

No. 607,664.

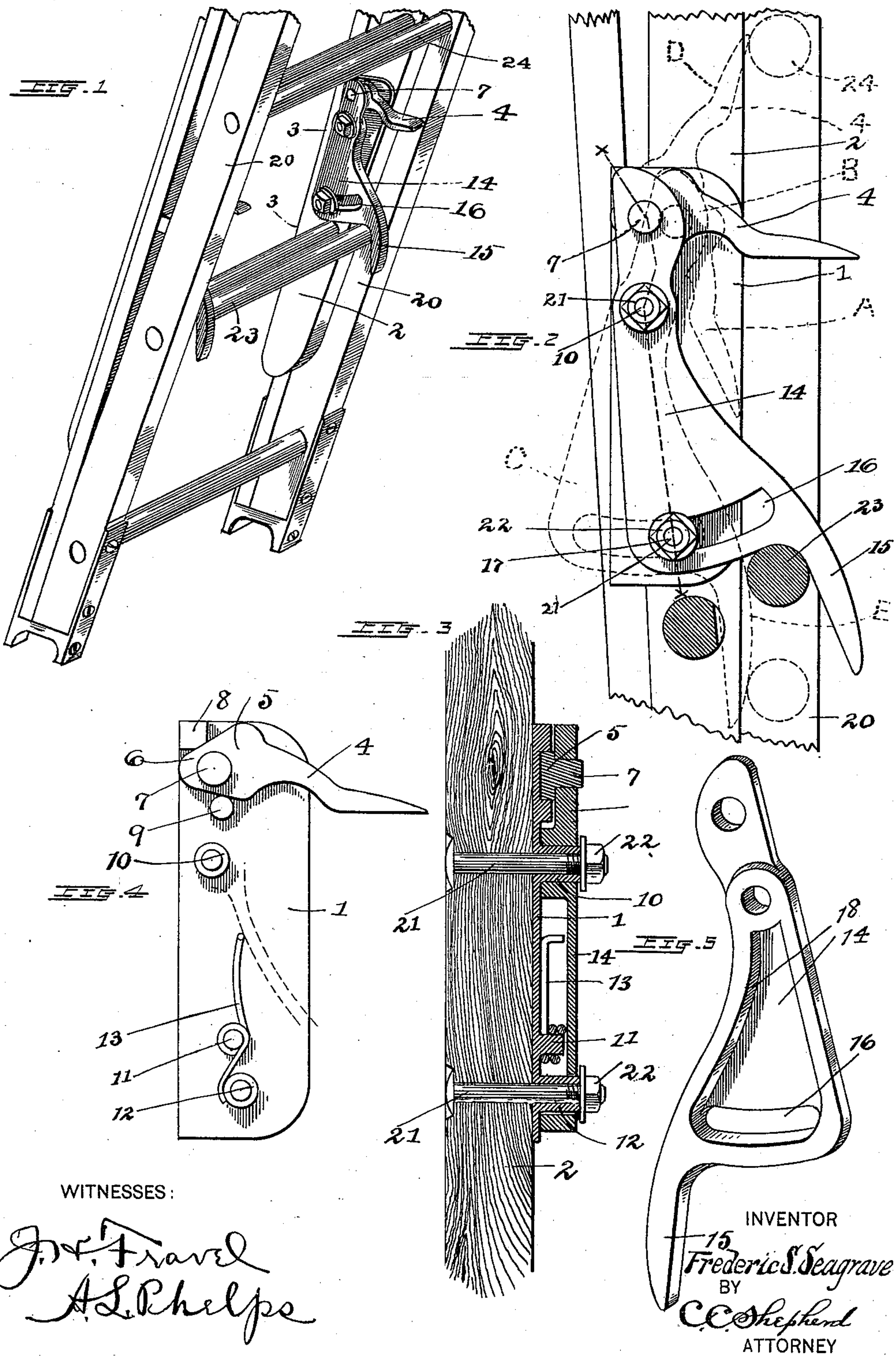
Patented July 19, 1898.

F. S. SEAGRAVE.

AUTOMATIC COUPLING OR LOCK FOR EXTENSION LADDERS.

(Application filed Aug. 16, 1897.)

(No Model.)



UNITED STATES PATENT OFFICE.

FREDERIC S. SEAGRAVE, OF COLUMBUS, OHIO.

AUTOMATIC COUPLING OR LOCK FOR EXTENSION-LADDERS.

SPECIFICATION forming part of Letters Patent No. 607,664, dated July 19, 1898.

Application filed August 16, 1897. Serial No. 648,438. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC S. SEAGRAVE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Automatic Couplings or Locks for Extension-Ladders, of which the following is a specification.

My invention relates to the improvement of ladder-couplings of that class which are adapted for the purpose of connecting or engaging extension-ladders.

The objects of my invention are to provide the movable or sliding ladder-section with an improved lock or coupling which is adapted to be tripped by contact with the first rung of the stationary ladder which is above the coupling and to engage or lock on any rung when desired; to so construct and arrange the parts of my improved lock or coupling as to combine great strength and simplicity of construction and operation; to so arrange the parts of my device as to obviate any tendency to undue friction or binding of the locking-arm during contact with rungs of the lower ladder; to so construct my improved coupling and its operating parts as to facilitate its production in a comparatively small form and admit of its being adapted for use on heavy or comparatively light ladders, and to produce other improvements which will be more specifically pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a view in perspective of the lower portion of two united ladder-sections, showing the application of my improved coupling or lock to the second rung of the lower ladder. Fig. 2 is an outer side or face view of my improved coupling, showing the same in position on the ladder-frame and showing in dotted lines different positions assumed by the parts of my device when in operation. Fig. 3 is a sectional view which for the sake of clearness in illustration is taken on four different planes, as indicated by dotted line *xx* in Fig. 2. Fig. 4 is an inner side view of the fixed base-plate with the locking or coupling arm or plate removed therefrom, and Fig. 5 is a detail view in perspective of the locking-arm.

Similar numerals refer to similar parts throughout the several views.

In the construction of my improved ladder coupling or lock I employ a base-plate 1, one of which is in the manner hereinafter described adapted to be secured to the inner face or side of each of the parallel side arms 2 of a ladder 3.

4 represents a trip-lever the cam-head 5 of which has its inner end portion of the nose form indicated at 6, this nose portion being provided with an outwardly-projecting fulcrum-pin 7. The nose of the cam-head is adapted, as shown more clearly in Fig. 4 of the drawings, to project between projecting lugs or pins 8 and 9, which project from the upper end portion of said plate 1, said lever being supported in this position in the manner hereinafter described. At a point in the upper portion of the plate 1 and below the lever-head I provide said plate with an outwardly-projecting and tubular fulcrum-pin 10, while in the lower portion of said plate I provide a pin 11 and beneath the latter a tubular pin 12, with which is connected the lower end of a suitable spring finger or wire 13, the purpose of which will be shown hereinafter.

14 represents my improved locking or coupling plate or arm, the comparatively narrow upper end portion of which is provided with a pin-opening, which is adapted to receive the outwardly-extending fulcrum-pin 7 of the trip-lever 4. Below this point the arm 14 is fulcrumed, as shown, to the pin 10. The lower portion of the arm 14 is widened rearwardly, and said widened portion terminates in a rearwardly and downwardly extending lock or coupling-finger 15. In the lower portion of the arm-body I provide a transverse slot 16, which is preferably of the slightly-curved form shown. Through this slot extends loosely the pin 12 of the plate 1. As shown more clearly at 18 in Fig. 5 of the drawings, the locking or coupling arm 14 has its body or main portion recessed on its under side, and when said arm is mounted upon the plate 1 in the manner above described the spring-finger 13 exerts a pressure against the outer arm-wall formed by said recess, this contact being shown partly in dotted lines in Fig. 4 of the drawings. It is obvious that the pres-

sure of the spring 13 upon said arm-wall must result in the pin 17 being normally retained in the forward or inner end of the slotted opening 16 and the locking-finger 15 being normally supported in the path of the rungs of the lower or stationary ladder 20, between the parallel side frame-pieces of which said ladder-section 3 is adapted to be moved.

The manner of securing the base-plate 1 in connection with the ladder-frame consists, preferably, in providing bolts 21, which pass through the parallel frame-arms 2, and thence through the tubular pins 10 and 12, hereinbefore described. The outer ends of these bolts are provided with nuts 22, as indicated.

In order to describe the operation of my improved couplings or locks, we will assume that the upper or sliding ladder 3 is in the relative position with the lower or stationary ladder indicated in Figs. 1 and 2 of the drawings—that is, the lock-finger 15 at the juncture of its under side and the under side of the arm-body 14 is engaged with and resting upon a rung 23 of the lower ladder. When the locking-arm is in this position, the trip-lever 4 is, as shown in the drawings, extended between the rung 23 and the next higher rung 24. In order to extend the ladder formed by the combination of the upper and lower or sliding and stationary sections, the ladder-section 3 is moved upward by any suitable means, this upward movement resulting in a disengagement of the lock-finger with the rung 23 and in a contact of the trip-lever with the next higher rung 24. This contact of the trip and upper rung results in a depression of the trip to the position indicated at A in dotted lines in Fig. 2. The depression of the trip-lever to the last-described position results, through the turning of the cam-head 5 against the pin 9, in throwing the upper end portion of the arm 14 outward to the position indicated in dotted lines at B and in throwing the lower portion of said arm 14 outward to the position indicated in dotted lines at C. A continuing upward movement of the upper ladder results in the trip-lever passing the rung 24 and in said trip-lever and locking-arm assuming their normal positions. A second depression or inward movement of the locking-arm, however, occurs when the outer curved surface of the locking-fingers comes into contact with and passes said rung 24. Having passed the latter rung, it is obvious that the locking-arm will again assume its outward position and admit of its engagement with the rung 24 in the manner in which it formerly engaged the rung 23. In case it is not desired to lock the lower ladder upon the next succeeding rung the upward movement and operation of passing the rungs may be continued until that rung with which it is desired to engage the upper ladder is reached.

In lowering the upper ladder it is first necessary to raise said upper ladder until the trip-lever has passed the next higher rung. A downward movement of the upper ladder is

now begun, resulting through the contact of the rung, which we will assume is 24, with the under side of the trip-lever, resulting in an upward and inward movement of the latter to the position indicated in dotted lines at D in Fig. 2. This upward movement of the trip-lever results through the engagement of its cam-head with the upper plate-lug 8 in drawing the locking-arm inward until its locking-finger assumes the position indicated in dotted lines at E, in which position said locking-finger may pass the next lower rung. It is obvious that this downward movement of the upper ladder may be continued to the desired point, when the operation of again engaging the locking-finger with the next upper rung consists in raising the upper ladder until the locking-finger passes and springs into engagement with the next higher rung.

From the construction and operation which I have described it will be seen that by the use of my improved lock or coupling the ladder-sections are provided with an improved automatic locking mechanism, by means of which the rungs of the upper ladder may be successively engaged. It will be observed that the locking-arm of my improved coupling is fulcrumed in its upper end portion, thereby obviating that tendency toward binding or wedging of the locking-finger against the rungs when passing the latter, which is ordinarily encountered in cases where the locking-arm is fulcrumed at a lower point. It will also be seen that the position and arrangement of the trip-lever is such as to cause comparatively slight friction in accomplishing its work of throwing back the projecting arm of the lock. It will also be observed that the construction of my improved ladder lock or coupling is such as to insure great strength and at the same time admit of its being formed comparatively short and of less material than ordinarily employed for such purposes. I am enabled to produce my improved lock in the short form shown owing to the fact that the locking-arm and trip-lever work in opposite directions in lowering the upper ladder, and the distance between the outer ends of said trip and locking-finger when the latter are extended from each other need only be equal or substantially equal to the distance between the rungs from center to center. Attention may be called to the fact that the construction, size, and arrangement of my improved ladder-lock is such as to admit of its being attached to the ladder-frame immediately above the lower rung of the ladder, whereas in ordinary ladder-coupling constructions it has been found necessary to remove the second rung of the upper-ladder section to admit of the locking device being placed in position for use; but by my device each rung of the upper-ladder section is utilized. In addition to its use on extension-ladders, such as are employed by city fire-departments, and on large and heavy ladders it is evident that my improved lock may be

readily adapted for use on ladders of lighter construction for ordinary purposes.

5 Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

10 In an automatic coupling or lock for extension-ladders, the combination with a base or back plate adapted to be secured to the inner side of an upper-ladder section, of a spring-actuated locking-arm fulcrumed in its upper portion to said plate, said locking-arm hav-

ladder section, a trip-lever having a cam-shaped head eccentrically fulcrumed to said 15 locking-arm and lugs 8 and 9 projecting from said back plate whereby the contact of said trip-lever with the upper or lower side of a rung of the lower ladder results in the lower portion of the locking-arm being thrown in- 20 wardly in position to pass a rung, substantially as and for the purpose specified.

FREDERIC S. SEAGRAVE.

In presence of—

C. C. SHEPHERD,
EDWARD M. TAYLOR.