

(No Model.)

E. G. PARKHURST.
CRANK ARM FASTENING.

No. 512,745.

Patented Jan. 16, 1894.

Fig. 1.

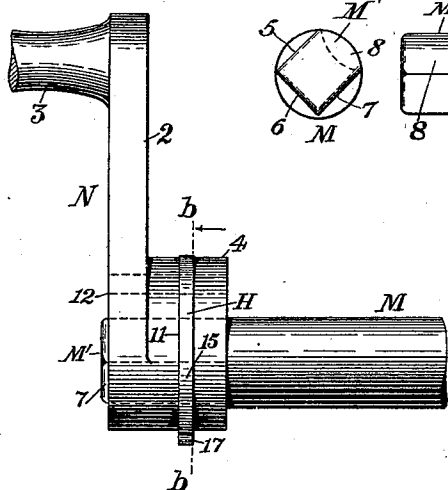


Fig. 8.

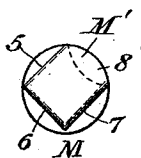


Fig. 9.

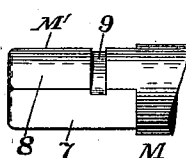


Fig. 2.

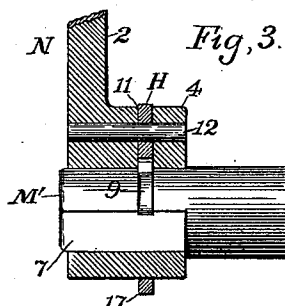
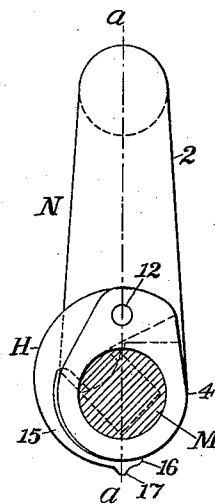


Fig. 4.

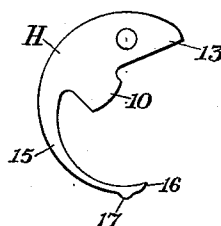


Fig. 5.

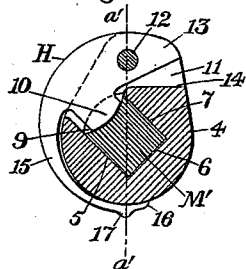


Fig. 6.

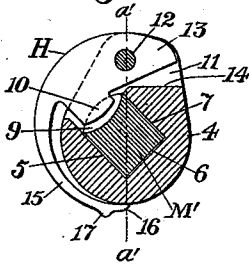
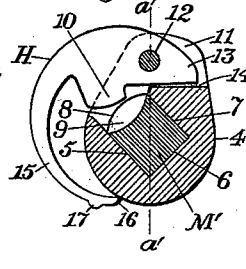


Fig. 7.



Witnesses:
John L. Edwards Jr.
Fred. J. Dole.

Inventor:
Edward G. Parkhurst,
By his Attorney,
J. H. Richards

UNITED STATES PATENT OFFICE.

EDWARD G. PARKHURST, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE
HOTCHKISS ORDNANCE COMPANY, LIMITED, OF LONDON, ENGLAND.

CRANK-ARM FASTENING.

SPECIFICATION forming part of Letters Patent No. 512,745, dated January 16, 1894.

Application filed July 26, 1893. Serial No. 481,479. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. PARKHURST, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Crank-Arm Fastenings, of which the following is a specification.

This invention relates to attachments for removably securing crank-arms to shafts; the object being to provide improved means for attaching and detaching a crank-arm to and from its shaft by a shaft-fastening or locking device operable by hand.

My present improvement is especially intended for use in connection with the operating cranks or levers of rapid-fire guns, especially those of the "Hotchkiss" type.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of a crank-arm attachment embodying my present invention, and showing the crank-arm locked in place on its shaft. Fig. 2 is an end elevation of the crank-arm attachment, as seen from the right-hand in Fig. 1. Fig. 3 is a longitudinal section (except of the shaft and pin) on the line *a a*, Fig. 2. Fig. 4 is a side view of the shaft-lock shown in a position corresponding to its position in Figs. 2, 5, 6 and 7. Figs. 5, 6 and 7 are sectional views in line *b b*, Fig. 1, illustrative of the operation of the device. Fig. 8 is an end view of the shaft, as seen from the left-hand in Figs. 1 and 3, showing the preferred form of the non-rotative crank-arm bearing. Fig. 9 is a side view of said bearing as seen from the right hand in Fig. 8, and corresponding in position to Figs. 1 and 3.

Similar characters designate like parts in all the figures of the drawings.

For the purpose of illustrating the application of my present invention to one of its more important purposes, I have shown a crank-arm which is designated in a general way by *N* and is furnished with a shaft-lock device made according to my present improvements, removably fitted upon the non-rotative crank-arm bearing of an ordinary shaft, *M*. The crank-arm *N* may be any ordinary crank-arm, such, for instance, as used on the operating-shafts of rapid-fire guns. The crank-arm herein shown consists of a

lever-arm, 2, which is usually provided at its outer end with some suitable handle, as 3, whereby to operate the same by hand; and a hub 4, bored for receiving the crank-arm bearing of said shaft, on which bearing the crank-arm hub should be fitted to slide closely but freely.

For the purpose of securing the required non-rotative engagement between the crank-arm and its shaft-bearing, this bearing, as shown best in Figs. 5 to 8, inclusive, is squared or flatted on one or more sides thereof so as to operate after the manner of an ordinary squared-shaft; or, after the manner of an ordinary round shaft having a key projecting therefrom for engaging a corresponding key-way in the part carried thereon. In the present instance, the shaft *M* has the crank-arm-bearing *M'* thereof flatted on three sides, designated by 5, 6 and 7, respectively; the fourth side, designated by 8, is shown forming a continuation of the cylindrical outer surface of the shaft *M*, and in this side—(which is preferably left full, as shown, and not cut away)—is formed the transverse shaft-lock notch 9 for receiving the working-end, or bolt, 10, of the shaft-lock hereinafter more fully described. The crank-arm-bearing, being irregularly shaped as set forth, is not only non-rotative within the corresponding bore of the crank-arm, but will enter said arm only in one position; by this means, when the crank-arm is applied to a gun of the class specified, the crank-arm, whenever put in place, always comes to its proper working position as required in that class of ordnance.

The shaft-lock consists of a plate, or lock-catch, designated in a general way by *H*, and which is supported on the crank-arm, and is capable of being moved from and into the bore of said arm for the purpose of engagement and disengagement with and from the shaft. As a means for mounting said shaft-lock to have the required movement radially of the shaft-axis and at the same time rigidly hold the same against any movement longitudinally of said axis, the shaft-lock is supported in a slot 11, formed transversely in the hub 4 of the crank-arm and communicating with the shaft-bore of the crank-arm; the shaft-lock being pivotally supported in said slot 11 by a pin or pivot-bearing, 12, as will

be understood by comparison of the figures of drawings.

The shaft-lock H in the preferred form thereof herein-shown, has on the inner side thereof the lock-catch, or bolt-end, 10, adapted for engaging in the aforesaid transverse slot or lock-notch 9 of the shaft M. The outward movement of the shaft-lock from its working position shown in Fig. 5 to its open position shown in Fig. 7 is limited by the projecting end or stop-arm 13, which engages against the stop-face 14 of the crank-arm hub, as shown in said Fig. 7. Extending beyond its catch 10, the shaft-lock is furnished with a spring-arm, or yielding lever-arm, 15, whose outer end 16, when the shaft lock is in its closed or working position shown in Figs. 2 and 5, extends beyond the central line $a' a'$ and yieldingly grasps the outer side of the crank-arm hub in opposition to the pivot-pin 12, thereby holding the shaft-lock in place with a considerable degree of force, dependent, of course, upon the elasticity of the spring-arm 15 and the distance its point 16 extends beyond said line $a' a'$ of the axes of the shaft and shaft-lock pivot. In Fig. 6 the shaft-lock is shown in its mid-stroke position, with the extreme point of its said spring-arm bearing on the crank-arm hub at the line $a' a'$. In Fig. 7, the shaft-lock being here shown fully open, said spring arm is released from its tension, its point standing contiguous to the surface of the crank-arm hub at some distance to the left hand of the line $a' a'$ and thus operating to normally hold the shaft lock in its open position ready for the crank-arm to be slid onto or off from the shaft, as the case may be.

Having thus fully described the application of my present improvements to a crank-arm removably mounted upon the end of a shaft, it will, of course, be clear that the same improvements are equally applicable to the hub of a wheel similarly supported.

It will also be understood that my improved crank-arm attachment, and the several parts thereof, may be modified in various ways within the scope and limits of my invention.

The operation of the crank-arm attachment will be readily understood from the drawings in connection with the preceding description. The crank-arm being locked in place on the shaft, as shown in Figs. 1, 2, 3 and 5, the operator may grasp the same by the hub of the crank-arm, bringing his finger over the spring-arm 15 in engagement with the checked surface of the projection 17 thereof, and thereby withdraw the shaft-lock from its position in Fig. 5 to its position in Fig. 7, and then withdraw the crank-arm directly off from the shaft M without releasing his grasp of said arm. By this means the crank-arm may be instantly unlocked and removed, and by a reverse operation instantly replaced and locked on the shaft; no shifting of the hand on the crank-arm being ordinarily required for the operation of the shaft-lock.

By means of the construction and mode of

assembling herein described, of the several parts, it is practicable to have these so fitted as to be freely assembled and disassembled by hand without having any objectionable play of one part upon the other; also the use of small separable details such as the normally loose screws and pins heretofore largely used in this class of devices, is entirely avoided, the device herein shown having only one pin 12, and this being firmly driven into the crank-arm hub 4, and therefore normally non-separable.

By the term "non-rotative bearing" as applied to the crank-arm-carrying portion of the shaft, I refer to that feature of the construction whereby the shaft is fitted for non-rotative sliding movement in the crank-arm; but I do not intend by the use of said term to limit my improvement to the use of a crank-arm bearing of any particular cross-sectional shape; for it will be understood that the cross-sectional form of said portion of the shaft may be varied as may be required in any particular instance, so long as the engagement between the shaft and crank-arm is non-rotative; that is, so long as said parts operate, for effecting the rotary movement of the shaft, upon the well-known principle of a shaft-and-key.

Having thus described my invention, I claim—

1. In a fastening of the class specified, the combination with the shaft having the non-rotative crank-arm-bearing and having a transverse shaft-lock notch, of the crank-arm fitted for longitudinal movement on said crank-arm-bearing, and a shaft-lock pivotally supported in the crank-arm transversely of said bearing and adapted to engage in said shaft notch, and a shaft-lock-retaining arm for holding the shaft-lock in removable engagement with said shaft-lock notch, substantially as described.

2. In a fastening of the class specified, the combination with the shaft, of the crank-arm hub fitted for longitudinal non-rotative movement on the shaft and having in one side thereof a slot transversely of the shaft and extending to the bore of the hub of said crank arm, and a shaft-lock pivotally supported in the said slot and having a spring arm extending over and engaging the hub for detaining the shaft-lock in working position, substantially as described.

3. In a fastening of the class specified, the combination with the shaft having a crank-arm-bearing substantially as specified and a shaft-lock notch, of a part fitting said bearing and having the transverse slot 11 and the movable shaft-lock pivotally supported in said slot, and having a catch for engaging the shaft lock notch, and having the spring-arm extending, when the shaft-lock is closed, beyond the line of the axes of the shaft and shaft-lock pivot, whereby the shaft-lock is normally held in its working position, substantially as described.

4. In a fastening of the class specified, the combination with the shaft, and with the crank arm hub fitted thereon and having a pivot and a stop-face, of the shaft-lock supported
5 on said pivot and having a stop-arm limiting its opening movement by engagement with said stop-face of the said hub, and means for yieldingly holding the shaft-lock closed and open, substantially as described.

EDWARD G. PARKHURST.

Witnesses:

A. C. DIEFFENBACH,
FRED. J. DOLE.