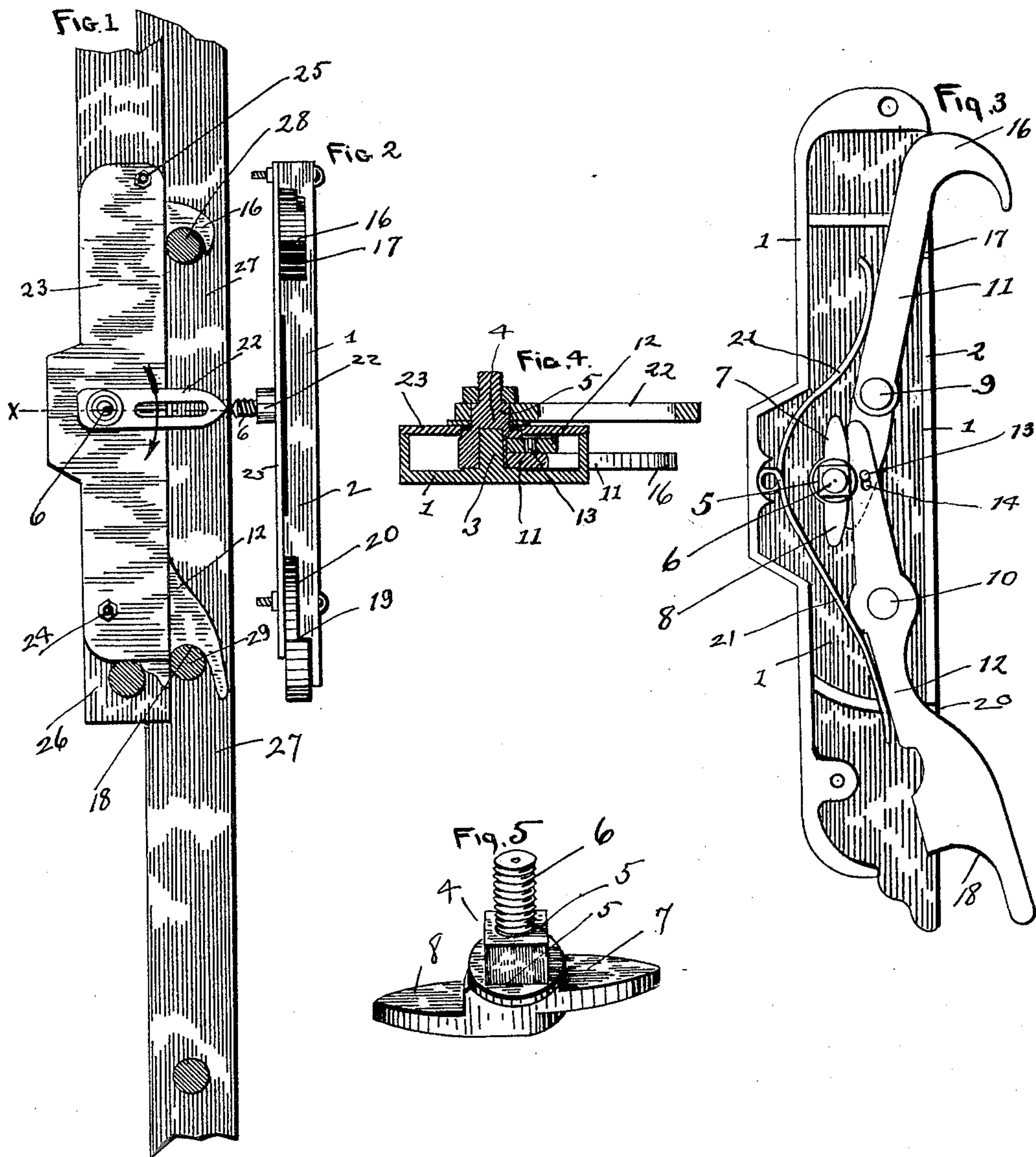


(No Model.)

F. S. SEAGRAVE.  
EXTENSION LADDER COUPLING OR LOCK.

No. 581,776.

Patented May 4, 1897.



WITNESSES:

Ray Blinn  
A. L. Phelps

INVENTOR

Frederic S. Seagrave

BY

C. C. Phelps  
ATTORNEY



# UNITED STATES PATENT OFFICE.

FREDERIC S. SEAGRAVE, OF COLUMBUS, OHIO.

## EXTENSION-LADDER COUPLING OR LOCK.

SPECIFICATION forming part of Letters Patent No. 581,776, dated May 4, 1897.

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*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 Extension-Ladder Couplings or Locks, of which the following is a specification.

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

The objects of my invention are to provide simple, reliable, and effective means for producing a connection between extension-ladders, to so construct and arrange a coupling device as to admit of its engagement with two rungs of the adjacent ladder, and to otherwise produce a safe and substantial ladder-coupling. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 represents a central vertical section of two ladders, showing my improved coupling device in use. Fig. 2 is a detail view in elevation of said coupling device, taken at right angles with that shown in Fig. 1. In this view the engaging ends of the locking-arms are, for the sake of illustration, shown in their inner position. Fig. 3 is a plan view of said coupling device with the top plate removed therefrom. Fig. 4 is a sectional view on line *xx* of Fig. 1, and Fig. 5 is a detail view in perspective of the tumbler employed in operating the locking-arms.

Similar numerals refer to similar parts throughout the several views.

1 represents an oblong base-plate which is formed substantially cup shape by the employment of outwardly-projecting edge flanges 2. At or about the center of the length of the base-plate 1 is formed an upwardly-projecting stem 3, upon which is rotatably supported the central portion of a tumbler-body 4. As indicated in the drawings, this tumbler-body may be provided in its outer portion with a square head 5, from which extends outward a screw-threaded pin 6. The inner end portion of the tumbler has extending in opposite directions and at right angles

with the direction of the length of the pin 6 fingers 7 and 8, the finger 7 being on a higher plane than the finger 8, as indicated more clearly in Fig. 5 of the drawings.

Arranged on opposite sides of the center of the length of the plate or casing 1 are outwardly-projecting fulcrum-pins 9 and 10.

11 and 12 represent locking or coupling arms. At points in their inner halves the locking-arms 11 and 12 are fulcrumed, as shown, on the pins 9 and 10. The arm 11 has its inner end portion beyond its fulcrum-point depressed or cut away to admit of the inner end portion of the arm 12 overlapping the same.

The inner end portion of the arm 11 is provided with an upwardly-projecting pin 13, which passes loosely through a short slotted opening or mortise 14 in the corresponding portion of the arm 12. The portions of the arms 11 and 12 which are thus connected are adapted to be retained in contact with corresponding faces of the tumbler-fingers 7 and 8.

As indicated in the drawings, the outer end of the arm 11 is formed with a downturned hook 16, said hook portion being adapted to be projected, by the means hereinafter described, through a recess 17 in the upper end portion of the casing-flange 2. The lower and outer end portion of the arm 12 is so recessed as to produce an offset or shoulder 18 therein, and said arm is so formed as to present an inclined upper side, as shown. This outer end termination of the arm 12 is recessed to form a shoulder portion 19 and, as indicated in Fig. 2 of the drawings, the flange 2 of the body or casing is provided with a correspondingly-shaped recess 20 to admit of the free outward and inward movement of said arm-head.

The arms 11 and 12 are normally retained in the outwardly-projecting position shown in Figs. 1 and 3 of the drawings by means of a suitable spring 21, the latter having its central portion fixed to one side of the center of the length of the casing and having its arms normally exerting an outward pressure on the backs or inner sides of said locking-arms. The casing or body 2 is designed to be covered by a suitable top plate 23.



22 represents a trigger-arm, one end of which is mounted upon the outwardly-projecting head 5 of the tumbler and the remaining end of which normally extends at right angles with the direction of the length of the casing and to a point on the outer side of the latter. The outer end of this trigger-arm is provided with a beveled or rounded edge, as indicated in the drawings. This trigger may, if desired, be formed integral with or as a stem of the tumbler.

As indicated in the drawings, the coupler-body herein described is adapted to be secured at points 24 and 25, which are preferably out of alinement with each other, to the inner side of one of the parallel frame-arms 26 of a ladder, and the frame-arms 26 of said ladder are adapted to fit within the corresponding frame-arms of a ladder 27, of which 28 and 29 represent two rungs.

As further shown in the drawings, the ladder-frames 26 and 27 being in the positions shown in Fig. 1, the hook-shaped termination 16 of the arm 11 is designed to engage with the upper and outside of the upper rung 28, while the outwardly-projecting lower end portion of the arm 12 has its recess 18 engaged with the upper and outside of the rung 29. In this position it will be observed that the locking-arms are engaged with two separate rungs of what may be termed the "stationary" ladder-frame 27 and that the weight of the movable ladder 26 or any weight thereon will be equally distributed upon the two rungs.

In moving the ladder 26 upward or outward to gain an increased ladder length it is obvious that the upper side of the outwardly-projecting portion of the trigger-arm 22 will come into contact with the upper rung 28, resulting in an inward movement of the trigger 22 in the direction of the arrow shown in Fig. 1 and in a consequent partial rotation of the tumbler-body. The pressure thus necessarily exerted by the tumbler-fingers upon the inner end portions of the locking-arms must result, as will readily be seen, in the outer or rung-engaging ends of the locking-arms being drawn within the casing until the trigger is out of contact with the rung 28. Although the locking-arms are thus again allowed to spring outward, it is obvious that the contact of the rung with the inclined upper portion of the locking-arm 12 must again result in the locking-arms being pressed inward, thus allowing the arm-hook 16 to pass the next succeeding rung and the arms 12 and 16 to pass and, by lowering the ladder 26, to engage with the rungs 28 and 29.

It is obvious that the shoulders formed in the flange 2 of the casing by the production therein of the recesses 17 and 20, in conjunction with the shoulder 19 of the arm 12, will form bearings for the locking-arms when the latter are in their outer positions.

In order to lower the upper-ladder section,

the upper ladder must first be elevated until the trigger has passed the next rung above. This being accomplished, the upper-ladder section may be lowered, the trigger coming into contact with the upper side of the rung 28, thus drawing inward the locking-arms and retaining them in their inward position until the nose or outer side of the hook 12 is in contact with the inner side of the rung 29, thus admitting of the lowering of said upper-ladder section. This downward movement may be continued indefinitely, owing to the fact that the rungs are arranged at equidistant points, and that before the trigger releases from each successive round the nose of the hook 12 will have mounted upon the succeeding round thereof, holding both the arms in their inner positions. The locking-arms may be made to engage with any desired rungs by reversing the movement of the ladder-section. When the trigger is released and the nose of the hook 12 is disengaged from contact or pressure with the rung, the locking-arms both spring outward, after which the lowering of the ladder must result in a locking engagement of the arms and rungs.

I am aware that various ladder-coupling devices have been provided heretofore wherein means were employed for producing a coupling engagement with one rung of the ladder, but numerous accidents resulting from such insecure ladder connections have indicated the necessity of a stronger and safer coupling connection.

From the construction and operation which I have described it will be seen that simple and effective means are provided for producing a strong, positive, and safe engagement with two rungs of the stationary ladder and that the two rungs thus employed jointly receive the strain or weight of the adjacent ladder, thereby insuring persons mounted upon ladders of this character against accidents, which, as is well known, occur through the use of weak or insufficient ladder-couplings. It will also be observed that the necessity of forcing the locking-arms within the casing by contact with the rungs in the manner ordinarily employed is entirely obviated, inasmuch as the said locking-arms are thrown out of an engaging position through the contact of the rungs with the central trigger regardless of the direction in which the movable ladder is forced.

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

1. In a coupling for extension-ladders, the combination with a coupling body or plate adapted to be secured to a ladder-frame, of two locking-arms fulcrumed on said plate and normally projecting in the path of the rungs of an adjacent ladder, said locking-arms adapted to engage simultaneously with two rungs of said adjacent ladder and means for



disengaging said arms from said rungs, substantially as and for the purpose specified.

2. The combination with a ladder 26 and spring-actuated locking-arms 11 and 12 fulcrumed thereto, of a ladder 27 arranged adjacent to said ladder 26 and rungs 28 and 29 with which said locking-arms are adapted to be engaged at the same time and means ar-

ranged between said locking-arms for withdrawing the latter from connection with said rungs, substantially as and for the purpose specified.

FREDERIC S. SEAGRAVE.

In presence of—

E. W. BRINKER,

C. C. SHEPHERD.