(No Model.)

I. H. MULFORD.

THILL COUPLING.

No. 456,051. Patented July 14, 1891.

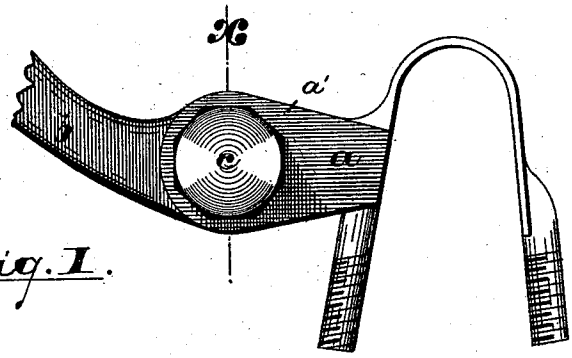

Fig. 1.

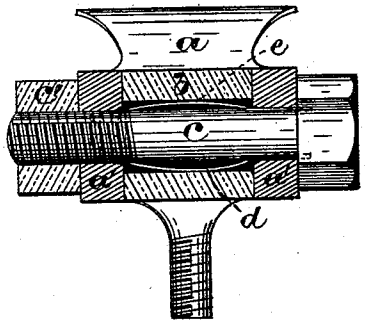

Fig. 2.

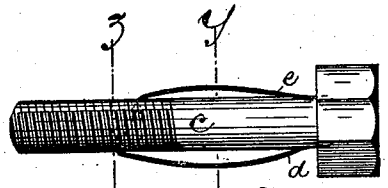

Fig. 3.

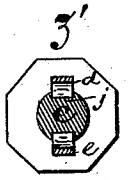

Fig. 4.



Fig. 5.

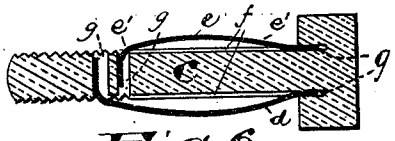

Fig. 6.

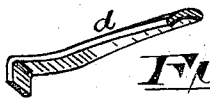

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

ICHABOD H. MULFORD, OF EAST ORANGE, ASSIGNOR OF ONE-HALF TO DAVID DODD, OF NEWARK, NEW JERSEY.

THILL-COUPLING.

SPECIFICATION forming part of Letters Patent No. 456,051, dated July 14, 1891.

Application filed July 24, 1890. Serial No. 359,815. (No model.)

To all whom it may concern:

Be it known that I, ICHABOD H. MULFORD, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Thill-Couplings and Bolts Therefor; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The objects of this invention are to provide a more simple, inexpensive, durable, and effective thill-coupling for carriages and other vehicles; to provide a bolt which may be applied to any of the ordinary couplings now in the market in substitution for the common bolts therein without otherwise changing the construction of said couplings; to provide an anti-rattling bolt which may be conveniently supplied to the market; to guard against the detachment of the bolt and the uncoupling of the thill-iron, and to secure other advantages and results, some of which will be set forth in connection with the description of the working parts.

The invention consists in the improved thill-coupling and the improved bolt therefor and in the arrangements and combinations of parts, substantially as will be hereinafter set forth, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters indicate corresponding parts in each of the several figures, Figure 1 is a side elevation of the improved thill-coupling. Fig. 2 is a sectional view of the same, taken on line X. Fig. 3 is a detail view of the anti-rattling bolt therefor. Fig. 4 is a transverse section on line y. Fig. 5 is a similar section on line z, and Fig. 6 is a longitudinal section of said bolt on line z'. Fig. 7 is a detail view of one of the springs, showing a preferred construction.

In said drawings, a indicates an ordinary clip adapted to be secured upon the axle of a vehicle. b indicates the thill-iron, and c is a bolt adapted to be secured by a nut c' in the eyes of said clip and thill-iron to hold the parts in operative relation to one another, the said bolt being provided at one end with a head and at the opposite extremity with a screw-thread, by means of which the nut c' is secured upon said bolt.

To prevent the parts from rattling because of looseness occasioned by wear or poor fitting, I have arranged longitudinally on said bolt, and preferably in permanent relation thereto, springs d e, adapted to be forced with said bolt into the said eyes of the clip and thill-iron and to engage the inner walls thereof, as indicated in Fig. 2, to prevent rattling. The springs are arranged at the center of the said bolt, the longer spring extending from the head to the screw-threads and the shorter spring projecting from the shank from a point near the head to a point at or near the said threads. Said springs are outwardly bent or bowed, the centers thereof extending into engagement with the co-operating part of the coupling, while the ends engage the bolt. The spring e is preferably made shorter than the spring d to engage the thill-iron alone and to serve as a lock or means for preventing longitudinal movement of the bolt whereby the latter is firmly and securely retained in position in the coupling, the ends e' of the said shorter spring, which rise above the periphery of the bolt, as indicated in Fig. 3, immediately engaging the ears a' of the clip on the bolt moving laterally to prevent further lateral movement, as will be understood. The longer longitudinal spring d is also outwardly curved and extends from ear to ear of the axle-clip, as indicated in Fig. 2, engaging the walls of the perforations in both the clip-ears and the thill-iron. The spring thus serves to prevent rattling of the bolt on either of said parts. Being outwardly curved at the center, the said spring will bear on the thill-iron to prevent rattling, even though the perforation in said thill-iron should be larger than those in the ears, as indicated in said Fig. 2. The bolt is longitudinally grooved or recessed, as at f in Fig. 4, to receive the spring when pressed down by being forced into the coupling, and at the extremities of the spring said bolt is notched, as at g, or otherwise formed to receive the said extremities and allow suf-

ficient longitudinal movement thereof to provide for the straightening of the normally-curved central parts thereof. I prefer to hold or fasten the springs in permanent relation to the bolt to prevent detachment or separation thereof when the bolt is removed from the coupling, so that there will be no assembling or adjusting of parts remaining for the purchaser. This may be accomplished in various ways; but for simplicity and ease of manufacture I prefer to extend the springs into recesses formed in the bolt-head, as indicated in Fig. 3, and at the opposite ends, where the springs extend into the notches in the shank of the bolt, I upset the metal of said shank at the sides of the spring, so that said spring cannot detach itself from the bolt, as will be easily understood upon reference to Fig. 5. The springs may be simple flat ones, as shown in Fig. 4; but I prefer to curve the upper surfaces, as in Fig. 7, more or less in correspondence with the peripheral curve of the bolt-shank. The springs are arranged on the shank of the bolt, which I may define to be that portion lying between the head and the screw-threaded portion of the periphery of the bolt, so that when the nut is screwed onto said threaded periphery there will be no interference of parts, and when the bolt is in the thill-coupling the said springs will be brought into proper relation with the ears of the clip and the thill-iron.

To assemble the parts prior to operating the coupling, the clip and thill-iron are simply brought into their usual relation and the bolt carrying the spring forced longitudinally into place and the nut c' screwed thereon, all as is common in the ordinary coupling operations. The springs bear outward against the walls of the eyes of both the thill-iron and clip, and thus prevent the noise resulting from an improper fit or looseness.

The bolt may be employed in connection with other devices than thill-couplings, and other variations and modifications than those positively provided for may be made therein without departing from the spirit of this invention.

Having thus described the invention, what I claim as new is—

1. The improved thill-coupling for carriages and like vehicles, combining with the clip having ears a' and a thill-iron arranged between said ears a bolt having a head at one end and a thread at the other and a longitudinally-grooved portion between, a spring arranged in said groove and bent outward at the center and engaging the thill-iron, substantially as shown, and a nut screwed upon the said threaded extremity of the bolt and holding said bolt in place, substantially as set forth.

2. The improved thill-coupling herein described, combining with the thill-iron and clip having ears a' a bolt having a head at one end and a threaded and longitudinally-grooved shank extending through said ears and said thill-iron, a nut c', and an outwardly-curved spring extending longitudinally on said shank and bearing on said thill-iron at the center and at the opposite ends bearing outwardly against said ears, substantially as and for the purposes set forth.

3. The improved thill-coupling herein described, combining with the clip having ears a' and a thill-iron a bolt having a long and a short spring, the former extending into the ears and bearing outwardly therein and the latter providing abutting curves to engage the said ears to prevent longitudinal movement of the bolt, substantially as set forth.

4. In a thill-coupling, the combination, with the longitudinally-grooved and peripherally-threaded bolt, of an outwardly-curved spring arranged in said groove, the end of which terminates short of the extremity of the threaded part, substantially as and for the purposes set forth.

5. In a thill-coupling, the combination, with the longitudinally-grooved bolt having a recess formed in the head thereof and a recess formed transversely between said head and the threaded extremity of the shank, of an outwardly-curved spring arranged in said groove, substantially as and for the purposes set forth.

6. The improved thill-coupling herein shown and described, combining with the clip having ears a' a thill-iron arranged between said ears, a bolt extending through said thill-iron and ears and held therein by a nut c', the said bolt having longitudinal grooves and springs arranged therein and bearing outward at the center against said thill-iron and clip, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of July, 1890.

ICHABOD H. MULFORD.

Witnesses:
CHARLES H. PELL,
OSCAR A. MICHEL.