To all whom it may concern:

Be it known that we, CLARENCE E. WRIGHT and JAMES J. BORAH, citizens of the United States, residing at Bonilla and Huron, respectively, in the county of Beadle and State of South Dakota, have invented new and useful improvements in Automatic Lowering Devices, of which the following is a specification.

This invention relates to automatic lowering devices, the object in view being to provide a simple, compact and effective device for lowering persons or loads of any kind, without any assistance, the device embodying a friction brake mechanism which will take care of itself in accordance with the tension at which the device is set to operate, this being controlled by means, having in connection therewith, an indicator adapting the device, as a whole, to be set to work under the stress of a load of any predetermined weight.

The invention is particularly designed for use as a fire escape to enable persons to rap- idly descend from the windows or other openings of a burning structure, and on account of the compactness and economy in manufacture of the device, it will have a large field of usefulness, as a large number of the devices may be placed in stores, factories, public and private buildings, hotels, and the like, and will enable people to descend rapidly by means of the device with perfect safety.

With these and other objects in view, the invention consists in the construction, combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

In the accompanying drawings: Figure 1 is a side elevation of the lowering device. Figure 2 is a vertical longitudinal sectional view through the same. Figure 3 is a vertical cross section on the line a—a of Figure 2. Figure 4 is a detail cross section on either of the lines b—b of Figure 2.

The lowering device contemplated in this invention comprises a casing which also constitutes a supporting frame for the operative parts of the mechanism contained therein, this frame embodying the opposite heads 1 and 2, which are connected securely together by means of a hood 3 securely fastened thereto, as shown in Figure 2, said heads or end pieces being further connected at the bottom by a bar 4, which also forms a track for a traveler or cable guide, hereinafter more particularly described.

One of the end pieces or heads 1 of the frame is provided with an inwardly extending circumferential flange 5, at the inner edge of which is an inwardly turned friction flange 6 having applied to the outer face thereof a friction band or surface 7, a corresponding friction band or surface 8 being applied to the other head or end piece 2 of the frame, upon the inner side thereof, as clearly shown in Figure 2.

Mounted rotatably within the combined frame and casing above described is a drum of hollow construction, the same embodying the disk-shaped end walls 9 and 10, and the peripheral wall 11, one of the end walls 9 being removable to give access to the interior of the drum, which is filled with any suitable liquid or fluid, for a purpose which will hereinafter appear.

As shown, the end walls of the hollow drum are connected and held in fixed relation to each other by parallel guide rods 12. These guide rods are provided, at their ends, with nuts 13 adapting the same to be removed, and also permitting the drum to be taken apart to get at the mechanism contained therein.

13 and 14 designate lowering cables which are wound around the drum.

Extending centrifugally through the drum and frame or casing is a stationary hollow threaded main supporting shaft 15. One end of said shaft is reduced and shouldered, as shown at 16, and enters a corresponding opening in the adjacent end piece or head 1 of the frame, where it is held from rotating by means of one or more keys 17, or the equivalents thereof. The opposite end of said shaft is received in a socket 18 in the opposite end piece 10 of the rotary drum, while the drum 6 is provided with a hub-like extension 19 which is received in a socket 20 in the end wall 2 of the frame or casing. The construction just described enables the drum to turn within the frame or casing and around the stationary threaded shaft 15.

21 designates a traveling piston which is movable endwise within the drum and lengthwise upon the stationary shaft 15. This piston is provided with holes, at 22, for the guide rods 11, thus causing said piston to revolve with the drum, and as said piston
is internally threaded to agree with the threads of the shaft 15, it will be apparent that as the drum rotates the piston is moved from one end of the cylinder to the other, said piston being provided with a small port 23 through the body thereof, which will permit the liquid or fluid to pass slowly through said port from one side of the piston to the other, and act with the desired resistance to such movement. It will further be understood that owing to the back-pressure of the liquid or fluid against the side of the piston, the drum, as a whole, will be pressed in the opposite direction, so as to bring one end thereof against the corresponding friction surface 7 or 8, as the case may be, the drum being free to slide for a limited distance on and relative to the shaft 15.

The shaft 15 is hollow or provided with a central longitudinal bore, in which is arranged a valve stem 24 provided at two points with regulating valves 25, each of said valves being provided with a port or outwardly flaring passage 26 adapted, by the partial rotation of the valve, to open or close a corresponding port 27 in the shaft 15, the ports 27 and the valves 25 being arranged adjacent to the opposite ends of the drum, whereby when the enlarged hub 28 of the piston nearly reaches the end of its throw in either direction, it is adapted to cover one of said ports and therebyyieldingly and gradually arrest the further movement of the piston, and consequently the further rotation of the drum carrying the lowering cables. The arrangement described serves to check the speed of the device, causing the cable to descend more slowly, as the latter approaches the end of its travel, thereby making an easier and safer landing for the person operating the device. The drum is allowed to keep on rotating at a much slower rate of speed, however, by means of the vent through the body of the piston itself, until a complete landing is safely effected. Furthermore, by adjusting the valves by means of the stem 24, the rapidity of flow of the liquid or fluid through the ports 27 and lengthwise of the hollow shaft outward again to opposite side of the piston may be regulated according to the weight to be imposed upon the cable. Past on the end of the stem 24 is an indicator hand 29 adapted to register with graduations on one end of the casing or frame, as shown at 30, said graduations having numbers indicating the proper weight to be imposed upon the lowering cable. This enables the device to be set for any predetermined weight. Where the shaft 15 passes through the end wall 9 of the drum, there is arranged a stuffing box 31, while another stuffing box 32 is provided for the point where the stem 24 passes through the end wall 1 of the frame or main casing.

33 designates one or more piston rings, with which the piston 21 is equipped, in order to insure close contact between the periphery of the piston and inner wall of the drum.

Mounted to slide on the track 4 is a traveler, consisting of the upper bar or section 34, and a lower bail-shaped section 35 which extends under the track 4. The bar 34 has its opposite ends supported on inwardly extending flanges 36 at the bottom of the casing, and said bar is provided at or near its opposite ends with apertures 37, through which the cables 13 and 14 pass. It will be observed that as the cable 13 is drawn downwardly and as it unreefs from the drum, the traveler moves lengthwise of the track 4, and thereby guides the other cable upon the drum, so as to occupy the same position previously occupied by the cable 13. If desired, an auxiliary drum or spool 38 may be arranged adjacent to the main frame or casing, upon which the unwound cable may be stored preparatory to using the device in practice. As the first cable, however, is unwound from the drum to lower a person or object, the other cable is relieved of its weight. In this way, the device may be alternately used in connection with the different cables, and one person after another may rapidly descend from a burning building, it only being necessary to set the indicator-hand 29 at the graduation representing the approximate weight of the person or object to be lowered. The speed of rotation of the drum, and consequently the speed of travel of the downwardly moving cable is governed by the size of the port 23 and the size of the ports 27, through which the liquid passes in its movement from one side to the other, during the travel of the piston lengthwise of the shaft 15.

What is claimed is:

1. A device of the class specified, embodying a stationary frame, a friction surface thereon, a hollow cylindrical drum mounted in said frame for rotary and endwise movement toward and away from said friction surface, a piston movable within and endwise of the drum, a stationary threaded shaft on which the piston is threaded, a cable passing around said drum, and means permitting a slow movement of the liquid from one side of the piston to the other.

2. A device of the class described, embodying a stationary frame, a friction surface thereon, a hollow cylindrical drum mounted in said frame for rotary and endwise movement toward and away from said friction surface, a stationary threaded shaft within said drum provided with ports near the ends of the drum, means for regulating the size of said ports, a piston having a port therethrough and movable within and endwise of the drum and also adapted to cover
and uncover the shaft ports, and a cable passing around said drum.

3. A device of the class specified, embodying a stationary frame, a friction surface thereon, a hollow cylindrical drum mounted in said frame for rotary and endwise movement toward and away from said friction surface, a hollow stationary threaded shaft having ports at and near the ends of the drum, a piston movable within and endwise of the drum and adapted to cover said ports one at a time and also provided with a port therein for the passage of the liquid, and a cable passing around said drum.

4. A device of the class specified, embodying a frame having friction surfaces at opposite ends thereof, a revolving hollow cylindrical drum journaled therein and movable endwise toward and away from said friction surfaces and containing liquid or fluid, a piston movable within and endwise of the drum, a stationary shaft on which the piston is threaded, a cable passing around said drum, and means permitting a slow movement of the liquid from one side of the piston to the other.

In testimony whereof we affix our signatures in presence of two witnesses.

CLARREN E. WRIGHT.
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Witnesses:
T. W. DAWSEN,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."