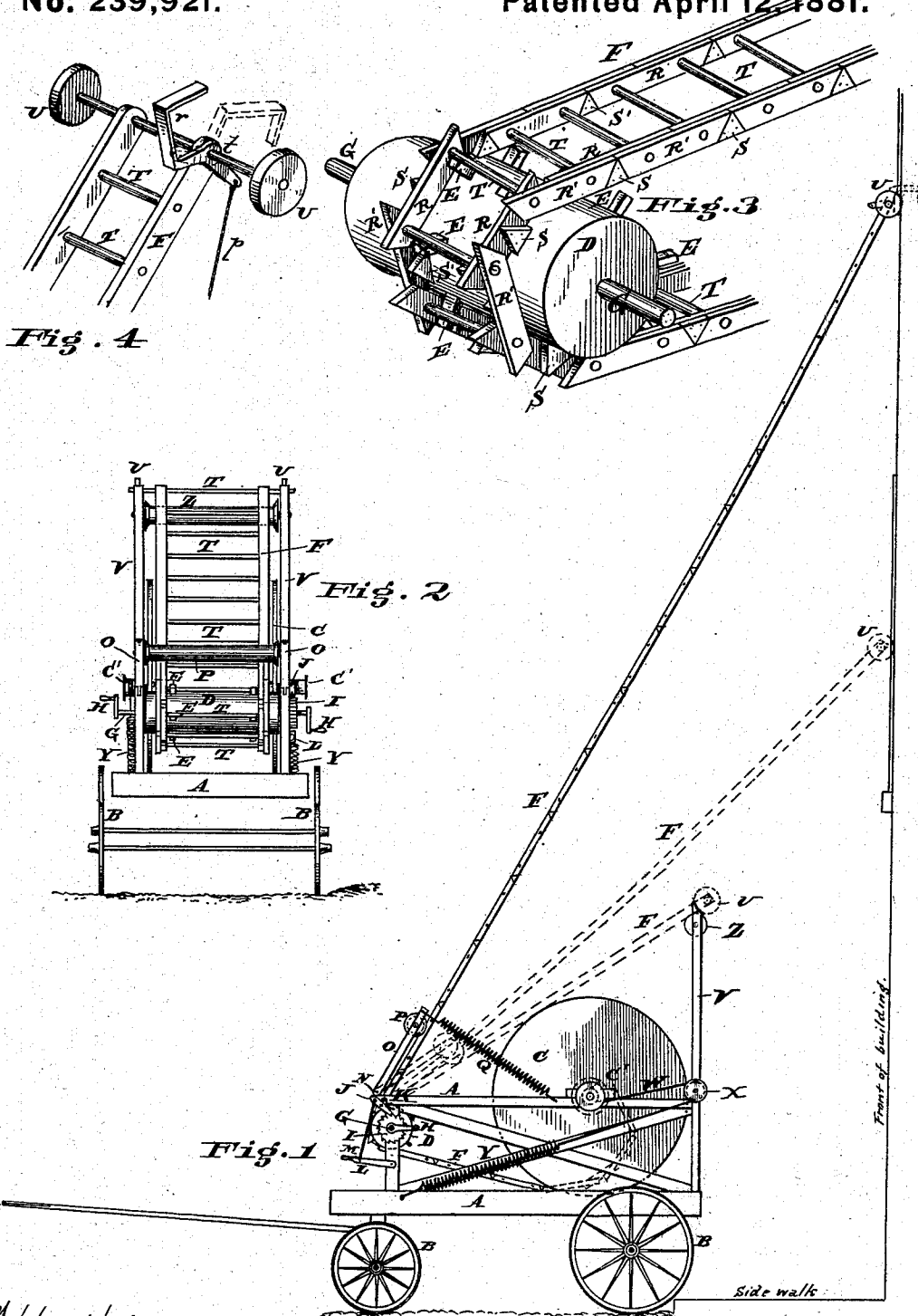


(No Model.)

H. C. BENDER.
Fire Escape Ladder.

No. 239,921.

Patented April 12, 1881.



Attest
[Signature]
L. J. Matos.

Inventor
Henry C. Bender
By his atty.
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UNITED STATES PATENT OFFICE.

HENRY C. BENDER, OF MONTGOMERYVILLE, PENNSYLVANIA.

FIRE-ESCAPE LADDER.

SPECIFICATION forming part of Letters Patent No. 239,921, dated April 12, 1881.

Application filed January 25, 1881. (No model.)

To all whom it may concern :

Be it known that I, HENRY C. BENDER, of Montgomeryville, county of Montgomery, and State of Pennsylvania, have invented an Improvement in Fire-Escapes, of which the following is a specification.

My invention relates to fire-escapes adapted to high buildings; and it consists of the combinations, hereinafter pointed out, of a flexible ladder capable of being wound upon a drum or run up against the side of a building, in which position it has the essential features of a rigid ladder, said ladder being provided at the end with rollers or wheels, whereby there will be less friction against the wall of the building, and also to guide the end of said ladder over the windows and their sills, and mechanism for balancing, supporting, adjusting, and transporting said ladder, all of which is more fully set forth in the following specification, shown in the accompanying drawings, which form part thereof, and referred to in the appended claims.

Heretofore fire-escape ladders have been jointed in sections and then raised bodily and braced, or they have been made telescopic; but these forms have serious objection in their construction and adaptation to their designed purpose. Jointed ladders have also been made and adapted to be wound upon a drum, and in being propelled upward having the hinges locked when the sections are in a straight line, said ladders being propelled upward by means of a rope and windlass or by cog-wheels working in teeth on the side rails.

In my invention I overcome all the difficulties which have heretofore been contended with. The transportation is easily effected, the ladder can be instantly used without preparation, can be adjusted to any height to suit the building, is effective in its operation, and durable in its construction.

In the drawings, Figure 1 is a side elevation of my improved fire-escape. Fig. 2 is a front elevation of same. Fig. 3 is a perspective view of part of the ladder and its toothed propelling-cylinder. Fig. 4 shows latching mechanism at top of ladder.

A is the frame of the apparatus, and is supported upon wheels B and provided with a

pole, and is adapted to be drawn by horses. Supported in the frame A is a large drum, C, which is free to rotate in bearings.

Located in front of drum C is a small toothed cylinder, D, the teeth E of which are spaced, so as to catch every round of the ladder F. This cylinder D is supported and secured to a shaft, G, carried in suitable bearings in the frame A, and on either end and set at right angles are cranks H H, and on one end is also secured a ratchet-wheel, I, in which a pawl, J, works. Pawl J is pivoted to the frame A, and is kept in contact with ratchet-wheel I by a spring, K, and is oscillated away from said wheel by means of lever L and rod M.

Pivoted to frame A, at N, above the cylinder D, is a frame, O, which carries idler-roller P, said roller being kept against the ladder F by tension-springs Q, for the purpose of keeping the ladder against the building.

The ladder F consists of a series of sections, R R', provided with wedge-shaped blocks S S' on opposite sides, which prevent the ladder being flexible in one direction. Said sections being pivoted together between the blocks S S' and ends by the rounds T, as shown in Fig. 3, therefor, every round acts as a pivot. The sections R R' may be made of wood, strengthened by metal strips, and the rounds may be made of metal. In practice it is preferable to secure the round to one of the sections to prevent turning when in use. By this construction the ladder is made flexible in one direction and rigid in the other when straightened, and the lower end is secured to the axle of drum C. The upper end, for a distance equal to or a little greater than the width of a sidewalk, is made rigid, and is provided with guide or friction wheels U on the end, which rest in supporting-standards V in the frame A when ready for transportation.

Z is a supporting-roller.

The axle of the drum C is provided with cords W, the ends of which are secured to its axle or auxiliary drums C'. The cords are then passed over idler-rollers X on either side and the ends attached to springs Y. By this arrangement the ladder, when being lowered, is automatically wound upon the drum C.

The operation is as follows: The apparatus being placed in position with the drum C next to the sidewalk and the wheels B locked, the cranks H are rotated. The teeth E of the drum D raise the ladder by catching the rounds. The end of the ladder is projected up, resting upon supporting-roller Z, until the rollers or wheels U strike the wall, as shown in dotted lines, Fig. 1; then the ladder runs up against the side of the house, the wheels U preventing the end catching in the window, and as the ladder is only capable of folding toward the house, if it were not supported, it cannot close or double up. The tension-roller P keeps it against the wall. When it reaches the desired floor the top is hooked to the window-sill by latch-hook r, which is pivoted to the top of the ladder at t, and is operated by a cord, p, from the ground.

I do not confine myself to the precise construction shown or described, for my invention consists, broadly, in a ladder flexible in one direction only, and capable of being wound automatically upon a drum, and mechanism to operate it.

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

1. In a fire-escape, a ladder made flexible and adapted to be wound upon a drum, in combination with mechanism to propel the end of said ladder up the side of a building, and mechanism to automatically wind the ladder upon the drum when it is being lowered, substantially as and for the purpose specified.

2. In a fire-escape, a flexible ladder capable of being wound upon a drum, in combination with mechanism to propel the end of said ladder up the side of a building, and self-adjusting mechanism to press upon the ladder and hold it against the wall, substantially as and for the purpose specified.

3. In a fire-escape, a flexible ladder capable of being wound upon a drum, in combination with mechanism to propel the end of same up the side of the building, self-adjusting mechanism to keep the ladder against the wall, and mechanism to automatically wind the ladder upon the drum when being lowered, substantially as and for the purpose specified.

4. A ladder adapted to fire-escape purposes, made flexible in one direction only and capable of being wound upon a drum, consisting of sections R R', having obliquely-cut ends, which, when the ladder is straightened, leaves a wedge-shaped opening between any two adjacent ends, said sections being hinged together near the ends by the rounds T, and respectively provided on the outside and inside, at the middle of the sections, with wedge-shaped blocks S S', yet rigid when straightened against the wall, substantially as shown and described.

5. In a fire-escape, a flexible ladder capable of being wound upon a drum, in combination

with mechanism to propel the end of same up the wall of a building, self-adjusting mechanism to press upon the ladder and hold it against the wall, and mechanism operated from the ground to secure said end to the window, substantially as and for the purpose specified.

6. In a fire-escape, the combination of frame A, drum C, flexible ladder F, toothed cylinder D, adapted to mesh with the rounds T of said ladder, tension-roller P, supported in frame O, spring Q, to press the roller against the ladder, and cranks H H, substantially as and for the purpose specified.

7. In a fire-escape, a flexible ladder capable of being wound upon a drum, the upper section of which is long enough to reach over the sidewalk from the house to the machine, in combination with rollers or wheels U upon its end, and located on the sides, as described, to guide the ladder over the windows, and mechanism to press upon the ladder and hold it against the wall, as and for the purpose specified.

8. In a fire-escape, the combination of drum C, ladder F, made flexible toward the building, toothed cylinder D, adapted to mesh with the rounds T of the ladder, shaft G, cranks H, or their equivalent, ratchet-wheel I, and pawl J, substantially as and for the purpose specified.

9. In a fire-escape, the combination of a sectional jointed ladder flexible in one direction only and adapted to be propelled up the side of a building, toothed cylinder G, the teeth of which mesh with the rounds of the ladder, the end or upper section being made long enough to reach over the sidewalk from the machine to the building without additional support, substantially as and for the purpose specified.

10. In a fire-escape, the combination of a sectional jointed ladder made flexible in one direction only and adapted to be propelled up the side of a building, toothed cylinder G, the teeth of which mesh with the rounds of the ladder, the end or upper section being made long enough to reach over the sidewalk from the machine to the building without additional support, and friction-rollers U, located on the outside of the top of the ladder, said rollers being set far apart, and of sufficient diameter to clear the end of the ladder of the window-sill and guide the end over the window to the next story above, substantially as and for the purpose specified.

11. In a fire-escape, the combination of a sectional jointed ladder made flexible in one direction only and adapted to be propelled up the side of a building, toothed cylinder G, the teeth of which mesh with the rounds of the ladder, drum C, small drums C', secured to the axle of drum C, cords W, and springs Y, to cause the ladder to be automatically wound upon the drum when being lowered, substantially as and for the purpose specified.

12. In a fire-escape, the combination of a sectional jointed ladder made flexible in one direction only and adapted to be propelled up the side of a building, toothed cylinder G, the teeth of which mesh with the rounds of the ladder, the end or upper section being made long enough to reach from the building to the machine over the sidewalk, rollers U, stop-standards V, and supporting or guide

roller Z, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

HENRY C. BENDER.

Witnesses:

R. M. HUNTER,
THOS. J. HUNT.