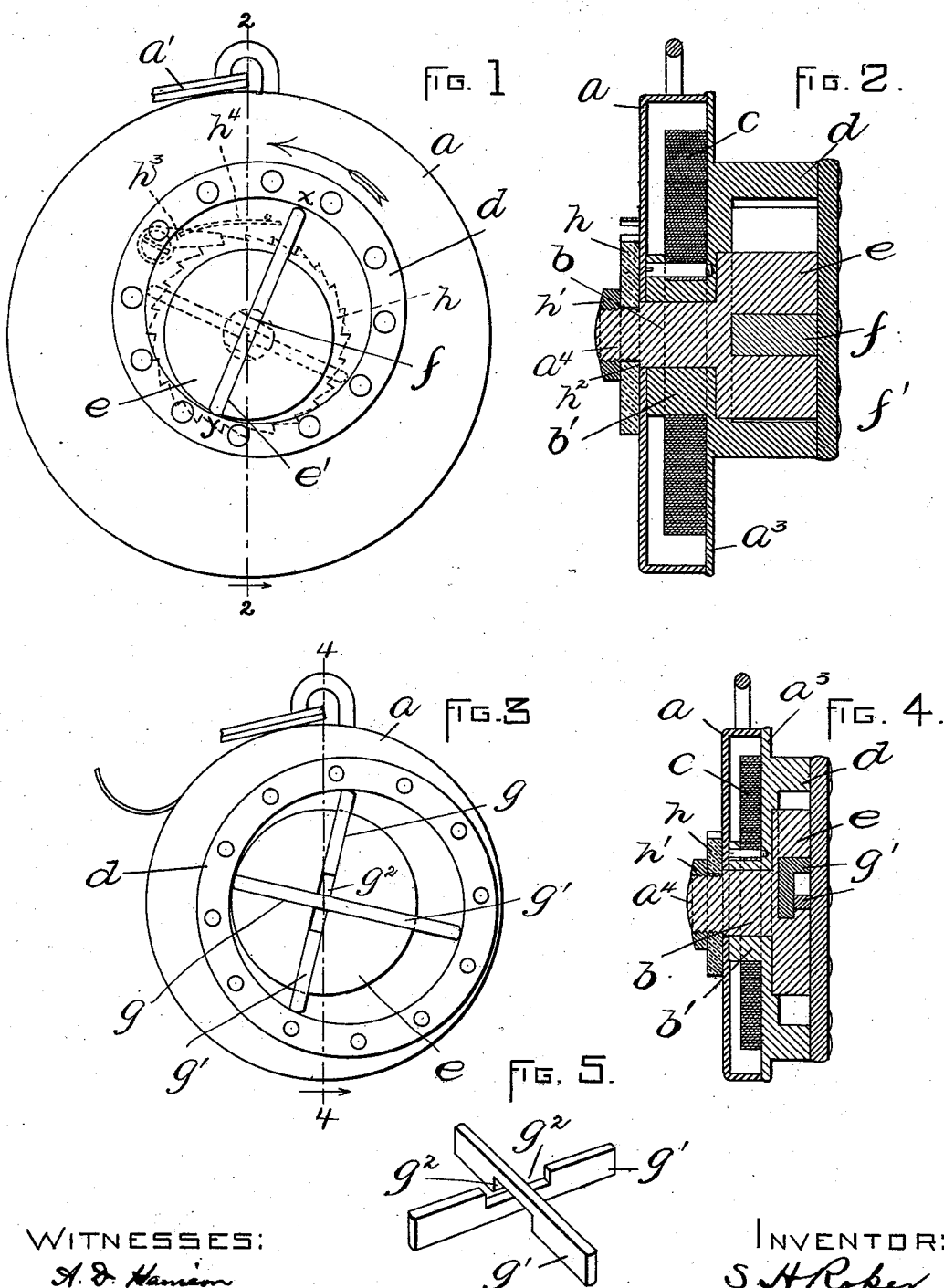


(No Model.)

S. H. ROPER.
FIRE ESCAPE.

No. 531,567.

Patented Dec. 25, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

SYLVESTER H. ROPER, OF BOSTON, MASSACHUSETTS.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 531,567, dated December 25, 1894.

Application filed May 19, 1893. Serial No. 474,763. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER H. ROPER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a specification.

This invention relates to that class of fire-escapes in which an object or person is lowered by means of a line which unwinds from a reel or drum.

An apparatus embodying these features is shown in my former patent, No. 439,191, granted October 28, 1890, and means are there illustrated whereby a suitable fluid may be employed as a retarding agent to prevent too rapid rotation of the reel or drum in unwinding.

The object of the present invention is to provide improved means for securing this retarding effect through the agency of a fluid.

To this end, the invention consists in certain novel combinations of parts, as recited in the appended claims.

The accompanying drawings illustrate constructions by which the invention may be carried out.

Figure 1 shows a side elevation of a structure illustrative of one form in which the invention may be embodied, the cover of the eccentric chamber being removed. Fig. 2 shows a section on line 2—2 of Fig. 1. Figs. 3 and 4 show views corresponding with Figs. 1 and 2, of a different form in which the invention may be embodied. Fig. 5 shows a detail perspective view of the movable walls or pistons employed in the structure shown in Figs. 3 and 4.

The same letters of reference indicate the same parts in all the figures.

In the drawings, the letter *a* designates a casing, which is adapted to be suspended from a suitable fixed support, as a sill, by means of a chain *a'*, attached to it and having a hook at its free end. Thus the said casing will be held practically stationary. A spindle *b* extends through the said casing, and a drum or reel *b'* is mounted on said spindle. A line, preferably a steel tape *c*, is attached to the drum and winds on the same within the casing, the latter having an opening in one side, through which the tape issues from the case. An approximately circular chamber *d* projects at one side of the casing *a*, and is fast with the drum *b'*, being preferably formed in-

tegral therewith and being also preferably formed integral with a plate *a³*, constituting one side of the casing *a*. The chamber *d* is eccentric with respect to the drum and spindle. A circular block *e* has position within the said casing *d*, and is fast with the spindle, being preferably formed integral therewith, and is concentric with said spindle, its periphery being in contact with or in very close proximity to the inside wall of the chamber *d*, so that a crescent-shaped space exists at all times within the said chamber.

The construction thus far described will be found in each form of the device illustrated.

Referring now more particularly to Figs. 1 and 2, the block *e* is formed with a diametrical slide-way *e'*, and a piston, in the form of a plate *f*, fits said slide-way, and is adapted to extend across the chamber *d*. The chamber *d* is filled with fluid, preferably glycerine on account of its density, and the operation is as follows: The person or object to be lowered is attached to the tape *c*. The speed of the descent is checked by the co-action of the piston *f* with the fluid in the chamber *d*. It will be remembered that the chamber *d* is fast with the drum, and hence it will be rotated therewith. The chamber being eccentric, the point of engagement of its inner surface with the periphery of the circular block *e* will travel around the latter, and, as it approaches the projecting end of the piston *f*, the latter is moved back by its engagement with the wall of the chamber, and the space between the piston and such point of engagement is gradually decreased to nothing. At the same time, the opposite end of the piston is projected from the block *e*, and the action just described again takes place. As before stated, the chamber *d* is filled with fluid, and hence the fluid in the gradually decreasing space above mentioned offers resistance to the rotation of the chamber and hence that of the drum, the piston forming a wall against which the fluid is forced. This fluid must escape from the space by the end of this wall or by the block *e*, and the restriction at the point of engagement of the end of the piston with the wall of the chamber, and at the point of engagement of the block *e* and the wall of the chamber, is such as to so retard the rotation of the drum in a direction to unwind the tape that a comparatively heavy body may be lowered with safety.

The block *e* being eccentric with respect to the chamber, and the piston *f* extending diametrically of said block, in order to maintain an even and uniform resistance at all times, the inside wall of the chamber is made slightly elliptical, the distance being less between the points *x* and *y* than between any other two points in the inside circumference, so that the ends of the piston bear the same relation to the wall of the chamber, whether the piston is extending diametrically of the chamber, as shown in full lines in Fig. 1, or is cutting a segment thereof, as shown in dotted lines in said figure.

In the construction illustrated in Figs. 3 to 5, the block *e* has two diametrical slide-ways *g*, extending at right angles to each other; and two pistons, in the form of plates *g'* are employed, one fitting each slide-way, and, where said pistons cross each other, they are cut out as shown at *g''*, so that their edges may be in the same plane. The operation is the same as that described with reference to the construction shown in Figs. 1 and 2, the pistons being reciprocated in their slide-ways and constituting walls against which the fluid is forced. The inside wall of the chamber is slightly elliptical, as in the construction first described, only that not such exactness is necessary as in said former case, for the reason that, while one piston is extending diametrically of the chamber, the other piston is offering the resistance which retards the rotation, and hence it is not necessary that said first-named piston fit with such nicety at all points as in the former case where but one piston was employed and constantly offered the resistance.

Provision is made for re-winding the tape while the resistance is dormant, as follows: The spindle projects from the case *a*, as at *a'*, and a ratchet *h* is affixed to it in the present instance by flattening two sides of the spindle and correspondingly shaping the opening in the ratchet which receives the spindle, and by screwing a nut *h'* on the end of the spindle, which is threaded for the purpose, and clamping the ratchet between it and a shoulder *h''* of the spindle. The ratchet works close to the case, and a pawl *h'''* is pivoted to the latter and pressed into engagement with the ratchet by a spring *h''''*.

The direction of rotation of the drum during the unwinding of the tape is such that the pawl *h'''* forms a stop, which prevents rotation of the ratchet and consequently of the spindle, and hence the drum turns on the spindle and the resistance is active. When the drum is rotated in the reverse direction, the pawl no longer acts as a stop, and the ratchet may freely pass it. Hence the drum and spindle move together, and consequently the circular block and eccentric chamber will both move together, and, as their relation does not then change, no resistance is encountered.

It is evident the invention may be embodied in other forms than those here shown, and hence it is not limited to the latter.

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

1. A fluid retarder comprising in its construction a cylinder rotatively and eccentrically mounted on a rotatable support and adapted to contain a fluid, means for locking the said support against rotation in one direction and permitting its rotation in the opposite direction, and a movable partition carried by the support and dividing the cylinder and designed to adjust itself under rotation of the cylinder on its support to the changing relation of said cylinder and support due to their eccentricity, said partition causing a restricted flow of fluid between the compartments of the cylinder.

2. A fire-escape, comprising in its construction a spindle and support therefor, a drum on said spindle, a line attached to said drum, a chamber arranged to rotate with the drum, a movable wall in the chamber and rendered operative by the rotation of the drum on the spindle to produce resistance to such rotation, in co-action with a fluid in the cylinder, and means whereby under one direction of rotation the drum turns on the spindle, whereas under the opposite direction of rotation the drum and spindle turn together.

3. A fire-escape, comprising in its construction a spindle and support therefor, a drum on said spindle, a line attached to said drum, a chamber adapted to rotate with the drum and eccentric with respect to the spindle, a circular block fast with the spindle and inclosed within the said chamber, said block being concentric with the spindle and having a diametrical slide-way, a movable wall fitting said slide-way and adapted to be reciprocated therein as the drum rotates, a ratchet affixed to the spindle, and a pawl on the spindle-support and engaging the ratchet.

4. A fire-escape, comprising in its construction a spindle and support therefor, a drum on said spindle, a line attached to said drum, a chamber adapted to rotate with the drum and eccentric with respect to the spindle, a circular block fast with the spindle and inclosed within the said chamber, said block being concentric with the spindle and having intersecting diametrical slide-ways, and movable walls fitting said ways and adapted to be reciprocated therein by engagement with the wall of the eccentric chamber.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 12th day of May, A. D. 1893.

SYLVESTER H. ROPER.

Witnesses:

C. F. BROWN,
A. D. HARRISON.