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F. A. DAVIDSON

HANGING SCAFFOLD

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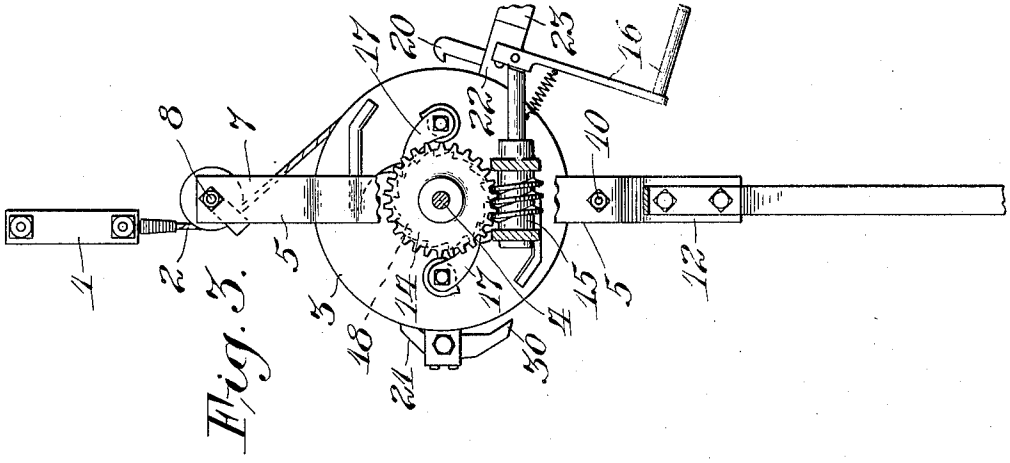


Fig. 3.

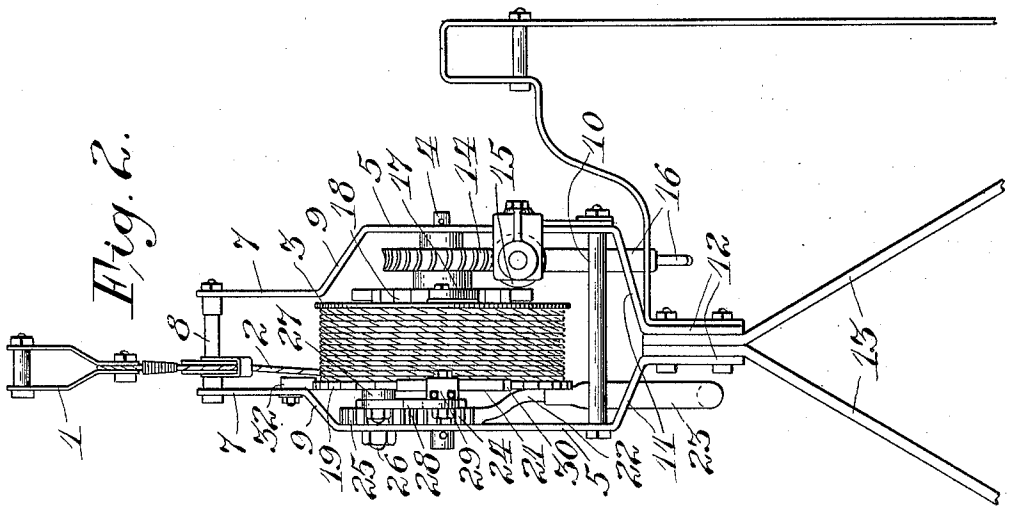


Fig. 2.

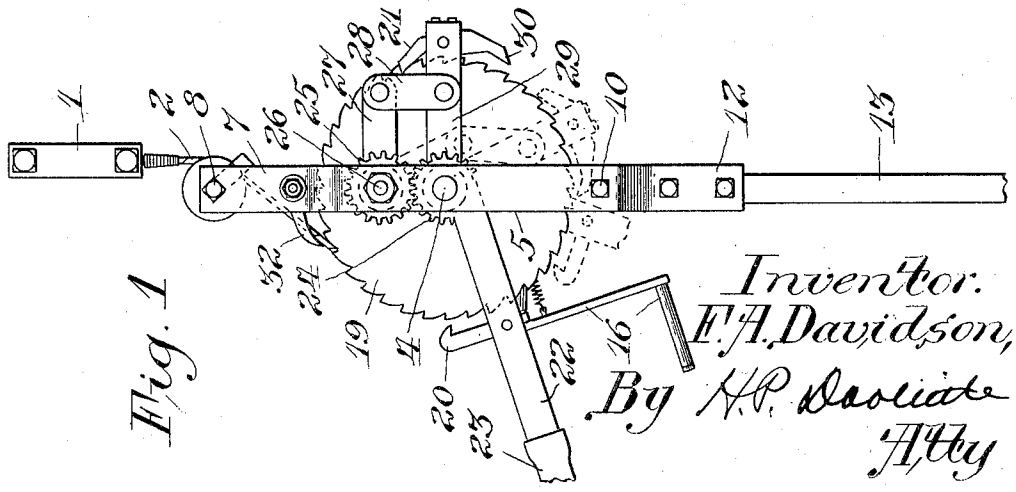


Fig. 1

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UNITED STATES PATENT OFFICE.

FREDERIC A. DAVIDSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE AMERICAN SAFETY DEVICE COMPANY, A CORPORATION OF NEW YORK.

HANGING SCAFFOLD.

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My invention relates to hanging scaffolds.

In this class of devices, a platform for a workman is mounted on spaced supports which are suspended from cables carried by hooks which engage the cornice of the building on which the work is to be performed, and hand operated mechanisms, usually including a winch drum, are mounted on the platform for the purpose of winding and unwinding the cable around the drum to raise or lower the platform. Such hoisting mechanism owing to the limited supporting area must be compact in assembly, and the operating mechanism must be readily accessible to the workmen and capable of comparatively easy and simple operation, and must be of positively actuated parts and reliable construction in order to insure safety. In meeting these conditions heretofore, the mechanisms provided have secured safety at the sacrifice of speed of operation. My invention aims to obtain in conjunction with the preservation to the full degree of the factor of safety and particularly in connection with the retention of control mechanism of established safeguarding value for lowering the scaffold, means for raising the appliance at a greater speed than heretofore, which means shall be of such construction and arrangement as to retain the present advantage of ease in hand operation, and be adaptable to and conformable with the present limited supporting area and compact assembly employed in hanging scaffolds.

With this object in view, my invention is embodied in preferable form in the construction hereinafter described and illustrated in the accompanying drawings.

In these drawings—

Fig. 1 is an end view in elevation of one of a pair of depending scaffold supports;

Fig. 2, a front view of this construction; and

Fig. 3, an end view from the opposite side of the device from that illustrated in Fig. 1.

Referring to the drawings, 1 is a hanger adapted to be suspended from a hook which takes over the cornice of a building. To this hanger is connected one end of a rope or cable 2 which passes around a drum 3 and on which it is adapted to be wound and unwound to raise or lower the scaffold. The shaft 4 of this drum is mounted in arms 5 of an open carrying frame. This frame must be not only of sufficient strength and rigidity to resist the tension strain imposed by the weight of the scaffold and its load, and twisting strains imparted by the operating mechanisms, but be of reasonably light weight and so simple and compact in form as not to obstruct the worker. The arms of this frame are in two separate parts and have upper parallel vertical portions 7 comparatively close together and joined by a bolt 8, and these parts of the arms terminate at their lower ends in outwardly bent portions 9, which again terminate in the more widely spaced vertical main parts of the arms which are separated laterally merely a sufficient distance to embrace the drum and its operating mechanisms. A cross-bolt or rod 10 braces the lower parts of these arms. The lower ends of the arms are continued into converging portions 11 which again terminate in vertical parts 12 to which are secured the upper ends 13 of an open hanger in which may be supported one end of a board or platform for the worker, according to the usual practice, the other end of such platform being carried by another hanger depending from a similar frame. Within the frame and mounted on the shaft of the drum is a worm wheel 14, driven by a worm 15 rotatably operable by a crank and handle 16. Pawls 17 are carried by the drum and are adapted to engage a ratchet wheel 18 loosely mounted on the drum shaft and keyed to the worm wheel hub, whereby as the worm wheel is turned the teeth of the ratchet wheel will ride under the pawls on the drum and permit the latter to turn in such direction as to unwind the rope. Since the ratchet wheel and drum turn in the same direction, these pawls serve, by engagement with the teeth, to prevent the drum from turning independently of and faster than the ratchet and worm wheels.

The above mechanism is adapted to effect and control the downward movement of the scaffold. The worm and gear provide a self-retaining mechanism which holds the platform against free descent and insures safety. This is a construction commonly employed. Such mechanism is capable of only a slow operation of the scaffold, which meets the requirements called for by the

character of the work commonly performed on such scaffolds.

For the lifting of the scaffold, a mechanism capable of the application of greater power is required, and it is also possible, from the standpoint of safety, to obtain a greater speed of operation. These results have been accomplished by the mechanisms heretofore in use, and it is the particular object of my invention to provide an improved elevation mechanism, cooperative with the compact assembly above defined, that will increase the speed of the lifting movement of the scaffold.

Within the frame and fixed to the drum, and at the opposite end of the axle to that on which the worm gear is mounted, is a ratchet wheel 19. This wheel is adapted to be operated by two double-acting oppositely moving ratchet pawls 20 and 21. The ratchet pawl 20 is pivoted on a lever 22, which is extended into an operating handle 23, conveniently located for operation by the worker. The inner end of the lever is fixed directly to a gear 24 which is loosely mounted on the axle between an arm of the frame and the drum. In the drawing, this gear is shown as a mutilated gear forming an integral part of the lever. It meshes with and turns a driven gear 25 mounted on a stub shaft 26 carried by the frame arm and fixed on the hub of this gear is a crank 27 projecting across the face of the ratchet wheel. Pivoted to the outer end of this crank is a link 28 pivotally connected to an arm 29 which is pivotally mounted at its inner end on the drum axle. At the end of this arm is pivoted the gravity ratchet pawl 21, which is adapted in its upward movement to engage the teeth of the ratchet wheel. The lower end of this ratchet pawl has a beveled tail 30, which, as shown in dotted lines, Fig. 1, is adapted to ride against cross-bolt 10, so as to hold the pawl out of engagement with the teeth when the operating handle is moved down to depending and inoperative position parallel to the frame, so as to be out of the way of the worker. A detent 32 pivoted on the frame engages the ratchet wheel.

When the scaffold is to be raised, the lever handle 23 is moved up and down by the workman on the platform. In the down stroke, the ratchet pawl 20 will engage the ratchet teeth and turn the wheel, thus rotating the drum and winding up the suspending rope. At the same time, gears 24 and 25 will be rotated in a direction to carry the ratchet pawl 21 down to its lower position. On the up stroke, the ratchet 20 will ride freely over the teeth while the ratchet 21 will engage the teeth and turn the wheel, thus obtaining a double action and a rapid elevation of the scaffold.

It will be seen that the journalling of the operating lever upon the axis of the drum, the mounting of the ratchet 20 directly on the lever, and the provision of the gears, operable upon the short crank, link and pawl arm for the other ratchet pawl 21, provide a very compact assembly which is protected by and does not project materially beyond the borders of the operating mechanism, and all the parts of which are within convenient reach of the workman.

What I claim is:

1. A hanging scaffold having a flexible suspending member, a winding drum therefor, a hand lever fulcrumed on the axis of said drum, a frame carried by said drum, a ratchet wheel operable to turn said drum in one direction, a ratchet pawl mounted on the lever, a second alternately acting ratchet pawl pivotally supported from the frame, and means mounted on said frame and connected to said lever for operating said second pawl.

2. A hanging scaffold having a flexible suspending member, a winding drum therefor, a ratchet wheel fixedly connected to the drum for turning the same in one direction, a handle lever, a ratchet pawl mounted thereon, a gear fixed to said lever, a second gear in mesh with the first, a second alternately acting ratchet pawl, and means connecting said second pawl with said second gear.

3. A hanging scaffold having a flexible suspending member, a winding drum therefor, a ratchet wheel for said drum, a ratchet pawl, a hand lever on which said pawl is mounted, a gear fixed to said lever, a second gear in mesh with the first, a crank fixed to the second gear, a swinging arm, a second ratchet pawl pivoted to said arm, and means connecting said crank and arm.

4. A hanging scaffold having a flexible suspending member, a winding drum therefor, a ratchet wheel for said drum, an operating lever, a pawl carried by said lever and adapted to engage said wheel, a second alternately acting pawl for engagement with said wheel, operating means connecting said second pawl with the lever, a frame carried by the drum, and a deflecting member on said frame adapted to contact with the end of said second pawl to lift the latter out of engagement with the wheel when the operating lever is swung down into inoperative position and substantially parallel with the frame.

In testimony whereof I affix my signature.

FREDERIC A. DAVIDSON.