July 29, 1947. J. M. BENSON 2,424,910

SAFETY SCAFFOLD WINCH

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Fig. 1.

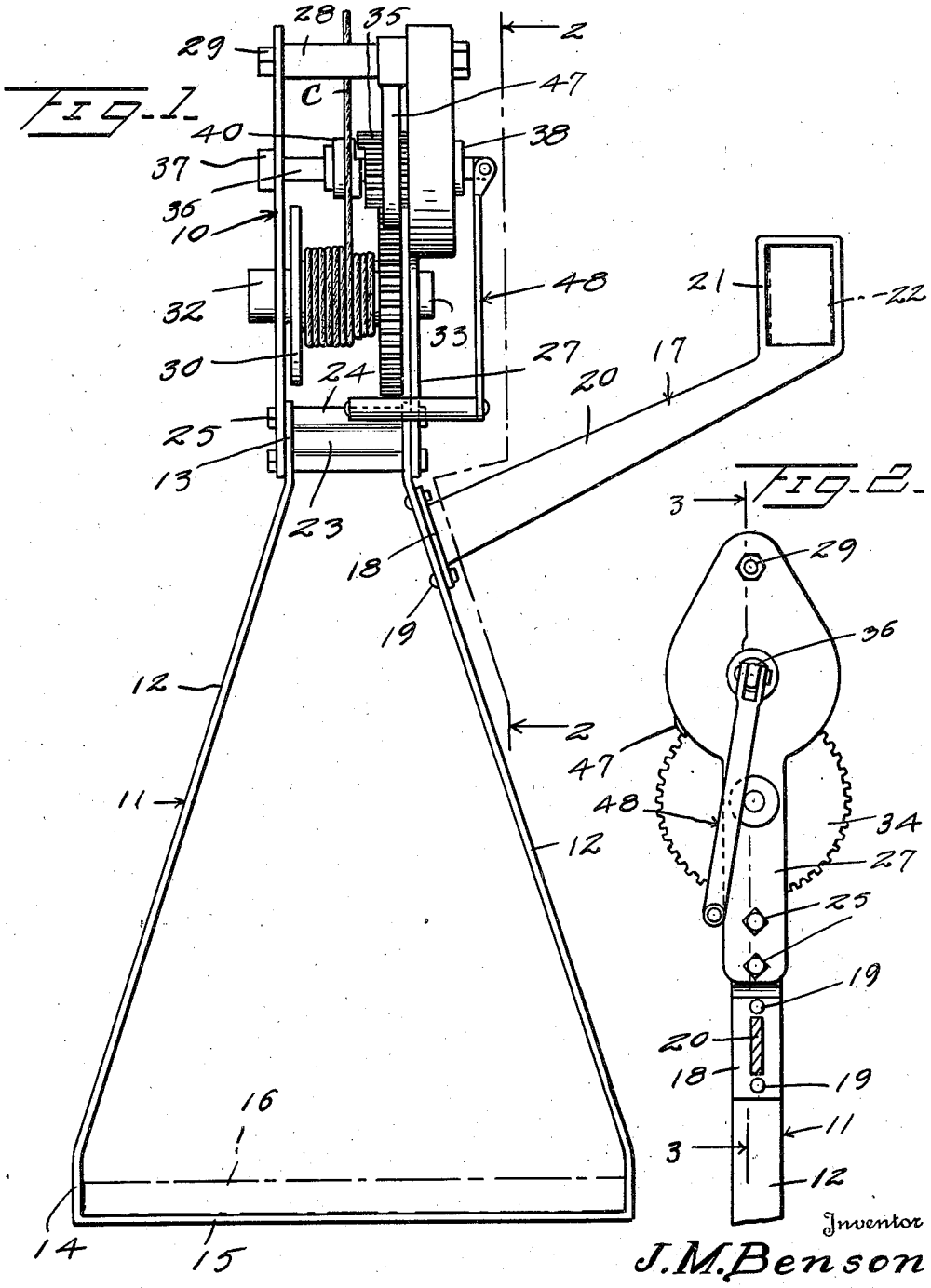


Fig. 2.

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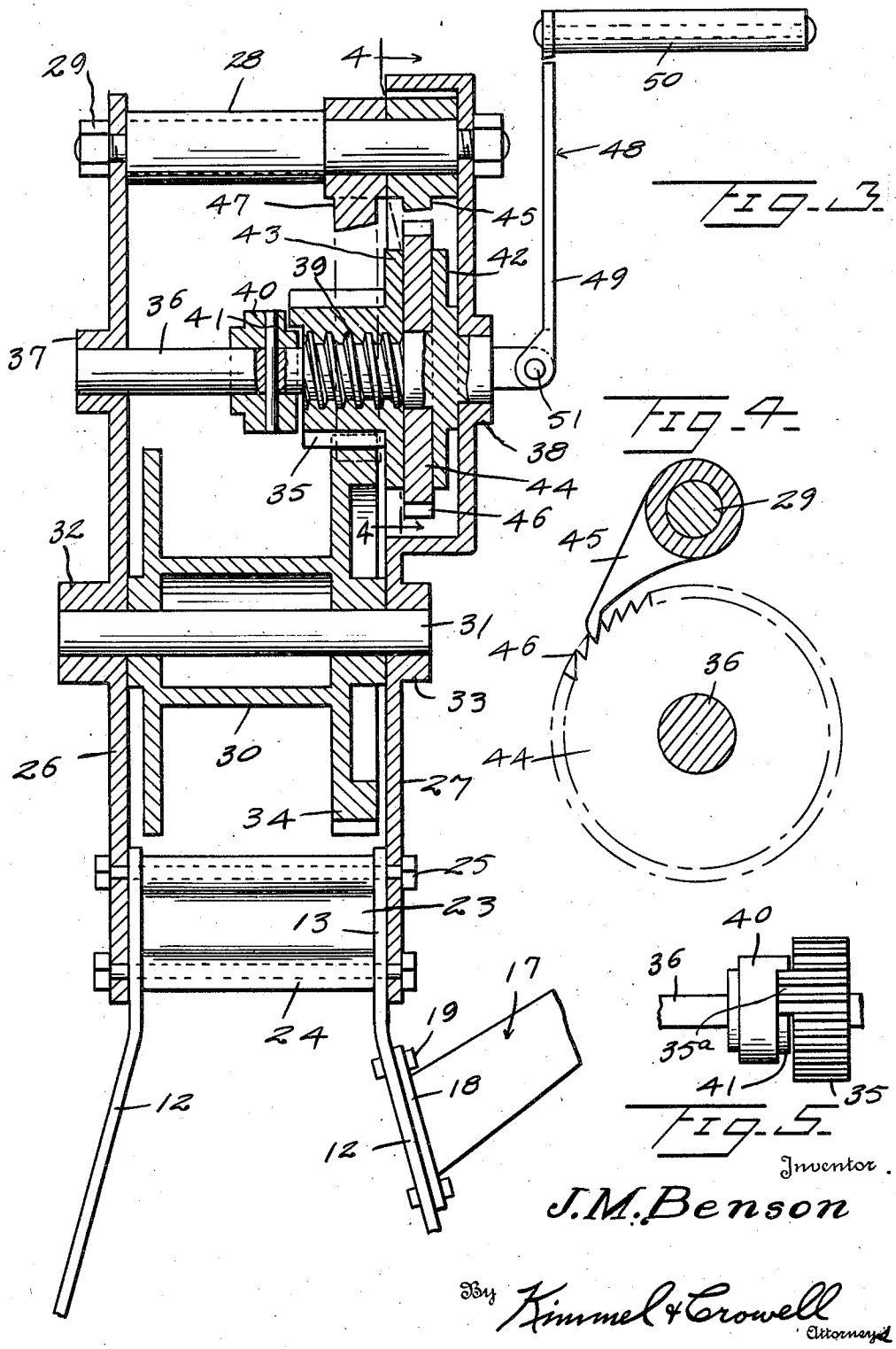


FIG. 3.

FIG. 4.

FIG. 5.

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UNITED STATES PATENT OFFICE

2,424,910

SAFETY SCAFFOLD WINCH

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1 Claim. (Cl. 254—187)

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This invention relates to safety scaffold.

An object of this invention is to provide an improved scaffold structure including a safety winch therefor.

Another object of this invention is to provide an improved scaffold winch embodying multiple safety means so that the winch will not be accidentally lowered by any excessive weight or sudden jar on either the scaffold or the winch.

A further object of this invention is to provide in a winch of this character a torque operated locking means for locking the winding drum against unwinding, the locking means being releasable when the winding crank is turned in a winding direction.

A further object of this invention is to provide a scaffold winch which is so constructed that the winding crank will serve as a brake in the unwinding of the drum, as in the unwinding operation it is necessary to reverse the rotation of the crank and the latter releases the locking means in proportion to the reverse rotation.

With the foregoing and other objects in view as may hereinafter more fully appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and as illustrated in the accompanying drawings wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to without departing from the spirit and scope of the invention.

In the drawings, wherein similar reference characters designate similar parts throughout the respective views,

Figure 1 is a detail side elevation of a scaffold and winch structure constructed according to an embodiment of this invention,

Figure 2 is a fragmentary sectional view taken on the line 2—2 of Figure 1,

Figure 3 is an enlarged sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 3,

Figure 5 is a fragmentary plan view of the driving gear and shaft therefor.

Referring to the drawing, the numeral 10 designates generally a winch structure which has secured to the lower end thereof a scaffold or platform supporting member, generally designated as 11. The scaffold or platform supporting member 11 comprises a pair of downwardly divergent bars 12, which are formed with vertical upper end portions 13, and with vertical lower portions 14. A horizontal connecting bar 15 con-

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nects the extensions 14 together and a platform 16 is adapted to engage on the horizontal bar 15. A rail supporting bracket 17 is secured to one of the bars 12 and includes a base plate 18 secured by fastening members 19 to the bar 12. An upwardly and outwardly extending arm 20 is carried by the base 18, and has formed integral with the upper outer end thereof, a rectangular loop or eye 21 within which a guard rail 22 is adapted to engage.

The vertical extensions 13 are disposed between the spacer plate 23 having enlarged tubular bosses 24 at the upper and lower portions thereof through which a pair of fastening members 25 engage for securing the platform supporting structure 11 to the frame of the winch 10. The winch 10 includes a pair of frame members 26 and 27 which are disposed in spaced apart relation being held in spaced apart relation by means of the spacer 23 and an upper tubular spacer 28 engaging about a bolt 29 which extends through the plates 26 and 27.

A winding drum 30 is rotatably mounted on a shaft 31 journaled through bearings 32 and 33 carried by the plates 26 and 27 respectively. The winding drum 30 includes a spur gear 34 at one end thereof which is adapted to mesh with a pinion 35. The pinion 35 is carried by a winding shaft 36 disposed above the drum 30 and journaled in bearings 37 and 38 carried by the plates 26 and 27. The shaft 36 is formed with a threaded part 39 on which the gear 35 threadably engages, and a block 40 is fixed on shaft 36 and is formed with a cutout 41 confronting the gear 35 which has certain of the teeth 35a projecting into the cutout so that the gear 35a will be limited in its rotation and movement to the left on shaft 36. In this manner gear 35, when moved to a position disengaging clutch 43 from ratchet clutch 44 will not be frictionally locked. The length of the cutout 41 is such as to provide sufficient movement of gear 35 on shaft 36 to declutch ratchet 44.

A plate 42 is fixed to shaft 36 and comprises one portion of a braking element and another braking plate or element 43 is fixed to or formed integral with gear 35. A toothed plate 44 is rotatably mounted on shaft 36, at one end of the threads 39, and is interposed between the plates 42 and 43. A pawl 45 is rockably mounted on bolt 29 and is adapted to engage the teeth 46 of plate 44 so as to hold plate 44 against rotation in one direction. A second dog or pawl 47 is rockably mounted on bolt 29 and is adapted to engage the

teeth of gear 34 so as to hold this gear against rotation in one direction.

Shaft 36, at one end thereof, has rockably secured thereto a winding crank 48 which includes a lever 49 and a right angularly disposed handle 50. The lever 49 is rockably mounted on a pivot 51 engaging through the adjacent end of shaft 36. Handle 50 constitutes a second safety means, which, as shown in Figure 1, is adapted in one position thereof, to engage against the adjacent edge of plate 27.

In the winding position of crank 48 this crank is swung upwardly and outwardly through an arc of substantially 180° to the position shown in Figure 3 so that handle 50 will be in outwardly extending position.

In the use and operation of this winch the cable C is wound on drum 30, crank 48 being swung outwardly as shown in Figure 3. As crank 48 is turned in a clockwise direction, as viewed in Figure 2, drum 30 will rotate in a counter-clockwise direction. Rotation of shaft 36 in a clockwise direction will cause thread 39 to draw plate 43 tight against ratchet plate 44. Ratchet plate 44 will be tightly held between plates 42 and 43 so that these three plates will rotate clockwise as a unit with pawl 45 riding over the teeth 46. As drum 30 is rotated dog 47 will also ride over the teeth of gear 34 so as to prevent reverse rotation of drum 30. In the event crank handle 48 should be dropped, or the hand gripping this crank handle should become disengaged therefrom, the torque of drum 30 will cause gear 35 to rotate in a counter-clockwise direction which direction will be to effect binding of the two plates 42 and 43 on ratchet plate 44.

As ratchet plate 44 is always engaged by dog 45, the reverse torque on gear 35 will cause this gear to be stopped in its rotation so that drum 30 will thereby be held against turning to unwind the cable C therefrom.

In the event it is desired to effect an unwinding of cable C from the drum, crank 48 is rotated slowly in a counterclockwise direction so as to disengage the plate 43 of gear 35 from ratchet plate 44. The speed of unwinding can readily be controlled by the desired reverse rotation of crank 48 and if further unwinding is undesired it is only necessary to stop rotation of crank 48 and shaft 36 whereupon gear 34 will turn gear 35 to effect a binding of the two plates 42 and 43 on opposite sides of ratchet plate 44.

As an added safety factor crank 48 may be swung downwardly to dispose the handle 50 in an inwardly projecting position which is the position shown in Figure 1, and this handle may then be engaged with one edge of plate 27. In this manner the frame of the winch will coact with the braking means hereinbefore described to positively lock the winding drum against rotation in an unwinding direction.

I claim:

A winch comprising a frame structure, a winding drum rotatable in said frame structure, a gear fixed relative to said drum, a drive shaft journaled in said frame structure, a brake comprising a clutch operating thread on said drive shaft, a driving pinion operatively connected with said clutch thread, a clutch plate fixed relative to said pinion, a second clutch plate fixedly carried by said shaft, an intermediate clutch plate loose on said shaft between said first and second clutch plates, a dog rockably engageable with said intermediate clutch plate for holding the latter against rotation in the unwinding direction of said drum, a pivot disposed transversely of said shaft adjacent one end thereof, a crank comprising an arm and a handle normal to said arm pivotally mounted on said pivot, said handle in the operative position of said crank extending away from said frame, said crank when rotated on said pivot through an arc of substantially 180 degrees having the handle disposed in inwardly projecting position with respect to said frame whereby said handle will lock said shaft against rotation in an unwinding direction of movement of said drum on failure of said brake, and correlated stop means fixed relative to said drive shaft for limiting relative rotation between said pinion and drive shaft.

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