March 23, 1926. 1,578,108

N. TOBIAS

FIRE ESCAPE

Filed Dec. 14, 1922 2 Sheets-Sheet 1

Fig.1.

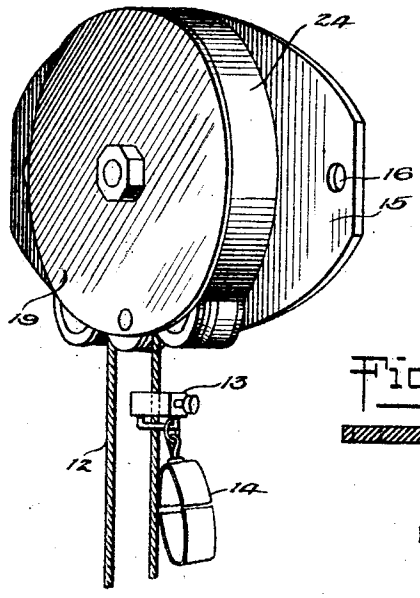
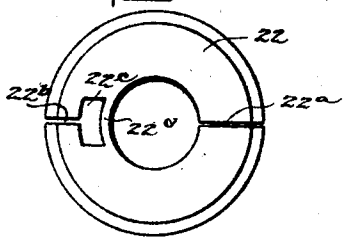


Fig.6.



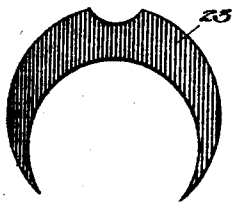


Fig.7.

Fig.3.

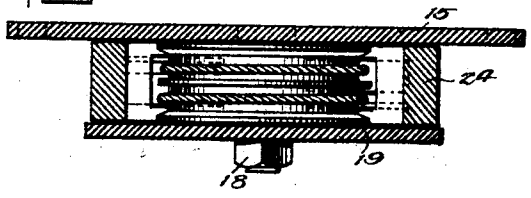


Fig.2.

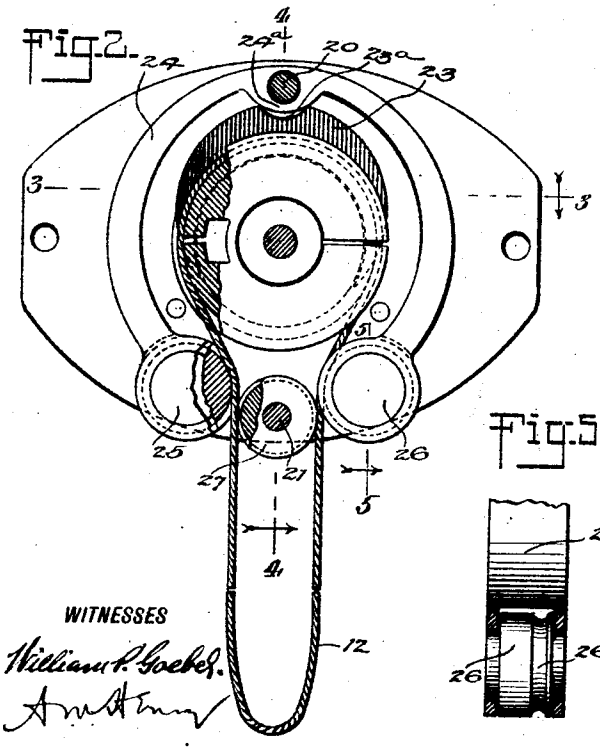
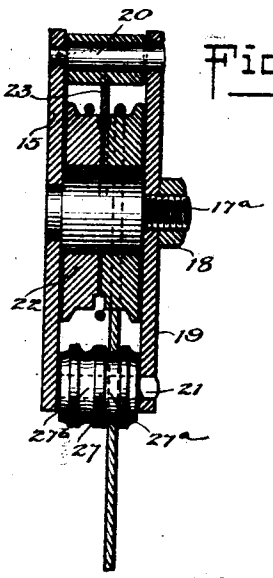


Fig.5.

Fig.4.



WITNESSES

William A. Goebel.

INVENTOR

Neuman Tobias

BY Munn & Co

ATTORNEYS

March 23, 1926. 1,578,108

N. TOBIAS

FIRE ESCAPE

Filed Dec. 14, 1922 2 Sheets-Sheet 2

Fig. 8.

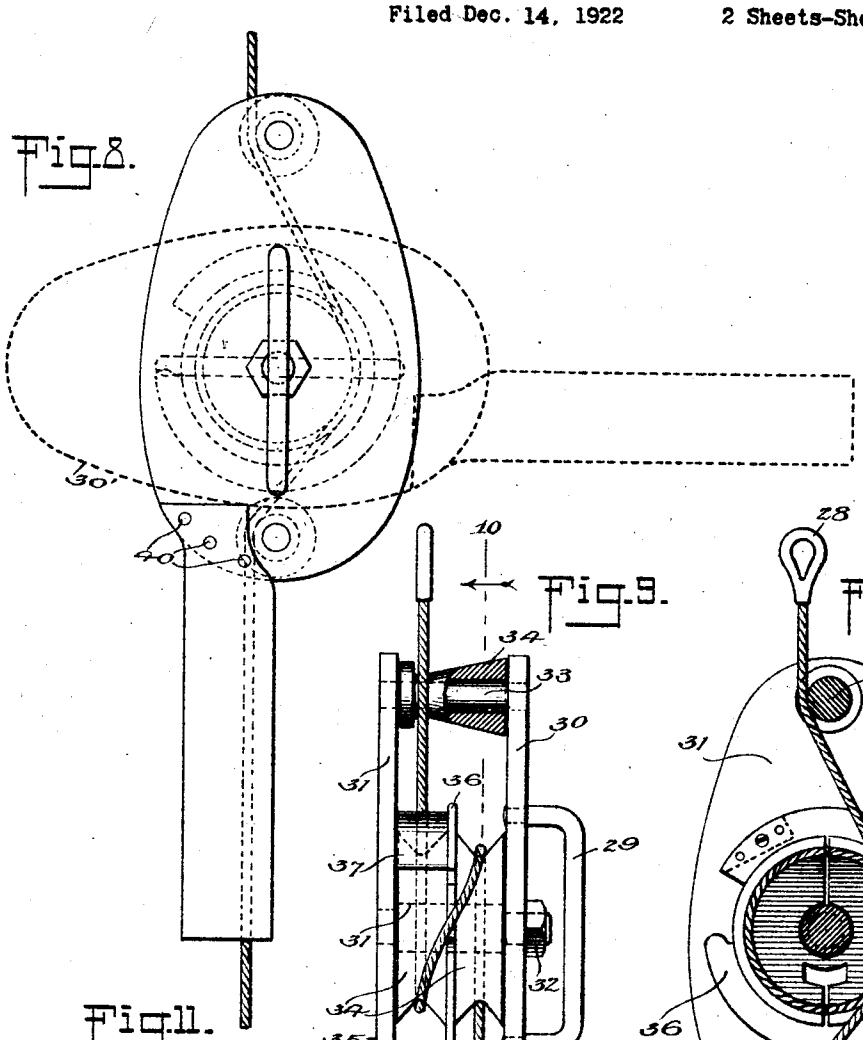


Fig. 9.

Fig. 10.

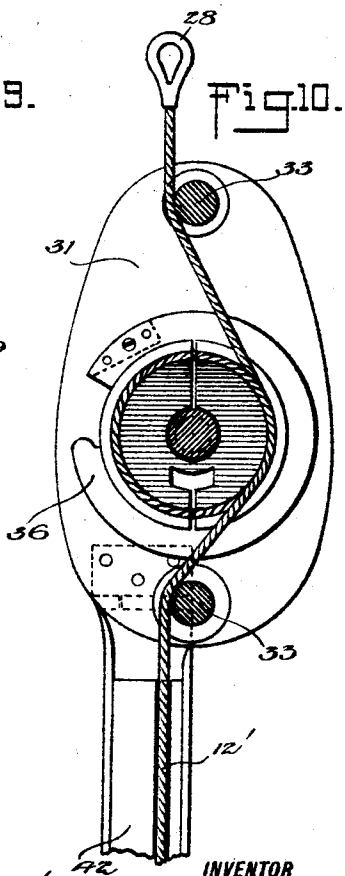
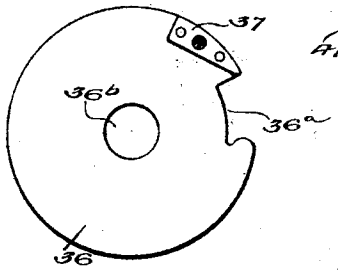


Fig. 11.



WITNESSES

William P. Goebel.

INVENTOR

Neuman Tobias

BY Munn & Co

ATTORNEYS

Patented Mar. 23, 1926. 1,578,108

UNITED STATES PATENT OFFICE.

NEUMAN TOBIAS, OF KINGSTON, JAMAICA, BRITISH WEST INDIES.

FIRE ESCAPE.

Application filed December 14, 1922. Serial No. 606,881.

To all whom it may concern:

Be it known that I, NEUMAN TOBIAS, a subject of the King of Great Britain, and a resident of Kingston, Jamaica, British West Indies, have invented certain new and useful Improvements in Fire Escapes, of which the following is a full, clear, and exact description.

This invention provides preferably a fire escape of the cable type, although obviously the same may be used for other purposes, as for acting like a rope hoist for raising and lowering workmen and inanimate objects, as will be understood from what follows.

The invention, which, of course, may be variously embodied, comprises essentially a flexible element, as a steel cable, and combined guiding and braking means for a looped intermediate part of the cable or the like, which means is easily manually controlled as to the last-named function and also automatically controlled in regard thereto according to the weight of the person or object being lowered, thereby to prevent too precipitate a descent and indeed to predetermine the rate of descent of objects of different weights in such manner that practically irrespective of the weight thereof all objects will descend at substantially the same predetermined speed according to the design of the apparatus.

The object last indicated is attained by arranging one of the guiding elements for the cable, preferably a roller, as a combined idler roller and variable clutch member, preferably so functioning in regard to the supporting shaft or stud relative to which the roller is rotatable. This roller will hereinafter be referred to as the main clutch roller. In order to insure a predetermined braking action, so that the latter will increase with an increase of weight over predetermined or average weight, the main clutch roller is preferably provided with a hub or inner portion directly engaging such stud and more or less warpable to embrace said stud (which, of course, is preferably fixed) more or less tightly, as the weight suspended by the cable is more or less than said predetermined or average weight. To these ends the intermediate portion of the cable is wrapped preferably a plurality of turns around the main clutch roller; and, as the invention may also be carried out according to at least one embodiment, the cable, beyond the main clutch roller, is preferably guided toward emergence from the combined guiding and braking means in such a way that the angle of emergence, varying as the weight of the object being suspended varies, controls the functioning of an auxiliary device for braking the cable or retarding the rate of its passage through said means.

The last-mentioned embodiment is the preferred one, as the invention is at present appraised, and in such embodiment said combined guiding and braking means is most conveniently associated with an endless cable and is secured in place at an elevated point, as adjacent to a window or door in a hotel, private dwelling or other building relative to which the fire escape or hoist is to be employed.

According to another possible embodiment, however, one end of the cable, which is not necessarily endless, is secured in place at such elevated point, and said combined guiding and braking means may travel up and down the length of said cable as the person or object being served by the apparatus is raised or lowered.

Various other objects and advantages of the invention will be in part apparent and in part specifically pointed out hereinafter.

The invention will be more clearly understood from the following description when taken in connection with the accompanying drawings, in which the two embodiments above mentioned are illustratively disclosed, but merely as examples of various possible ways in which the invention may be practically carried out; the scope of protection contemplated being indicated by the appended claims.

In said drawings:

Fig. 1 is a perspective view of the endless cable embodiment;

Fig. 2 is a front elevation thereof, with the front or cover plate removed, and with certain of the other parts partially broken away and partially in section;

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 2;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 2;

Fig. 5 is a fragmentary detail, showing one of the pair of rollers of the auxiliary guiding and braking device, being a vertical section on line 5—5 of Fig. 2;

Fig. 6 is a detail view, showing the main clutch roller, detached;

Fig. 7 is a view similar to Fig. 6, showing

what may be termed the coil-separator, detached;

Fig. 8 is a front elevation of the other embodiment hereinabove mentioned, certain of the hidden parts being indicated in broken lines, as are also certain of the parts when thrown to a temporary position to facilitate coiling the cable on the main clutch roller;

Fig. 9 is a side elevation of the parts shown in Fig. 8, certain of the parts being partially broken away and partially in section;

Fig. 10 is a vertical sectional view taken on line 10—10 of Fig. 9; and

Fig. 11 is a detail view showing the coil separator of this embodiment, detached.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to Figs. 1 to 7, the endless cable is indicated at 12, to which may be attached, as indicated at 13 in Fig. 1, a suitable clamp for suspending a belt or other appropriate appliance to engage the object or person being served, as by being passed under the arm-pits of a person to be lowered. All the other parts shown in these views comprise the combined guiding and braking means of the invention. Such parts include a base plate 15 which may have apertures 16 to permit said means to be securely anchored in place to or near a door, window or other part of the building from which the escape, if used as such, may be most conveniently operated.

Mounted on said plate 15 is a shaft or stud 17 the outer threaded end of which, as indicated at 17^a in Fig. 4, is adapted to receive a nut 18 to secure in place a plane cover plate 19. Such cover is, of course, provided with a central aperture to receive the threaded end of stud 17, and also has a pair of upper and lower apertures for accommodating the outer ends of auxiliary stud shafts 20 and 21 for loosely mounting certain other rotatable elements hereinafter described.

The main clutch roller 22 is loose on the central enlargement of stud 17. This roller is formed of some resilient metal, as steel, and is split as indicated at 22^a and 22^b, and at the inner end of split 22^a is provided with a T-head terminus 22^c as illustrated to incorporate as a unitary portion of the roller a main spring portion 22^d.

It will be seen from the structure as so far described that cover 19 may be easily removed subsequent to removing nut 18, for the purpose of properly winding an intermediate portion of cable 12 in a plurality of helical loops on the outer periphery of the main clutch roller; these loops being at all times held thus helically and held against kinking and mutual entanglement by means of the incorporation as shown of a crescent-shaped coil separator or wedge member 23 seated in a continuous groove on the roller periphery. Such roller is preferably split, or made in two halves, as illustrated in Fig. 4, to balance the action of the portions 22^d of each half and, in effect, to provide a single roller element warpable and clutchable on stud 17 in response to the tension of the particular loop wound around the same. An incidental advantage of this construction is a greater ease in partially disassembling and reassembling the parts, particularly in relation to properly engaging the cable 12 with the main clutch roller on removing merely cover plate 19 as just described. Engagement of the cable is even easier, if the outer half of the roller and the wedge member 23 are also removed, just before the cable is given its first loop around the roller; these last-mentioned parts being slipped back into place, just before the cable is given its second loop around the roller.

The auxiliary device which may in the above construction be also incorporated with great advantage, includes the combination of a preferably horseshoe-shaped steel or equivalent spring 24 preferably suspended at its upper center on stud 20, so that its depending side lengths constitute side walls or closures for a cover construction including cover plate 19. A pair of rollers 25 and 26 are revolubly mounted between the lower forked ends of spring 24, which rollers have staggered peripheral grooves, the roller 25 having its groove underlying the inner half of main roller 22, and the roller 26 having its groove underlying the outer half of said main roller as indicated at 26^a in Fig. 5. Midway between rollers 25 and 26, but of sufficiently small diameter to permit a limited play of the pivotally suspended spring 24, is a roller 27 loose on stud 21. This roller 27 is provided with a pair of parallel peripheral grooves, of which the groove 27^a lies opposite the groove 26^a of roller 26 and the groove 27^b lies opposite the groove of roller 25.

It will be noted that the lower curved face of a centrally enlarged portion 24^a of spring 24 coacts with the terminal points of a curved recess 23^a at the top of coil separator 23 (Fig. 2) to hold the latter part fixed during relative rotation of the main clutch roller.

Operation.—Assuming a person has slipped the strap 14 under his arm-pits, and steps free of a window ledge or the like, or even leaps therefrom, the down-pull on the depending length of cable 12 carrying such strap immediately acts according to the design of the parts to flex the spring portions 22^d of the halves of the main clutch roller in such manner as to impose sufficient friction to resist racing of the roller. As a result, the descent of such person is simple and easy, and at a predetermined rate practically irrespective of the weight of said per-

son. Also, simultaneous with the braking or clutch action set up as just described, the weight of the load on the descending length of cable 12 rocks the spring 24 to throw the roller 26 sufficiently to the right of Fig. 2 to impart a slight friction-drag on the length of the cable running upwardly between rollers 25 and 27, as a result of the closer approach of these two last-mentioned rollers. Further, the person being lowered may nicely control the rate of his descent by manipulating the uprunning length of cable, and, as actual experiments in connection with escapes from high places have demonstrated, the descending person may bring himself to a stop at any point by very slight pressure on said uprunning cable length. Likewise, the person being lowered approaches the ground as slowly as may be desired, and alights without a jerk.

Obviously, the apparatus just described may as well be used for other than life-saving purposes, and may even be used for hoisting objects of great weight easily and at a nicely controlled rate of ascent, as during the erection of structures and in connection with engineering works of all kinds.

Referring now to the embodiment shown in Figs. 8 to 11, which does not employ an endless cable, but instead a cable 12′ adapted to have its upper end, which may conveniently carry an eye-piece as indicated at 28, attached to the elevated point from which descent is to be made when the apparatus is used as a fire escape, the combined guiding and braking means comprises a self-complete structure which travels down the cable with the person seeking escape from such elevated point, and may then be caused to travel up the cable in preparation for the rescue of another person.

Such structure, it will be seen, includes a hand-hold member 29 securely attached to one of the two face plates 30 and 31 of the structure, to which member, if desired, may be shackled an arm-pit belt similar to the belt 14 of Fig. 1.

These face plates 30 and 31 are secured in predetermined spaced relation by means of a central shaft or stud 30ª, which may desirably be riveted at one end to plate 31. This stud at its other end is provided with a threaded reduced extension to take a clamp nut 32 as shown. These two plates are also spaced at top and bottom by means of studs 33, such studs rotatably carrying oppositely coned idler rollers 34.

The ends of the last-mentioned studs on the plate 30 are loosely received in the suitable apertures through said plate indicated, and the central stud 31 loosely supports the main clutch roller indicated at 35 and here employed also to receive helically a plurality of loops of an intermediate portion of the cable. This roller is also of the split type, that is, is comprised of two identical halves, and associated with an interposed coil separator, as in the case of the embodiment of Fig. 1, such separator being here marked 36. As a result of these provisions, the present construction, like that of Fig. 1, has the incidental advantage of being very easily and simply given a partial disassembly for properly associating the structure with the cable, in that a loosening and removal of a central nut (here the nut 32) permits readjusting of one of the plates relative to the other as a preparatory step properly to thread into place the looped portions of the cable. Thus, on loosening such nut 32, the plate 30 may be moved away from plate 31 sufficiently to clear the studs 34 and then rotated about the central stud 31 until redisposed as indicated in broken lines in Fig. 8 at 30′.

It will be seen best from Fig. 10 that the halves of the main clutch roller are preferably constructed with slits like those employed in the main roller of Fig. 1 and for a similar purpose.

The coil separator 36, herein employed, is of slightly different design, being of a generally circular outline except for a peripheral opening 36ª through which the cable smoothly passes in merging from one coil into another on the main clutch roller, and having a central opening 36ᵇ for loosely taking about stud 31. Separator 36 is permanently anchored to plate 31 by means of a shaped spacer and cable-guider member 37 securely attached to the separator and said plate, which attachment may conveniently be by rivet and screw means as indicated.

The operation of the apparatus as so far described will be readily understood, the manner of passage of the cable through the apparatus being clearly shown in Figs. 9 and 10; during which passage, of course, the apparatus and its burden descend at the required rate of speed commensurate with the weight-compensating, automatic drag action of main clutch roller 35, according to the theory and description of operation of the embodiment of Fig. 1.

The apparatus of Fig. 8 may also include, as an equivalent of the auxiliary braking and controlling means carried by the horse-shoe-spring 24 of Fig. 1, the following parts, whereby the rate of descent may be further controlled and stoppage at any point may be had. These parts include a split handle or auxiliary friction controller comprising a pair of relatively movable grip-members 38 and 39, the former of which is suitably secured rigidly to plate 30 as indicated at 40, and the latter of which is pivotally mounted on plate 31 as indicated at 41. Anchored in place in handle members 38 and

39 are blocks or drags of suitable friction material, as pieces of hard rubber 42 for gripping the part of cable 12′ passing between the handle members when they are squeezed together.

As to the operation of the apparatus in regard to this last described feature, the person using the escape maintains a hand hold on both members of said handle and by squeezing such members together, further controls, by way of the rubber drags 42, the rate of descent, and may even stop such descent at any point.

Inasmuch as many changes could be made in the above construction, and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It will also be understood that the language used in the following claims is intended to cover all the generic and specific features of the invention herein described and all statements of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. A suspensory apparatus adapted for the lowering of weights, including two elements comprising a cable and a cable-guiding structure one of which is adapted to be suspended from a fixed point of support and the other of which is adapted to have mounted thereon the weight to be lowered, said cable-guiding structure including a clutch device including a resilient and warpable main clutch roller, said clutch roller being slit at a plurality of points around its periphery and one of such slits being substantially T-shaped, said cable being looped about said roller, and means responsive to the weight of the object being lowered for controlling the actuation of such clutch device thereby to reduce variation of rates of descent for objects of different weights.

2. An apparatus of the class described comprising a cable, a cable-guiding and controlling structure adapted to be suspended from a fixed point, said structure including a resilient warpable roller about which a portion of the cable is looped, means for maintaining the loops of the cable separated from each other, and tensioning means influencing leads of said cable to maintain the loops associated with said roller.

3. A suspensory apparatus adapted for the lowering of weights, including two elements comprising a cable and a cable-guiding structure one of which is adapted to be suspended from a fixed point of support and the other of which is adapted to have mounted thereon the weight to be lowered, said cable-guiding structure including a clutch device including a resilient and warpable main clutch roller, and means responsive to the weight of the object being lowered for controlling the actuation of such clutch device thereby to reduce variation of rates of descent for objects of different weights, said clutch roller being of two parts and each part having wound over the same one of a pair of helically related loops of said cable, there being provided a loop-separator which is disposed intermediate the opposite ends of said roller.

4. A suspensory apparatus adapted for the lowering of weights, including two elements comprising a cable and a cable-guiding structure one of which is adapted to be suspended from a fixed point of support and the other of which is adapted to have mounted thereon the weight to be lowered, said cable-guiding structure including a clutch device including a resilient and warpable main clutch roller, and means responsive to the weight of the object being lowered for controlling the actuation of such clutch device thereby to reduce variation of rates of descent for objects of different weights, said clutch roller being of two parts and each part having wound over the same one of a pair of helically related loops of said cable, there being provided a loop-separator disposed intermediate the opposite ends of the roller and having a shaped portion directed toward the roller portion adjacent to which one loop merges into the other.

NEUMAN TOBIAS.