F. A. STRODEL.

THILL COUPLING.

APPLICATION FILED MAY 9, 1908.

950,733.

Patented Mar. 1, 1910.

Fig. 1.

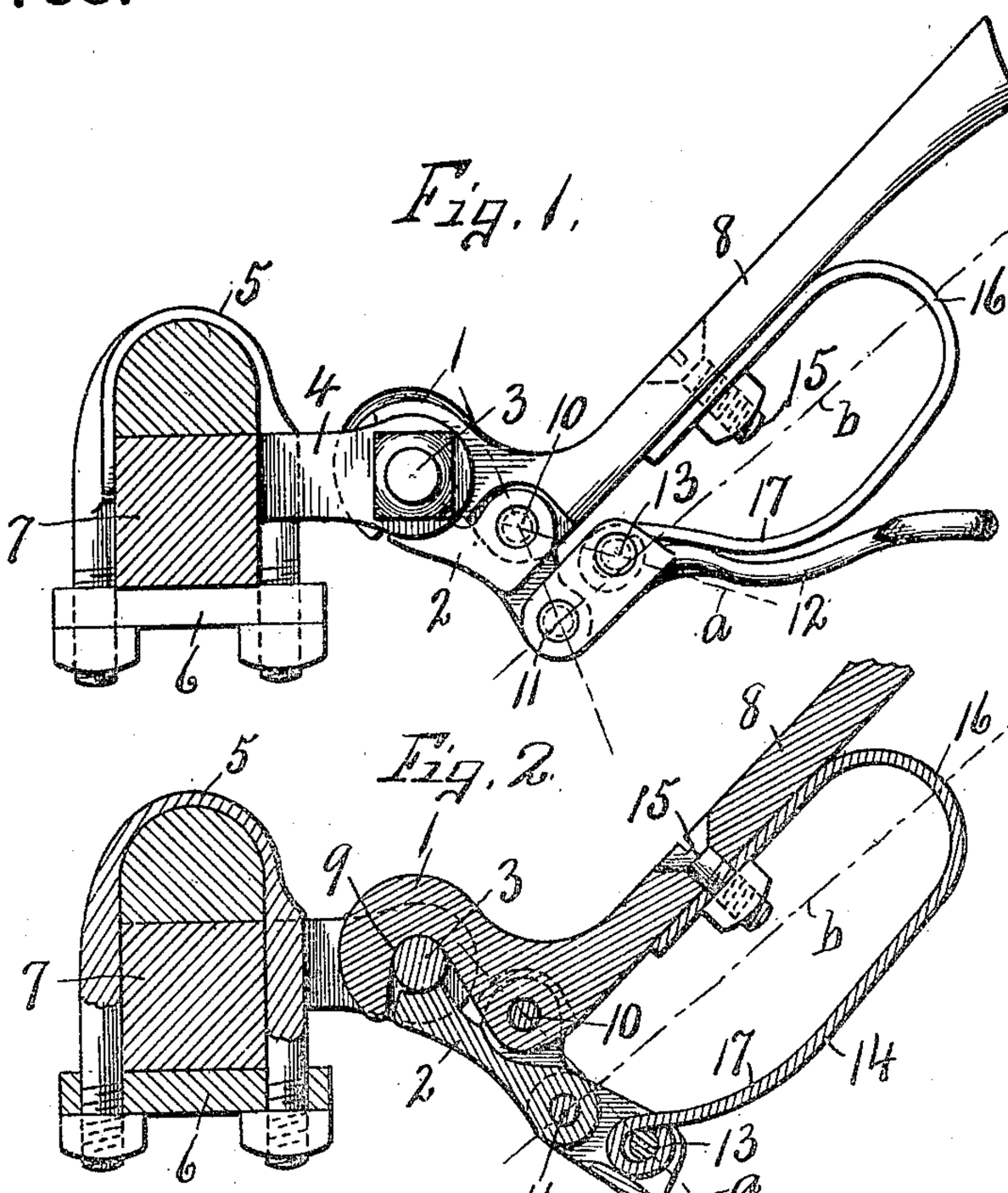


Fig. 2.

Fig. 4

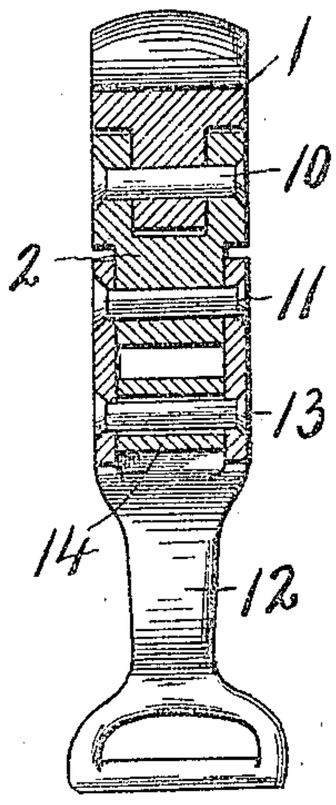
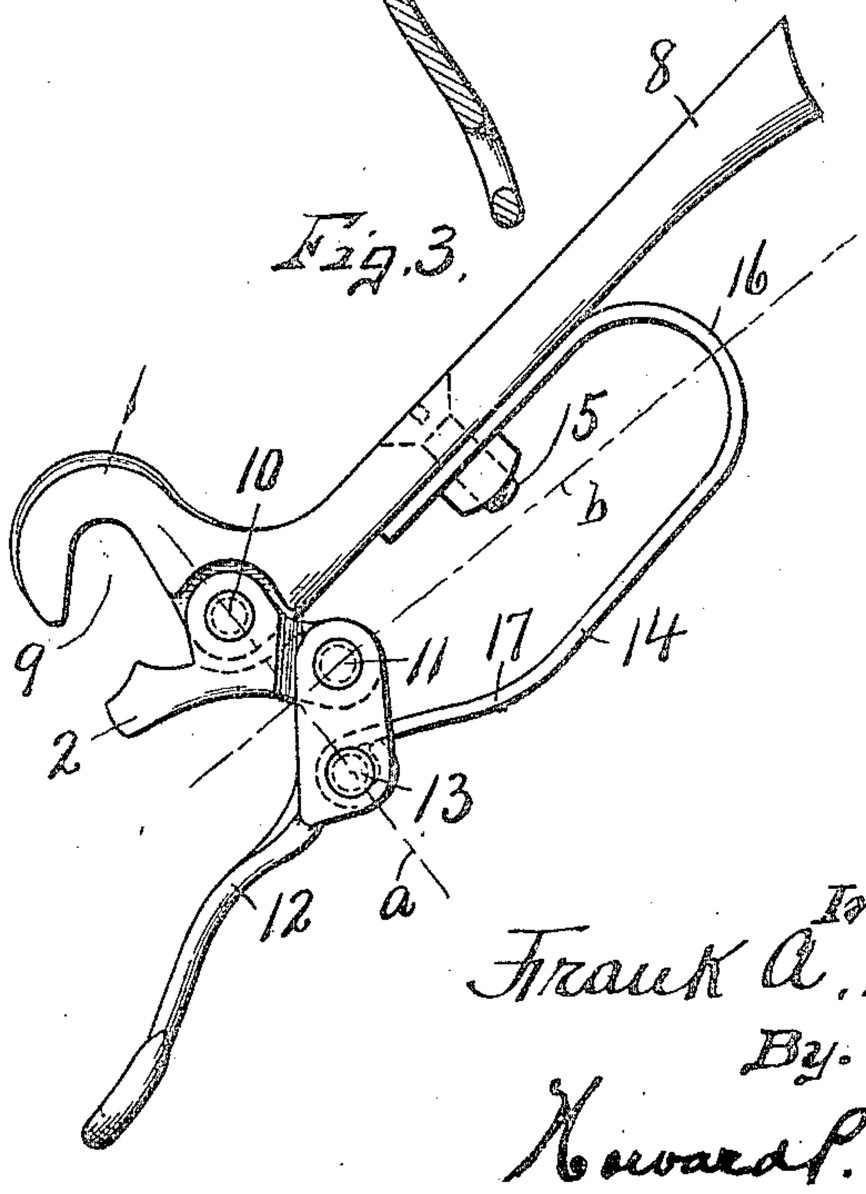


Fig. 3.



Witnesses.

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THILL-COUPLING.

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Application filed May 9, 1908. Serial No. 431,785.

To all whom it may concern:

Be it known that I, FRANK A. STRODEL, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Thill-Couplings, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in thill couplings of the quick shift type in which a coupling pin is adapted to be held in and released from the grasp of a pair of jaws, one of which is pivoted to the other, the pivoted jaw being eccentrically connected by a toggle lever to one end of a return bend spring in such manner as to hold the lever and jaw in locked position and also in open position. The return bend or U-shape spring has been found to be particularly efficient in couplings of this character by reason of the fact that it affords the greatest resiliency and that the strains are evenly distributed throughout its entire length rather than being concentrated at one particular point thereby obviating to a considerable extent the liability to crystallization and consequent breakage. Furthermore in this class of thill couplings it is customary to provide the fixed jaw with an opening in its under side forming a hook which fits over and upon the coupling pin so that the weight of the thills or jaw tends to keep the coupling in locking engagement with the coupling pin while the movable jaw enters the under side of the opening and engages the under side of the coupling pin to prevent upward displacement of the coupling jaw from said pin and it is, therefore, necessary to provide only just sufficient spring tension to hold this jaw in position to resist upward rebound of the hook from the pin.

My main object is to establish a direct toggle connection between the lever and movable jaw and to fulcrum the lever directly upon the free end of a return bend spring, the opposite arm of which is attached to the fixed jaw whereby the flexing joint of the toggle may pass through and to opposite sides of a direct line through the fulcrums of the movable jaw and lever as said lever is rocked in reverse directions for the purpose of tensioning the spring to lock the jaw in its closed and open positions. In other words, I have sought to establish a toggle connection between the free end of the spring and jaw and providing one of the toggle members with an extension constituting a lever whereby the toggle may be flexed to open and close the jaw with greater ease against the tension of the spring thereby permitting the use of a comparatively stiff spring which may be manipulated with or against its own tension with a minimum power applied to the lever.

Another object is to deflect the end of the spring upon which the lever is fulcrumed toward the fixed jaw and to enable said fulcrum to move through a direct line drawn between the flexing joint of the toggle and center of the return bend of the spring whereby a lengthwise tension is exerted upon the spring for the purpose of holding said jaw and lever in their closed position when the fulcrum of the lever is moved to one side of said direct line and for forcing the lever open when said fulcrum is moved to the opposite side of said line.

A still further object is to tension the free end of the spring attached to the lever so as to exert a pressure upon the toggle to hold the jaw closed when the lever is swung through a portion of its arc in opening the jaw, thus requiring a further movement of the lever to throw the flexing joint of the toggle to the inside of a direct line drawn through the fulcrum of the movable jaw and lever, the latter action causing the complete opening of the movable jaw.

Other objects and uses relating to specific parts of the thill coupling will be brought out in the following description.

In the drawings—Figure 1 is a side elevation of a thill coupling embodying the various features of my invention, the movable jaw and operating members being shown in their closed position. Fig. 2 is a longitudinal sectional view through the same parts showing the lever as rocked rearwardly from its closed locked position to its second locking position with the jaw still closed. Fig. 3 is an elevation similar to Fig. 1, omitting the coupling pin and axle and showing the lever as rocked to its extreme open position. Fig. 4 is a sectional view showing the flexing joint of the toggle in a direct line of the fulcrums of the movable jaw and lever.

In the drawings I have shown a fixed jaw —1— and movable jaw —2— as adapted

to grasp between them a coupling-pin —3—, the latter being in this instance mounted upon suitable ears —4— of a clip —5— which is secured by a clip plate —6— to an axle —7—. The fixed jaw —1— is preferably formed integral with a suitable thill iron —8— and is provided with an opening —9— in its under side for receiving the coupling pin —3—, said fixed jaw —1— being therefore, hook-shape and adapted to rest upon the upper side of said coupling pin while the opening —9— is of sufficient dimensions to easily receive the coupling pin —3—.

The movable jaw —2— is preferably made in the form of a lever fulcrumed at —10— to the fixed jaw —1— in front of the coupling pin —3—, one end of said jaw being movable in the lower side 9 of the coupling into and out of engagement with the coupling pin —3— at some distance to the rear of the fulcrum —10— while the opposite end of said jaw is pivoted at —11— to one end of a lever —12—. This lever is fulcrumed or pivoted at —13— upon one end of a return bend spring —14— having its opposite end or arm secured by suitable fastening means as a screw —15— to the under side of the fixed jaw —1—. This spring is, therefore, U-shape in general outline and is formed intermediate its ends with a return bend —16— while its free end which is attached to the pivotal pin or fulcrum —13— is deflected upwardly and rearwardly forming an additional bend —17— between the pivot —13— and return bend —16— to afford greater endwise resiliency to this portion of the spring.

It will be seen from the drawings that the spring —14— is located wholly in front of the fulcrum —10— of the movable jaw —2— and, therefore, in front of the coupling pin —3— with one end rigidly secured to the fixed jaw —1— or extension —8— thereof and its other end pivotally attached at —13— to the lever —12— some distance below and in front of the hinge pin —10— of the movable jaw —2— and adapted to be tensioned toward and from the hinge pin —10—as the lever —12— is rocked in reverse directions.

The portions of the jaw —2— and lever —12— between the fulcrums —10— and —13— constitute a toggle connection, the flexing joint of which is the pivot —11— connecting said lever with the adjacent end of the jaw —2— and movable through and to opposite sides of a direct line —*a*— drawn through the fulcrums —10— and —13— of said movable jaw and lever respectively for the purpose of opening and closing the movable jaw and tensioning the spring —14— to lock said jaw in either position as the lever is rocked in reverse directions. The fulcrum or pivotal connection —13— between the lever —12— and adjacent end of the spring —14— is also movable through and to opposite sides of a direct line as —*b*— drawn between the center or the return bend and flexing joint or pivotal pin —11— also for the purpose of tensioning the spring to lock the jaw and lever in their closed positions as seen in Fig. 1 when the fulcrum —13— is above or at the rear of the line —*b*— and to partially or wholly release the movable jaw as the lever is rocked in the reverse direction to bring the fulcrum —13— to the lower or front side of the line —*b*—.

The spring —14— is tensioned to exert a pressure upon the fulcrum pin —13— of the lever —12— toward the fulcrum —10— of the movable jaw —2— and, therefore, as the flexing joint or pivot —11— is moved to opposite sides of the direct line —*a*— between the fulcrums —10— and —13—, such spring pressure will tend to hold the jaw open or closed according to which side of said line the flexing joint or pivot is moved by the rocking of the lever —12—. For example, if the lever —12— is rocked rearwardly to throw the flexing joint —11— in front of the line —*a*— as shown in Fig. 3, the tension of the spring —14— will operate to hold the movable jaw open but if the lever is rocked forwardly a sufficient distance to throw the flexing joint —11— to the rear of said line as shown in Fig. 2, the jaw will be forced by the spring to its closed position without flexing the spring endwise, and in this position, the tension of the spring is sufficient to hold the movable jaw closed against the coupling pin. This would, however, leave the lever hanging downwardly too great a distance for safety and in order that the movable jaw may be more firmly held in its closed position and at the same time providing for the folding and locking of the lever in a more compact position, I have provided the spring with the auxiliary curve or bend —17— which enables it to be flexed longitudinally as the lever is rocked forwardly and upwardly. During this forward and upward movement of the free end of the lever —12—, the spring —14— is tensioned longitudinally particularly at the bend —17— and the fulcrum —13— is thrown from a position below to a position above the line —*b*— between the center of the return bend —16— and flexing joint —11— of the toggle thereby causing the spring to exert a rearward pressure upon the heel of the jaw —2— below its fulcrum —10— which operates to yieldingly hold the said jaw in its closed position with greater firmness.

It is evident from the foregoing description that the toggle connection between the lever and movable jaw allows the use of a comparatively stiff spring and at the same

time enables the lever to be operated in reverse directions for opening and closing the movable jaw with and against the tension of the spring with greater ease or less power as it is well known that the toggle action is one of the most effective means for producing great pressure or force with a minimum power and this is particularly useful in thill couplings of this character because it permits the jaws to be opened and closed with ease and at the same time permits the spring to exert its maximum tension in holding the movable jaw in its closed position.

The operation of my invention will be readily understood from the foregoing description taken in connection with the drawings and although I have shown the coupling jaws, spring and lever as mounted on the thill iron, it is evident that the same elements may be used in connection with the clip or clip plate of the axle and, therefore, I do not limit myself to the exact construction and arrangement shown and described.

What I claim is:

In a thill coupling, a coupling pin, two jaws, one of which is fixed and the other of which is pivoted intermediate its ends to the fixed jaw, said jaws adapted to grasp and release the coupling pin, a substantially U-shaped spring having a long and a short arm, the shorter arm being rigidly secured to the fixed jaw, a lever pivoted at its inner end to the outer end of the movable jaw and to which lever the free end of the longer arm of the spring is pivoted at a point removed from the inner end of the lever and the pivot between the movable jaw and lever, the longer arm of said spring being curved inwardly at a point adjacent its pivoted end whereby when the lever is swung forwardly on its pivot toward the spring to close the jaws, the inwardly curved portion of the spring is compressed or caused to flex longitudinally of the arms of the spring.

In witness whereof I have hereunto set my hand this 5th day of May 1908.

FRANK A. STRODEL.

Witnesses:
H. E. CHASE,
M. M. NATT.