

F. R. ALFORD.  
METHOD OF FORMING CLOCK RATCHETS.  
APPLICATION FILED MAY 2, 1908.

945,668.

Patented Jan. 4, 1910.

Fig. 1.

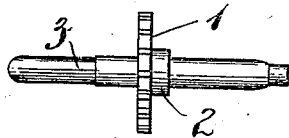


Fig. 2.

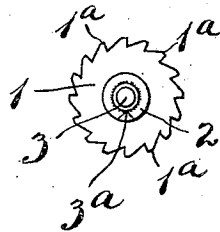


Fig. 3.

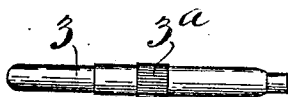


Fig. 4.

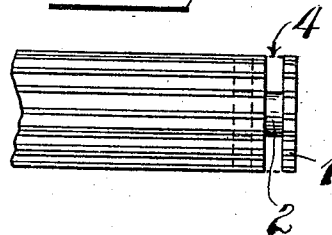
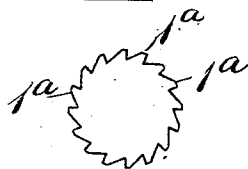


Fig. 5.



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*F. R. ALFORD*  
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*Rowley, Brown & McEachern*

# UNITED STATES PATENT OFFICE.

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## METHOD OF FORMING CLOCK-RATCHETS.

945,668.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed May 2, 1908. Serial No. 430,531.

*To all whom it may concern:*

Be it known that I, FRANK R. ALFORD, a citizen of the United States, residing at Winsted, Litchfield county, State of Connecticut, have invented certain new and useful Improvements in Methods of Forming Clock-Ratchets, of which the following is a full, clear, and exact description.

My invention relates to an improved ratchet and method of producing the same, the ratchet being particularly useful in connection with clock construction.

The object of the invention is to simplify and cheapen the process or method by which such devices are produced and at the same time to turn out ratchets of superior construction.

In the drawings, Figure 1 is a side elevation of my improved ratchet shown in connection with a spindle; Fig. 2 is an end view thereof; Fig. 3 is a side view of the spindle before the ratchet is placed thereon; Fig. 4 is a side elevation of the bar from which the ratchets are formed, one ratchet being shown as practically completed at the right hand end of said bar; Fig. 5 is an end view of Fig. 4.

The ratchet in its finished state is of conventional form and includes the main body 1, having teeth 1<sup>a</sup> around its edge.

2 is an integral hub.

3 is an arbor knurled at a suitable point to provide a multitude of longitudinally disposed ridges projecting above the surface of the arbor, as shown at 3<sup>a</sup> (Fig. 3). The completed ratchet when forced onto the arbor encounters said ridges which cut into the hub of the ratchet so as to securely hold the arbor and ratchet wheel in place.

The method of manufacturing comprises, first, forming a bar of metal by the extruding process, which involves heavy pressure, which bar is of an outline in cross section corresponding to the external outline of the finished ratchet wheel, the teeth 1<sup>a</sup> being simultaneously formed. This method of manufacturing compacts the metal and renders it exceedingly tough and resistant. The bars thus wrought are then placed in a suitable cutting machine and the ratchets are cut off in such a manner as to form the hub integral with the main body. In Fig. 4 I have shown a single groove or cut 4, such as made in said extruded bar of metal, for the purpose of forming one ratchet. This

single cut serves to form the hub of one ratchet and the largest part of one surface of two adjacent ratchets. In effect therefore (excepting the final cutting off operation), the single shaping cut suffices to produce a single complete ratchet and hub. Of course a final shearing cut must occur to separate each ratchet from the balance of the bar. Finally, a spindle passage is drilled through each ratchet and hub.

Heretofore ratchets of this type have been formed of cast metal. The rough blanks as delivered from the mold are bored and then forced upon their respective arbors, then trimmed down in a suitable lathe and finally the teeth are cut one by one. This exceedingly laborious process results in a very high cost of manufacture of an inferior article in the end. The rough cast blanks are first forced upon the spindle so as to avoid, so far as possible, the danger of breakage, said cast blanks being comparatively brittle and weak. If the blanks were first finished, the metal cut away in such finishing operation would merely tend to further weaken the ratchet and increase the danger of breakage. Cast blanks are also objectionable in that they are more or less porous.

By my improved method, as compared with the old method above outlined, many advantages will be seen. The metal, instead of being porous and brittle, is compact and tough. Each ratchet may be finished before it is applied to its spindle. Since the ratchet possesses great strength and resistance, the diameter of the knurled portion 3<sup>a</sup> of the spindle may be such as to cause the nurls to sink deeply into the hub of the ratchet, securely and permanently connecting said parts so that slippage is impossible. In this connection it might be said, that where cast ratchets are employed, great care has to be exercised to provide as few nurls as possible and as little increase in diameter at the knurled portion of the spindle, with the result that heretofore it has been found that cast ratchets cannot be connected to spindles with sufficient firmness to guarantee against slippage, after long continued use. By my invention, however, the connection is quite as effective as though the spindle and ratchet were integral.

The distinct advantages of this invention may be attributed wholly to the superior and

improved method of manufacture, and at the same time, as compared with the old process is much more economical from a manufacturing standpoint.

5 What I claim is:

10 The method of forming toothed ratchet wheels comprising, forming a bar of extruded metal of a length greater than the thickness of two ratchets arranged side by side, said bar being of a cross sectional outline corresponding to the external outline of the finished ratchet, partially severing said bar transversely by a broad shaping cut,

forming at once one side of one ratchet and the opposite side of the next adjacent 15 ratchet, a portion of the metal of the bar between two adjacent ratchets being retained to form a hub which shall be integral with one of said ratchets, and finally completely severing said bar by a narrower cut extend- 20 ing through that part of the bar designed to constitute the hub.

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