

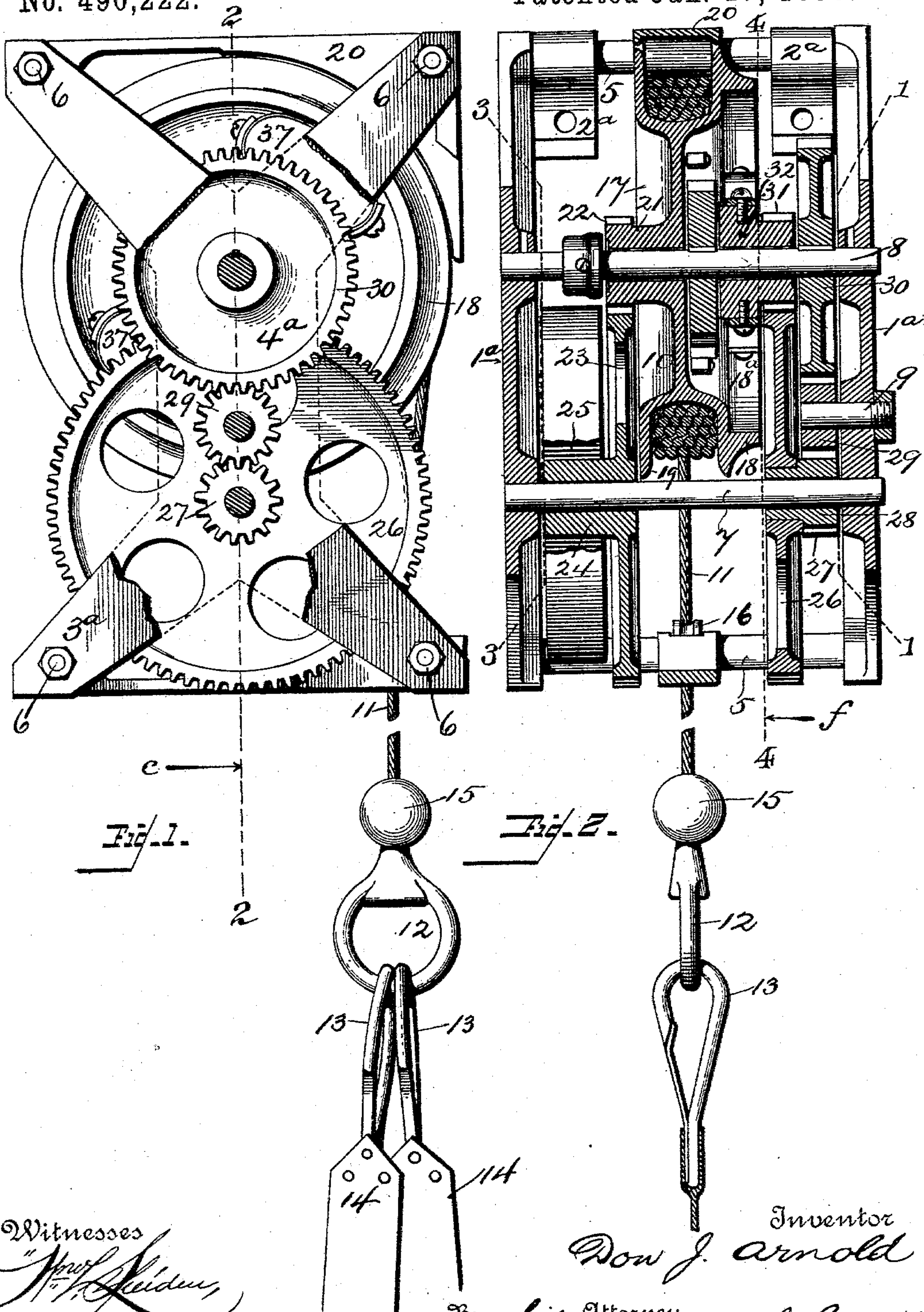
(No Model.)

2 Sheets—Sheet 1.

D. J. ARNOLD.
FIRE ESCAPE.

No. 490,222.

Patented Jan. 17, 1893.



Witnesses
Wm. H. Laidlaw,
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Inventor
Dow J. Arnold
By his Attorney
Chas. J. Gooch

(No Model.)

2 Sheets—Sheet 2.

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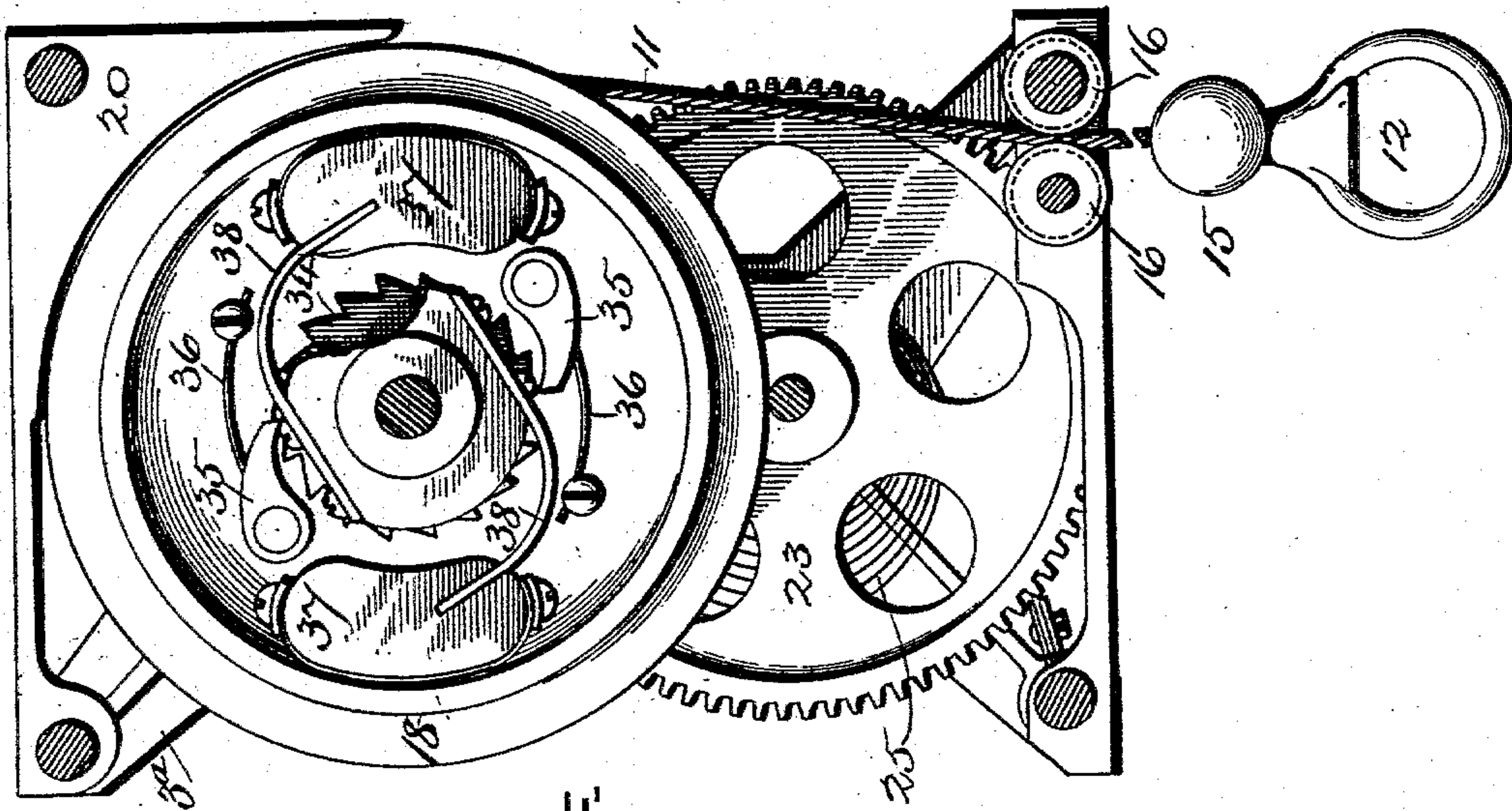


Fig. 4.

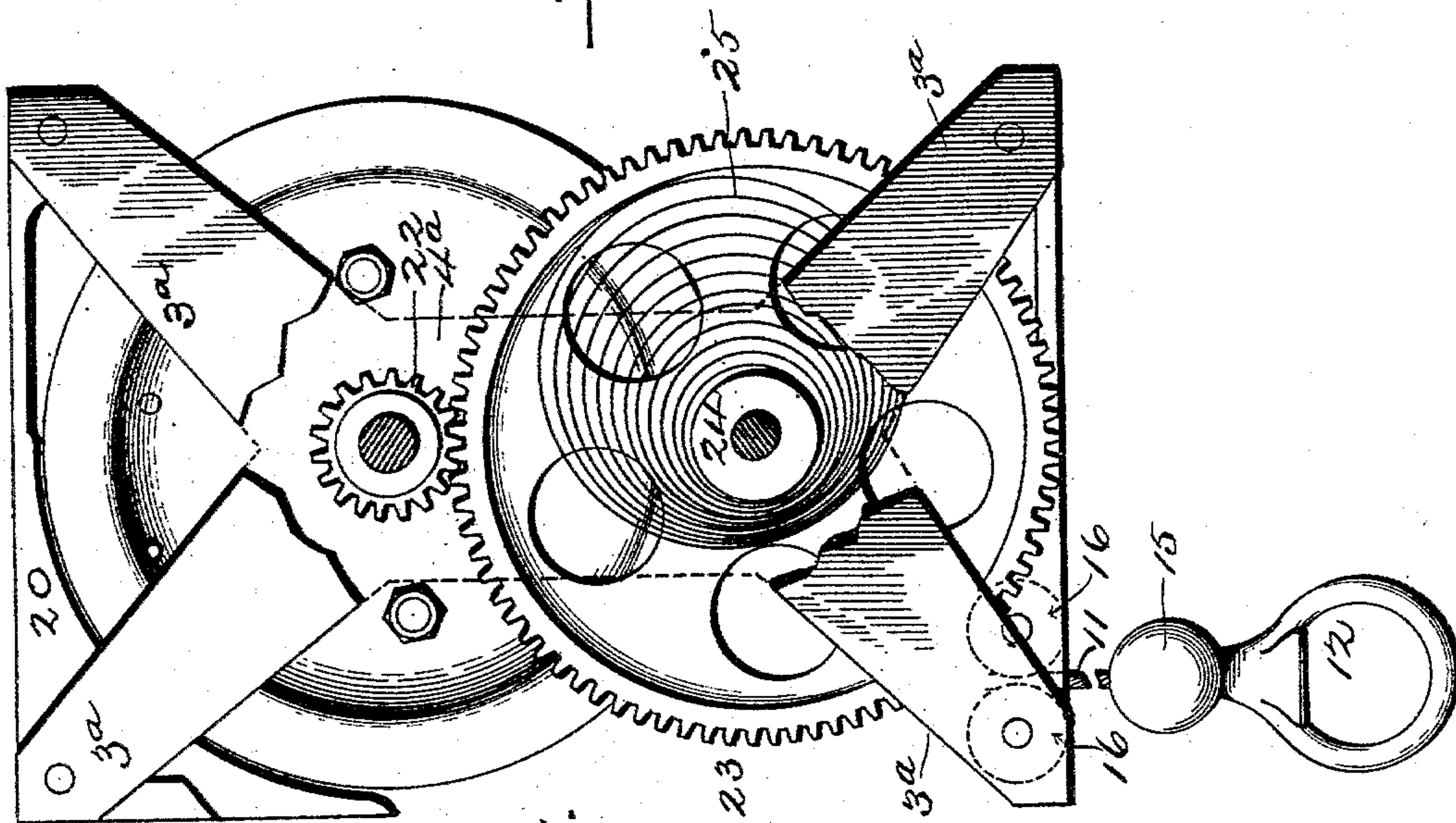


Fig. 3.

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UNITED STATES PATENT OFFICE.

DON J. ARNOLD, OF OMAHA, NEBRASKA.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 490,222, dated January 17, 1893.

Application filed June 25, 1892. Serial No. 438,003. (No model.)

To all whom it may concern:

Be it known that I, DON J. ARNOLD, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Fire-Escapes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in fire-escapes of the character wherein the operating mechanism is attached to a building and the person desiring to escape is automatically lowered by means of a rope or equivalent connection with said mechanism.

The construction and arrangement and advantages of my improvements are fully set forth in the following description and claims.

In the accompanying drawings, Figure 1 represents a sectional side elevation of my improved fire-escape taken on the line 1 1 of Fig. 2. Fig. 2 represents a transverse section taken on the line 2, 2 of Fig. 1, and looking in the direction of the arrow, *c*. Fig. 3 represents a sectional side elevation on the line 3, 3, of Fig. 2. Fig. 4 represents a sectional elevation on the line, 4, 4, of Fig. 2, viewed in the direction of the arrow, *f*.

1^a represents the framing of my improved fire-escape, which is designed to be attached to the wall, window-framing, or other suitable portion of a building by screws or other suitable devices passed through brackets or ears, 2^a. The framing consists of side plates, 3^a, of substantially X-shape and having a central vertical strip, 4^a, within which the shafts or journals, 7, 8, 9, carrying the gearing have bearing. The side plates are connected at their respective corners by rods or tubing, 5, having threaded ends and secured in position by nuts, 6.

10 represents a drum around which the wire-rope, 11, is coiled; said rope having at its inner end suitable connection with said drum, and having attached to its lower or free end a ring, 12, with which are engaged snap-hooks, 13, secured to a sling or belt, 14, in which the person descending rests or is supported.

15 represents a ball above the ring, 12, which serves as a cushion to prevent the battering of

the sheaves and ring while the rope is being recoiled.

16 represents a pair of sheaves or grooved pulleys between which the rope is guided, and which prevents undue friction thereon in use.

The rope-carrying drum, 10, it will be observed, has circumferential side flanges, 17, 18. Within the recess, 18^a, formed by the flange, 18, the governor-mechanism, to be presently described, for automatically regulating the speed of the mechanism while the rope is descending is contained. The wire rope, 11, as clearly shown in Fig. 2, is received and securely held when not in use within and guided in its coiling and uncoiling movements by the flanged and grooved periphery, 19, of the drum, 10. An additional protection, guard to and guide for the rope in coiling and uncoiling is afforded by a housing, 20. The rope-carrying drum, 10, is journaled on the shaft, 8, and has a hub, 21, on which is cast, or to which is rigidly secured, a toothed pinion, 22, which gears with a toothed wheel, 23, which is loose on the shaft, 7; around the hub, 24, of said wheel, 23, is coiled the spiral spring, 25, which serves to re-wind the rope, 11, upon the drum when the weight of the person on the belt is released.

The speed-regulating mechanism for governing the velocity of the rotation of the drum and, consequently, the speed at which the rope will pay out or uncoil, and the person or persons using the escape will descend, will now be described. 26 represents a main gear wheel which is loosely mounted on the lower shaft, 7, 27 is a toothed pinion which is cast with or secured to the hub, 28, of said wheel, 26; 29 represents a pinion mounted on the shaft, 9, and meshing with the pinion, 27; 30 is a toothed wheel which is keyed to the shaft, 8, and inter-meshes with the pinion, 29, and 31, is a pinion which meshes with the teeth of the main wheel, 26. This last-named pinion, 31, is formed integrally with the hub, 32, to which the brake-blocks, 33, are attached; said hub, 32, and pinion 31, being loose on the shaft, 8, as clearly shown in Fig. 2. The brake mechanism consists of a toothed ratchet, 34, keyed on the shaft, 8, within the recessed face, 18^a, spring-held dogs, 35, pivoted to the drum to

engage said ratchet at opposite points of its periphery, the springs, 36, serving to press said dogs normally into engagement with the teeth of said ratchet,—and brake-blocks, 37, secured to the hub, 32, by spring arms, 38, and extending outwardly toward the flange, 18 (see Fig. 4).

Where fire-escapes of my construction are applied to very tall buildings, where a coiled spring would not be strong enough to secure the return and recoiling of the wire rope a weight and rope may be substituted for said coiled spring; in such case, a tube would extend a few feet downward from the escape, within which the weight and its attached rope would travel up and down as the escape is operated, such tube serving as a protection to said rope and weight and, also, as a guide therefor in their vertical movements.

The mode of operation of my improved escape is automatic and very simple and effective. Any number of persons may descend thereby at one time by either clinging together or to different parts of the wire-rope. Taking, for instance, a single person desiring to descend: he passes the band, 14, around his body and snaps the snap-hooks, 13, into the ring, 12; he then steps out of the window, his weight acting upon the rope, 11, will thereupon operate to draw said rope downward, which act will cause the drum, 10, which is loose on the shaft, 8, to rotate and, consequently, pay-off the rope wound thereon; if the weight of the person so descending is not greater than will permit of the spiral spring gradually winding up on its drum, and, also, of the gradual descent of said person by the comparatively slow rotation of the rope-drum, the brake-mechanism will not go into operation; if, however, there are more than one person descending at one time, or if the single person descending happens to be somewhat heavy, the tendency of the drum 10 to more rapidly revolve and the rope to more rapidly uncoil will be overcome by reason of the engagement of the pawl and ratchet which, through the medium of the springs 36 are always in engagement, which engagement of the pawl and ratchet causes the hub 32 to rotate in a direction the reverse of the direction of the rotation of the drum, 10, and thereby throw the brake-blocks, 33, outward against the adjacent flange of the drum whereby the speed of rotation of said drum, and the consequent paying-out of the rope are governed and regulated to a speed of safety to the user. As the drum, 10, thus rotates it, through the medium of the gears, 22, 23, coils or winds up the spiral spring, 25. Upon the person using the escape reaching the ground, and detaching himself from the band, 14, the spiral spring, 25, will automatically uncoil and, through the medium of the gears, 22, 23, rotate the drum, 10 which, during such rotation, will then coil the rope thereon in readiness for re-use. The housing, 20, it will be

apparent, serves as a guide for insuring the regular coiling of the rope on the drum.

It will be apparent to anyone skilled in the art to which my invention appertains that the escape is quite simple in construction; has no complicated mechanism to get out of order; is readily operated; is always in readiness for use, and is reliable and safe in operation.

Having thus described my invention, what I claim is:—

1. A fire-escape consisting of a framing, a series of shafts extending transversely there-through, a rope-carrying drum loosely mounted on one of said shafts and having a grooved periphery within which the rope is coiled and at one side an outwardly-extending circumferential flange constituting a circumferential recess, a rope-guiding and guarding housing adjacent to the grooved periphery of the drum, a coiled spring, gearing connecting the arbor of said spring and the hub of said drum, pawl and ratchet mechanism located within the flanged recess at one side of said drum, brake mechanism also located within said flanged side recess of said drum and consisting of a drum loosely mounted on one of said shafts and brake-blocks connected therewith and adapted to grip the flange thereof, and intermeshing toothed gearing journaled on said shafts and adapted to actuate the brake mechanism, substantially as and for the purpose set forth.

2. A fire-escape, consisting of a frame, a rope-carrying drum having a grooved rope-receiving periphery and loosely mounted on a shaft in said frame, pawl and ratchet mechanism connected, respectively, to said drum and to said shaft, brake mechanism consisting of a hub loosely mounted upon said shaft and a plurality of brake-blocks flexibly connected with said hub and adapted to grip said drum, connected gearing mounted upon suitable shafting in the frame and connected with said brake-block-carrying hub and adapted to rotate said brake mechanism in one direction, a drum-rotating and rope-re-coiling device, as a spring or weight, and gearing mounted upon said shafting and connecting the rope-re-coiling mechanism and the drum and adapted to rotate said drum in a reverse direction to the direction of the rotation of the brake mechanism, substantially as and for the purpose set forth.

3. In a fire-escape of the character described, the combination with a frame and shafting therein, of a rope-carrying drum loosely mounted on one of said shafts, a rope-re-coiling device and gearing connecting the same and said drum, pawl and ratchet mechanism connected with said drum, a hub loosely mounted on one of said shafts, brake-blocks having spring arm connection with said hub, and mechanism connected with said hub whereby said hub may be rotated to throw the brake-blocks into gripping contact with the

drum to regulate the rotation thereof, substantially as and for the purpose set forth.

4. A fire-escape, consisting of a suitable framing, stationary shafting located therein,
5 a loosely journaled drum having a grooved rope-receiving periphery and flanged sides a housing extending around the upper portion of the periphery of said drum, rope-guiding sheaves located at or near the lower portion
10 of the framing, ratchet mechanism adjacent to said drum, brake mechanism mounted on the drum-carrying shaft, gearing connected

with and adapted to actuate the brake device a rope-recoiling device, as a spring or weight, and gearing connecting the same and the 15 drum, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DON J. ARNOLD.

Witnesses:

WM. MARSH,
H. E. RAINEY.