the spring is to cause the roller at each end thereof to wedge between the annular wall of the driven part and the cam-surfaces 10 10, whereby if the driven part is rotated in either direction the driven part will be clutched and independent rotation prevented.

From the foregoing it will be seen that when the several parts of the clutch mechanism are in the position shown in Figs. 7 and 10 the

driving and driven parts will be interlocked. Should the spacer 7 be shifted from the position shown in Figs. 7 and 10 to that shown in Figs. 8 and 11, the adjacent roll 11 will be moved down the cam-surface until it is held free of the annular wall 2^a of the driven member, in which position the driving part may be rotated in a left-hand direction freely without moving the driven part, but will clutch the latter when rotated in the right-hand direction. Should the spacers 7 7^a assume the position shown in Figs. 9 and 12, the reverse will be true. The means for shifting the spacers 7 7^a comprises a controlling-sleeve 14, having on its inner surface a cam-groove 14^a. (See Figs. 5, 6, and 13.) Upon the upper ends of the spacers 7 7^a are outward projections which extend into the groove 14^a. When the controlling-sleeve is in the position indicated in Figs. 7 and 10, the cam-groove will hold the spacers away from the clutch-rolls. By rotating the controlling member 14 in one direction one of the spacers will be moved to disengage one of the clutch-rolls. By reversing the controlling member the opposite clutch-roll will be disengaged. When the member 14 is at the middle point, both rolls will be disengaged, as shown in Fig. 7.

To facilitate the entrance of the ends of the spacers 7 7^a to the rear of their respective rolls, the ends thereof may be slightly tapered, as shown in Figs. 7 to 9.

15 is a stop on the driven part which projects into a groove 16 in the controlling member 14 for the purpose of limiting the rotative movement of the latter.

17 17 17 are notches on the controlling member, which may be useful in indicating to the user the three positions of said controlling member.

I am aware that ratchet devices have been employed whereby the driving and driven parts may be locked together and whereby they may be free to revolve independently in one direction and be locked in an opposite direction; but in such devices there is always more or less lost motion, depending upon the number of teeth employed. By my invention the ratchet mechanism is dispensed with and the user is able to secure positive action and an instantaneous response on the part of the driven member when the driving part is turned in the direction to cause the clutch-rolls to engage.

It should be understood that I have illustrated and described only the preferred form of my invention, which it is obvious may be modified in various ways without departing from the spirit and scope thereof.

What I claim is—

1. In a tool of the character described, a driving part, a driven part, a bearing to take the end thrust of one part against the other a cam-surface on one of said parts, a clutch-roller between said cam-surface and the adjacent surface of the other part whereby when said parts are rotated in one direction relatively to each other they will be interlocked by said clutch-roller, and a longitudinally-movable manually-operated means to engage said clutch-roller and block it out of its operative clutching position.

2. In a tool of the character described, a driving part, a driven part, an end bearing therefor to take the thrust thereof a hub on the driving part, a surrounding wall on the driven part, a double cam-surface on said hub said cam-surfaces being oppositely inclined, a pair of clutch-rolls, a single spring engaging both of said rolls for normally causing said rolls to move away from each other and toward the higher parts of the cam-surfaces and longitudinally-movable blocking-out devices arranged to coact with said clutch-rollers.

3. In a tool of the character described, a driving part, a driven part, a hub, a bearing to take the end thrust thereof a wall on the latter surrounding said hub, two clutch-rollers thereon and means to cause both of said clutch-rollers to simultaneously engage the driving and driven part to interlock the same and longitudinally-movable means to block out either of said clutch-rolls and hold it out of its operative clutching position.

4. In a tool of the character described, a driving part, a driven part, a cam-surface on one of said parts, a clutch-roller between said cam-surface and the adjacent surface of the other part whereby when said parts are rotated in one direction relatively to each other they will be interlocked by said clutch-roller, and a longitudinally-movable blocking-out device arranged to coact with said roller and antifriction-balls arranged between the driving and driven member and arranged to take the end thrust of one of said members against the other.

5. In a tool of the character described, a driving part, a driven part, a hub on the driving part, a surrounding wall on the driven part, a double cam-surface on said hub said cam-surfaces being oppositely inclined, a pair of clutch-rolls, a single spring for normally causing said rolls to move away from each other and toward the higher parts of the cam-surfaces and longitudinally-movable blocking-out devices arranged to coact with said clutch-rollers, and antifriction-balls between the driving and driven parts and at the end of the hub on the driving part and arranged to take the end thrust of said hub.

6. In a tool of the character described, a driving part, a driven part, a hub on the driving part, an end bearing to take the thrust of said hub, a surrounding wall on the driven

part, a double cam-surface on said hub said cam-surfaces being oppositely inclined, a pair of clutch-rolls, a single expansion-spring for normally causing both of said rolls to move away from each other and toward the higher parts of the cam-surfaces and longitudinally-movable blocking-out devices arranged to co-act with said clutch-rollers.

7. In a tool of the character described, a driving part, a driven part, a hub, an end bearing, a wall on the driven part surrounding said hub, two clutch-rollers and a single spring to cause both of said clutch-rollers to simultaneously engage the driving and driven part to interlock the same and longitudinally-movable blocking-out devices to displace either of said clutch-rolls and hold it out of its operative clutching position, and a controlling-sleeve coacting directly with said blocking-out devices.

Signed at New Britain, Connecticut, this 20th day of September, 1904.

HARRIS J. COOK.

Witnesses:
H. S. WALTER,
W. J. WORAM.