J. A. THOMPSON.
BATCHET WRENCH AND TOOL.
APPLICATION FILED SEPT. 26, 1921.

1,413,243.
PATENTED APR. 18, 1922.

[Diagram of a ratchet wrench with callouts and annotations.]

James Arthur Thompson

Inventor.

Benjamin Bowens, Benjamin Bowens.
To all whom it may concern:

Be it known that I, JAMES ARTHUR THOMPSON, a citizen of the United States, residing at Rushville, in the county of Schuyler and State of Illinois, have invented a new and useful Improvement in Ratchet Wrenches and Tools, of which the following is a specification.

My present invention relates to ratchet wrenches or tools, and has special reference to the provision of a ratchet wrench or tool which will be suitable for use in taking off and putting on the cap of a number of bolts used in the spars of a Ford automobile. One who is familiar with that portion of the structure of a Ford automobile will know that the space available for operations is restricted and that there is very little room in which to swing the handle of the wrench.

In designing this tool, I have provided a structure in which the ratchet teeth and dogs or pawls may both be made comparatively large, thereby greatly increasing the strength and durability of the tool and at the same time I have produced a tool which will function or ratchet with a much shorter swing of the wrench handle. I have also provided the tool in which the parts are few and of large size and in which the parts may be easily and effectively reversed to ratchet in either direction. In connection with the ratchet dogs or pawls, I have provided a single spring which may be so adjusted as to control the relative action of spring upon the respective dogs or pawls. I have also provided a structure in which the assembly and disassembly of the parts is simplified and facilitated so as to economize in the original cost of production and permit of an easy replacement or substitution of parts. While my wrench has been particularly designed for use in removing and replacing the cap of a number of bolts used in the spars of a Ford automobile, it may be used to advantage in any situation and made in any size or shape in which ratchets may be required.

I have attained the above mentioned results by means of the structure illustrated in the accompanying drawings, in which—

Figure 1 is a top plan of my wrench or tool.

Figure 2 is a side elevation of the structure shown in Figure 1.

Figure 3 is a bottom plan of the ratchet end of my wrench.

Figure 4 is an end view of the ratchet end of my wrench.

Figure 5 is a longitudinal section on line 5—5, Fig. 3.

Figure 6 is a central section taken at right angles to the section shown in Fig. 5, on line 6—6 thereof, and

Figure 7 is a section similar to that shown in Figure 6, but with the pawls or dogs and ratchet teeth in a different position. Similar reference characters refer to similar parts throughout the respective views.

My wrench consists of a handle portion 10, one end of which is slightly enlarged and transversely bored, at 11, from front to back to provide a bearing for a ratchet cylinder 12, the opposite end of the handle portion being offset, as at 13, for greater convenience in connection with its designed use upon a Ford automobile. The offset portion may also be conveniently extended and cut out to form an open-end wrench, as at 14, but neither the offset portion nor the open-end wrench are essential elements of my invention.

The end of the handle containing the bearing for the ratchet cylinder is longitudinally bored, as at 15, to provide a housing for the pawls or dogs, and the inner end of the bore is reduced, as at 16, for seating a spring which elements are to be hereinafter described. A transverse slot 17 is cut from the back of the handle into the bore 15; said slot being extended longitudinally in a different position. What may be regarded as the primary pawl or dog 19 is of cylindrical form and is cut away at its forward end upon a cord to accommodate a secondary pawl or dog 20 which is of a form to circumferentially complete the cylinder. Pawl or dog 19 is also bored from its inner end, as at 21, well up into the cut away portions. Pawl 20 is longitudinally slotted for a portion of its length, as at 22, and through this slot extends a ratchet reversing arm 23 which is screwed or otherwise secured in a hole 24, provided in the surface formed by the cutting away of pawl 19, as above described.

A pin 25 is provided transversely of the bore in the inner end of pawl or dog 19 by which the convolutions of a helical spring 26 may be screwed. The inner end of spring

UNITED STATES PATENT OFFICE.

JAMES ARTHUR THOMPSON, OF RUSHVILLE, ILLINOIS.

RATCHET WRENCH AND TOOL.

1,413,243.


Application filed September 26, 1921. Serial No. 503,231.
10 seats in the reduced portion 16 of the longitudinal bore in the handle, and the forward end of spring 26 operates against the inner end of pawl or dog 20. It will be
15 noticed that the portion of spring 26 which extends between its seat in the lower reduced end 16 of bore 15 and pin 25 will exert its power against dog or pawl 19, while the portion of spring 26 which extends be-
20 tween pin 25 and the rear end of dog or pawl 20 will exert its pressure upon the dog or pawl 20 and backwardly against pin 25. Thus, by screwing spring 26 to a greater or less extent beyond pin 25 prior to install-
25 ing the dogs and spring within the housing any desired differential between the action of the respective dogs or pawls may be secured with a single spring. The forward ends of both pawls or dogs 19 and 20 are beveled in the same direction, as at 27 and 28, so that they may successively retract and engage the same ratchet tooth on their forward faces when the handle of the wrench cannot be swung back far enough to engage a new tooth, thereby greatly reducing the extent of the swing necessary to cause the ratchet to function and permitting both ratchet teeth and dogs to be made of sub-
30 stantial size. While two pawls have been illustrated and described herein, it is ob-
35 vious that more than this number may be employed without departing from the spirit of my invention.

The dogs or pawls 19 and 20 being sec-
35 tions of a single cylinder, may be rotated in bore 15 by moving the ratchet reversing arm 23 from one end to the other of slot 17 at which positions the longitudinal slots permit the dogs to move forward into opera-
47 tive positions, while, if for any reason it is desired to throw the dogs or pawls en-
50 tirely out of operation, the ratchet reversing arm 23 may be left in an intermediate por-
55 tion of slot 17. For the purpose of prevent-
60 ing the rotation of the dogs from tending to rotate spring 26 with relation to the dogs and thereby disturbing its adjustment, I have extended an end thereof centrally of the coil of the spring thereby reducing sur-
65 face contact and friction.

The ratchet cylinder 12 is preferably pro-
70 vided with a portion of suitable dimensions to fit bearing 11, and in the surface of this portion are provided longitudinal channels for the purpose of providing the ratchet teeth 12c. One end of the ratchet cylinder is en-
75 larged, as at 12a, to form a shoulder abut-
80 ting the end of bearing 11, and an annular groove or channel is provided at the other end into which is sprung a split ring 12b to retain the cylinder in its bearing. To facilitate the assembly and disassembly of the split ring and also to facilitate the inser-
85 tion of the cylinder into its bearing when, through inadvertence, the dogs or pawls have not been withdrawn from operative position, I have beveled a segment of the grooved end of the cylinder, as at 12c.

In the illustrations I have shown the ratchet cylinder centrally bored, as at 12c, and the enlarged end thereof provided with a hexagonal socket 12f, but, obviously, any convenient configuration for work or tool engagement may be given this member without in any way varying the application of the principles of my invention.

What I claim as new is:

1. A ratchet tool comprising a handle, a toothed cylinder provided with work engaging means revolubly mounted in said handle, and a plurality of pawls carried by said handle and beveled at their outer ends in the same direction so as to successively en-
ge the teeth of said cylinder.

2. A ratchet tool comprising a handle, a toothed cylinder provided with work engaging means revolubly mounted in said handle, a longitudinally divided cylinder mounted in said handle endwise with respect to the periphery of said toothed cylinder, the ends of the divisions of said divided cylinder be-
ge beveled in the same direction so as to successively engage said teeth, and means for effecting a semi-rotation of said divided cylinder.

3. In a ratchet tool a plurality of pawls, one whereof is cylindrical in shape and lon-
gitudinally cut away for a portion of its length, the remaining pawl or pawls formed to circumferentially complete the cylindrical outline of said first mentioned pawl and hav-
ing longitudinal movement relative thereto; said first mentioned pawl being axially bored from its opposite end into said cut away portion, a projection extending into said bore, and a helical spring adapted to enter said bore and be rotated to cause cer-
tain of the convolutions thereof to pass said projection.

4. In a ratchet tool a plurality of pawls, one whereof is cylindrical in shape and lon-
gitudinally cut away for a portion of its length, the remaining pawl or pawls formed to circumferentially complete the cylindrical outline of said first-mentioned pawl and hav-
ing longitudinal movement relative thereto; said first mentioned pawl being axially bored from its opposite end into said cut away portion, a projection extending into said bore, a helical spring adapted to enter said bore and be rotated to cause certain of the convolutions thereof to pass said projection; said spring being axially extended to form a seat for the end opposite its end of entry into said pawl.

5. In a ratchet tool comprising a handle having a bearing for a cylinder therein, a pawl carried by said handle and extending into said bearing, a toothed cylinder adapted to enter said bearing and having a segment.
of the entering end thereof beveled so as to cause the retraction of said pawl upon the entry of said cylinder into said bearing.

6. In a ratchet tool comprising a handle having a bearing for a cylinder therein, a cylinder adapted to extend through said bearing having a circumferential groove upon the portion of said cylinder which extends through and beyond said bearing, and a split ring adapted to be sprung into said groove, a segment upon the grooved end of said cylinder being beveled to facilitate the application and removal of said ring.

7. A ratchet tool comprising a handle, a toothed cylinder provided with work engaging means revolvably mounted in said handle, a longitudinally divided element mounted in said handle endwise with respect to the periphery of said toothed cylinder, the ends of the divisions of said divided element being so beveled in the same direction as to successively retract and engage said teeth on their forward surfaces.

8. A ratchet tool comprising a handle, a toothed cylinder provided with work-engaging means revolvably mounted in said handle, and a plurality of pawls carried by said handle and arranged so that their end portions will successively engage the teeth of said cylinder.

9. In a ratchet tool a plurality of pawls arranged therein in longitudinal juxtaposition, a pin secured to and projecting laterally from one of said pawls, the other of said pawls being longitudinally slotted to accommodate said pin, whereby said pawls may be rotated simultaneously by said pin and are capable of independent successive longitudinal movement.

10. In a ratchet tool a plurality of pawls arranged therein in longitudinal juxtaposition, one of said pawls provided with a lateral element, and a spiral spring between the convolutions of which said lateral element extends and one end of which spring abuts the other of said pawls, whereby the rotation of said spring adjusts the tension exerted thereby upon the respective pawls.

11. In a ratchet tool a plurality of pawls arranged therein in longitudinal juxtaposition, and a single spring element engaging said pawls and adjustable to control the tension exerted upon each of said pawls respectively.

12. A ratchet mechanism including a plurality of pawls forming together a cylinder with their operative faces parallel so as to be capable of successive independent longitudinal movement and simultaneous rotation.

Signed at Rushville, county of Schuyler, and state of Illinois, this 29th day of August, 1921.

JAMES ARTHUR THOMPSON.