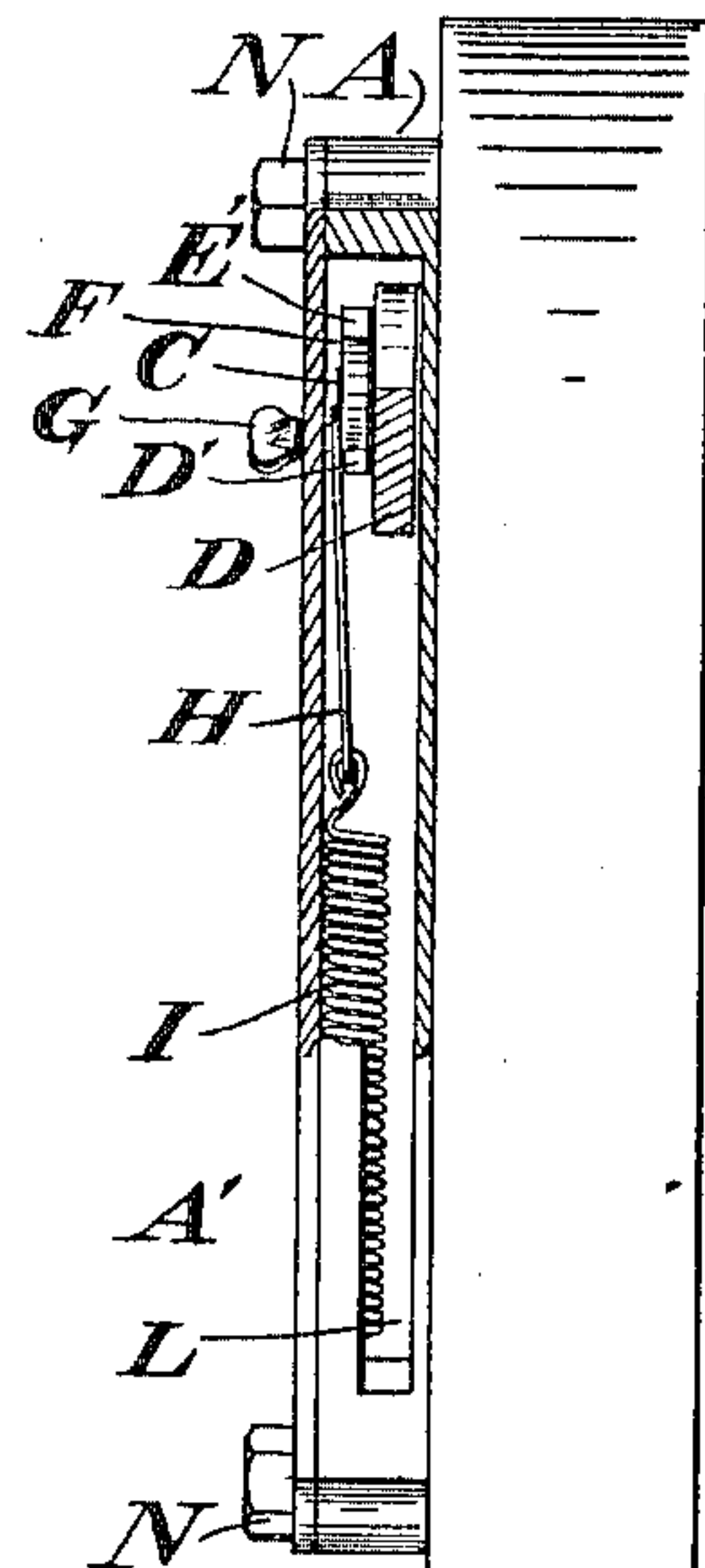
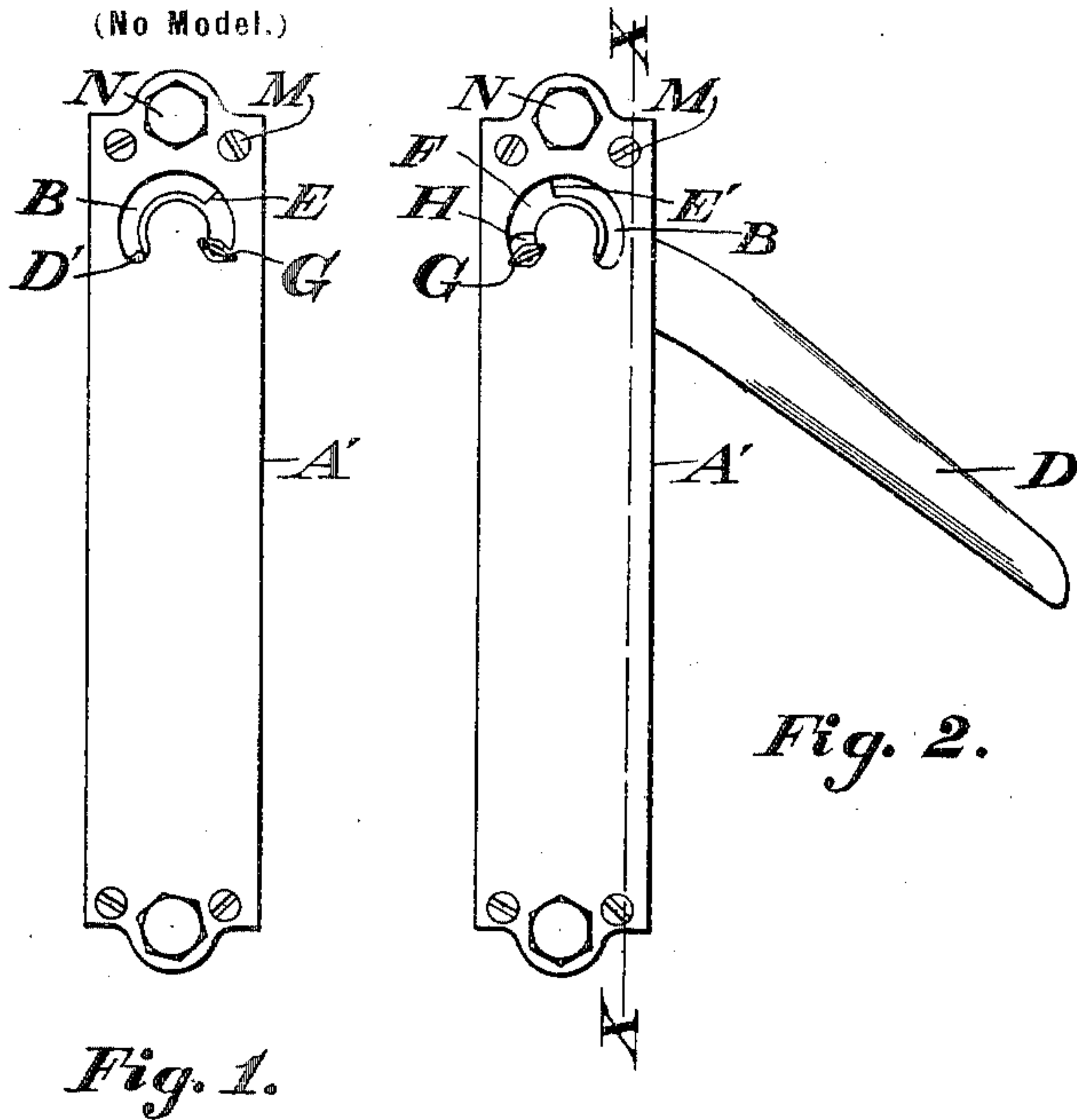


H. L. FRIZELL.

LADDER.

(Application filed June 12, 1900.)

2 Sheets—Sheet 1.



*Fig. 3.*

*Witnesses.*  
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*L. P. Higgins*

*Inventor.*  
*Herbert L. Frizell*  
*per Eugene Humphrey*  
*Attorney.*

No. 659,814.

Patented Oct. 16, 1900.

H. L. FRIZELL.  
LADDER.

(Application filed June 12, 1900.)

(No Model.)

2 Sheets—Sheet 2.

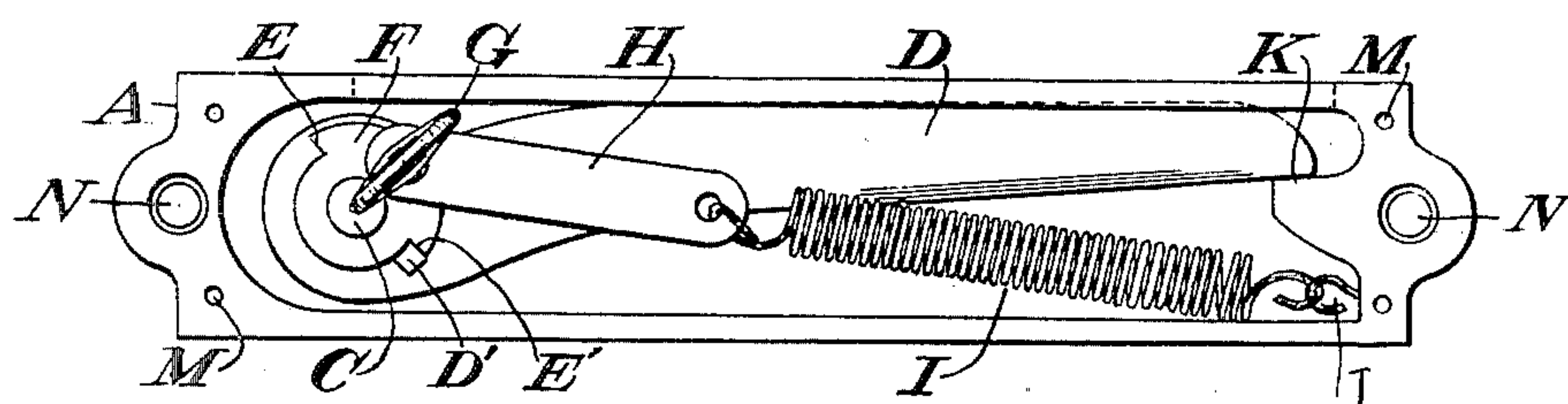


Fig. 4.

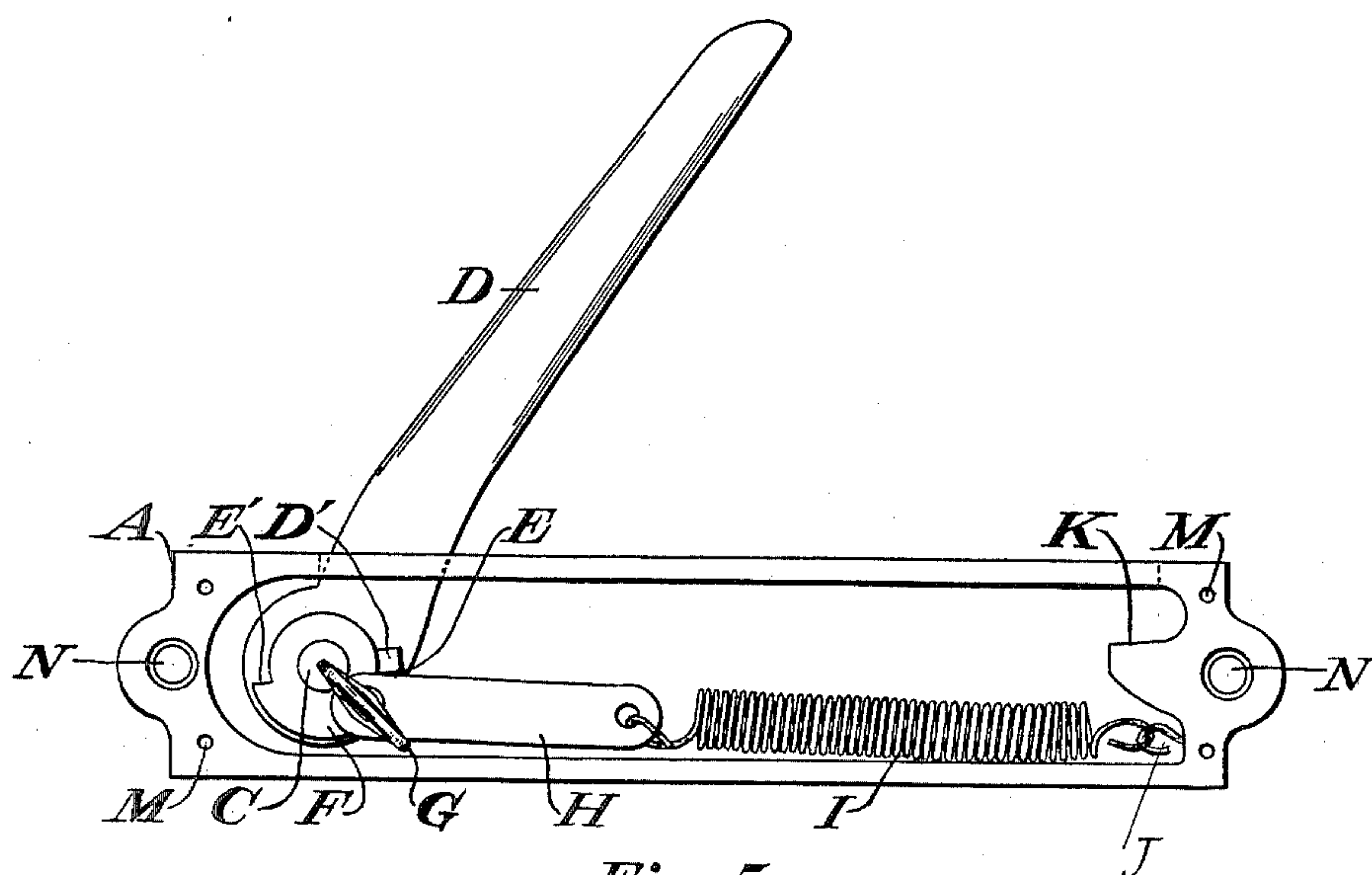


Fig. 5.

Witnesses.

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L. P. Higgins.

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Herbert L. Frizell  
per Eugene Humphrey  
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# UNITED STATES PATENT OFFICE.

HERBERT L. FRIZELL, OF BOSTON, MASSACHUSETTS.

## LADDER.

SPECIFICATION forming part of Letters Patent No. 659,814, dated October 16, 1900.

Application filed June 12, 1900. Serial No. 20,000. (No model.)

*To all whom it may concern:*

Be it known that I, HERBERT L. FRIZELL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Ladders, of which the following is a specification.

My invention relates to that kind or class of ladders commonly styled "roof-ladders" or "hook-ladders," used by carpenters and painters and for fire-department purposes; and the object of my improvement is to provide such ladders with a spring-hook which may be readily sheathed within the attachment by which it is secured to the side rails of a ladder during the time when the ladder is being placed in position or while it is being transported from place to place, and which hook will automatically open and close, as required, in the manner which will be fully explained herein. I attain the object stated by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the ladder-hook attachment with hook sheathed therein or closed. Fig. 2 is a similar view with the hook swung out or open. Fig. 3 is a longitudinal section taken as on line  $x x$ , Fig. 2, and as viewed from the right of said line. Fig. 4 is a side view with the cover removed, showing the interior devices in position as when the hook is swung inward or closed; and Fig. 5 is a similar view showing the position of the parts when the hook is swung outward or open.

The hook attachment consists of a metallic inclosing frame or case A, having a detachable cover or face plate A', in which a curved slot B is formed. In the opposite side of the case is secured a pivot-pin C, the axis of which is concentric with the circle in part described by slot B, and upon this pin is fitted the grappling-arm D of the hook, so as to swing outward and inward thereon. A stop D' is formed upon or secured to the arm, against which the shoulders E and E' on a plate F, which turns upon pin C, alternately act, according to adjustment, to open and close or swing out and in the grappling-arm of the hook. An eccentric-pin G is arranged to project from plate F through slot B and is adapted to be manipulated to turn the plate, as will be ex-

plained. The pin G also passes through a hole in one end of a strap H, to the opposite end of which is secured one end of an actuating-spring I, while the other end of the spring is attached to an eye J, secured in the body of the case. A notch K in the end of the case presents a shoulder which serves as a stop against which arm D acts when drawn into the case by spring I. The upper end of the slot L in the edge of the case serves as a stop to arm D when it is open or swung outward by the force of spring I. The cover or face plate A' is secured to the body of the case by screws M M, and the whole attachment when thus organized is secured to the side rails of the ladder, one on each side, by bolts and nuts N N, as shown, or it may be attached in any other substantial and suitable manner.

When the hooks are so attached to the ladder at its upper end, the operation of the hook is as follows: If it is desired to keep the grappling-arm sheathed within the case, then the projecting eccentric-pin G is turned into the position shown in Fig. 4, which places the strap H on the right of the pivot-pin C, and consequently the contractile force of the spring I turns the plate F so as to bring its shoulder E' against stop D', and thus automatically closes the arm into the case against stop K and sheathes it within the body of the case. By turning pin G in the opposite direction the plate F will be moved around so that its shoulder E will come into contact with stop D', and strap H will be carried past the center and over to the left of pivot C, when the contractile force of spring I will operate to automatically open or swing outward the arm D, as shown in Fig. 5. In this latter position the hook or arm is inwardly yielding, but outwardly rigid. This feature renders the ladder very convenient to use in places where it is difficult to turn the ladder over or use one with fixed and immovable projecting hooks. For instance, this ladder may be pushed up over the surface of a roof under overhanging obstructions, the weight of the ladder bearing upon the arms D and overcoming the resistance of the springs, keeping them sheathed in the case until the end of the ladder is thus carried far enough above the ridge-pole to free the arms, when the



spring will force them open and in position to seize upon the ridge-pole when the latter is retracted and to hold the same in place thereon. After the ladder is thus placed and the purpose of placing it there has been accomplished it may then be easily released and withdrawn by simply turning the eccentric-pin in slot B so as to carry strap H over to the opposite side of the pivot C and pushing the ladder up again far enough to clear the hook from the ridge-pole, when the spring will act to close the hook into the case, which self-closing action will enable the workman to freely withdraw the ladder without turning it over. Thus a single spring is made operative to both open and close the hook by changing the pull of the spring on the pivoted hook from one side of the pivot to the other, as described.

I claim—

1. A ladder-hook comprising a metallic case; a grappling-arm, pivoted within the case, provided with a projecting stop, and arranged to swing outward and inward through an opening in the case; a plate arranged to turn on the pivot of the arm, and having

shoulders which alternately act on the stop on the arm as the plate is turned; and an actuating-spring so connected with the case and plate that it may be made to actuate the arm from either side of its pivot, to swing it inward or outward; substantially as specified.

2. A ladder-hook embodying the combination of a case or box A, provided with a cover A' having a curved slot B therein; a grappling-arm D, provided with a stop D', and pivoted within the case, and arranged to swing outward and inward through a slot L, in the side of the case; an adjusting-plate F, arranged to turn on the pivot of arm D, and having shoulders E, E', which act against stop D': an eccentric-pin G, arranged to project from plate F, through slot B; a strap H, connecting an actuating-spring with the pin G; and an actuating-spring I, arranged to operate on either side of its pivot to move arm D, all substantially as and for the purposes specified.

HERBERT L. FRIZELL.

Witnesses:

EUGENE HUMPHREY,  
L. P. HIGGINS.