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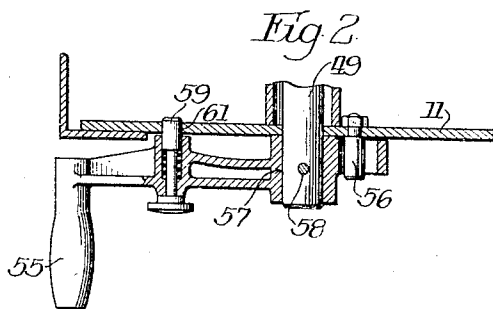
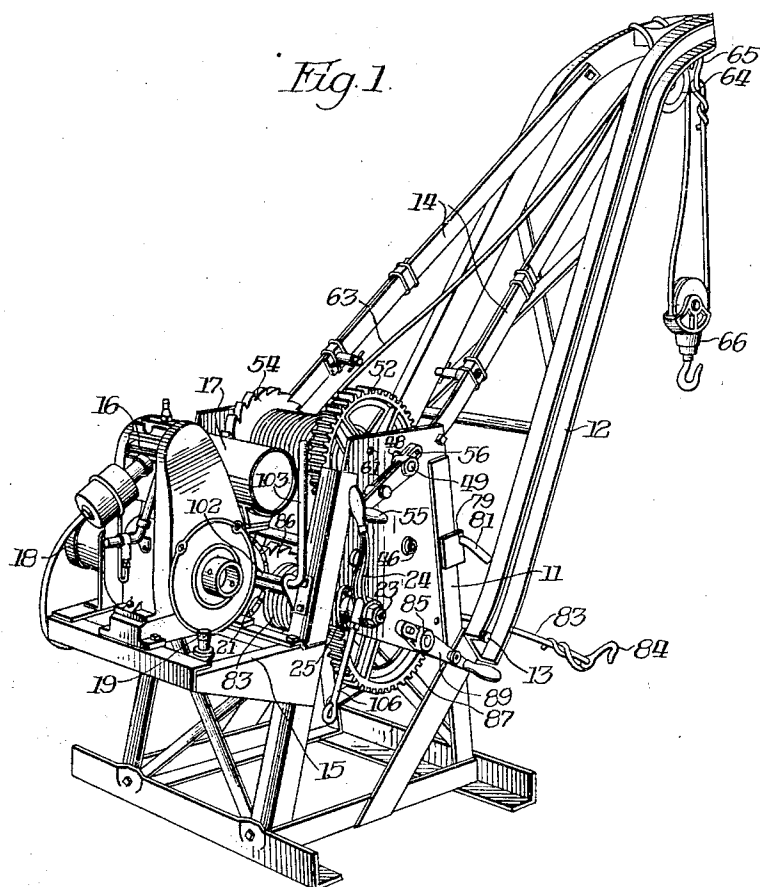
G. E. WEAVER ET AL

1,806,433

WRECK CRANE

Filed May 26, 1928

4 Sheets-Sheet 1 -



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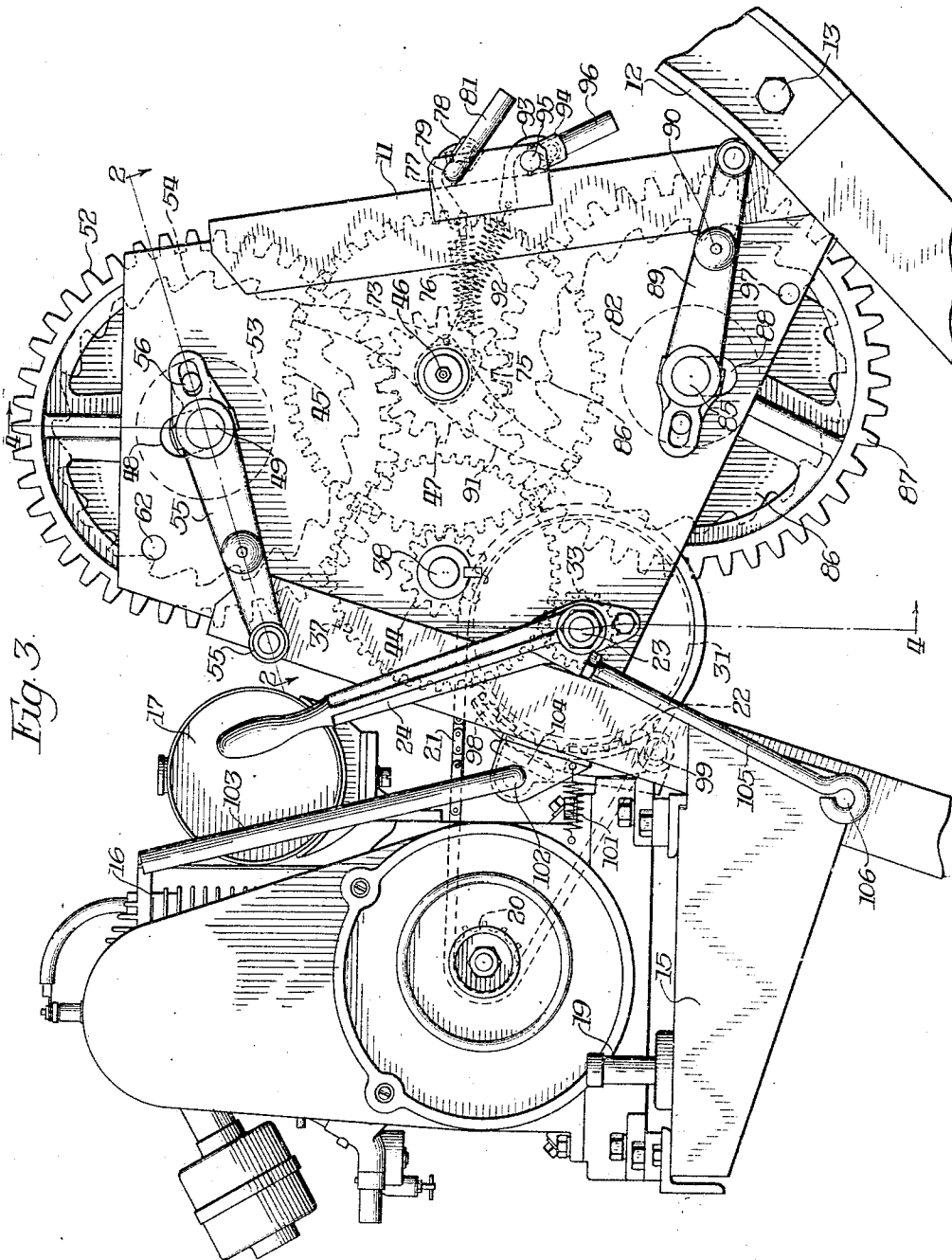
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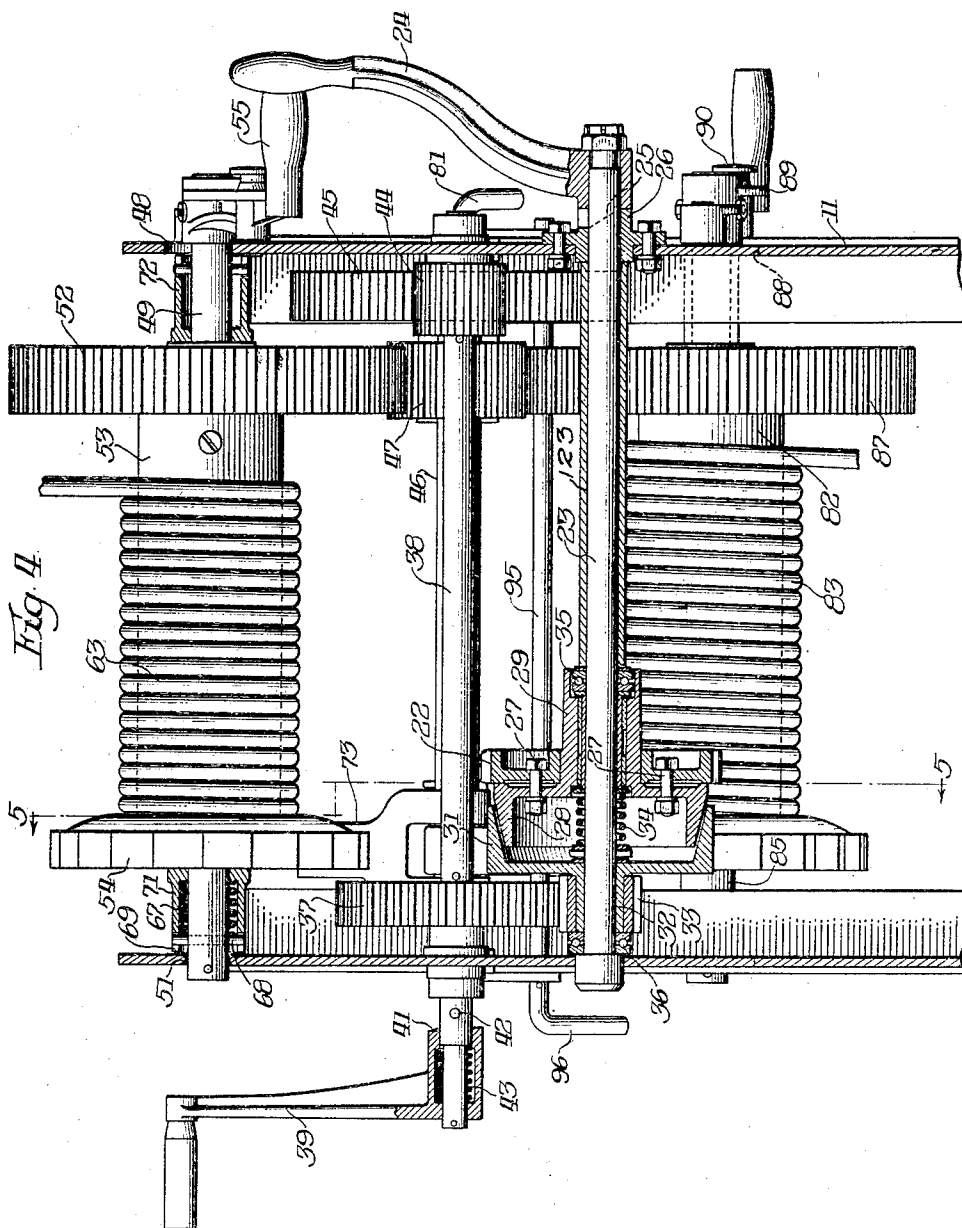
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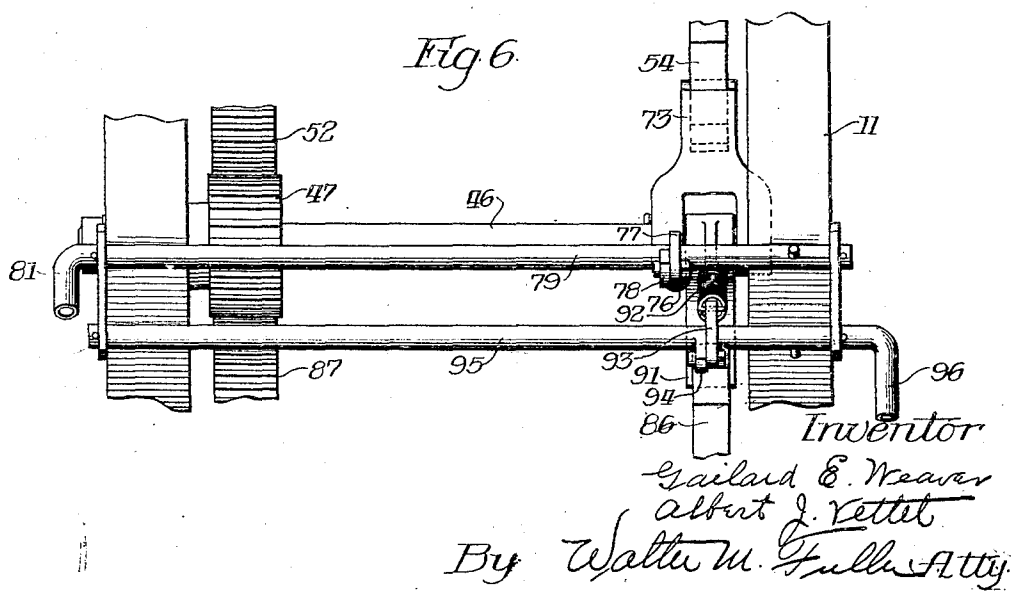
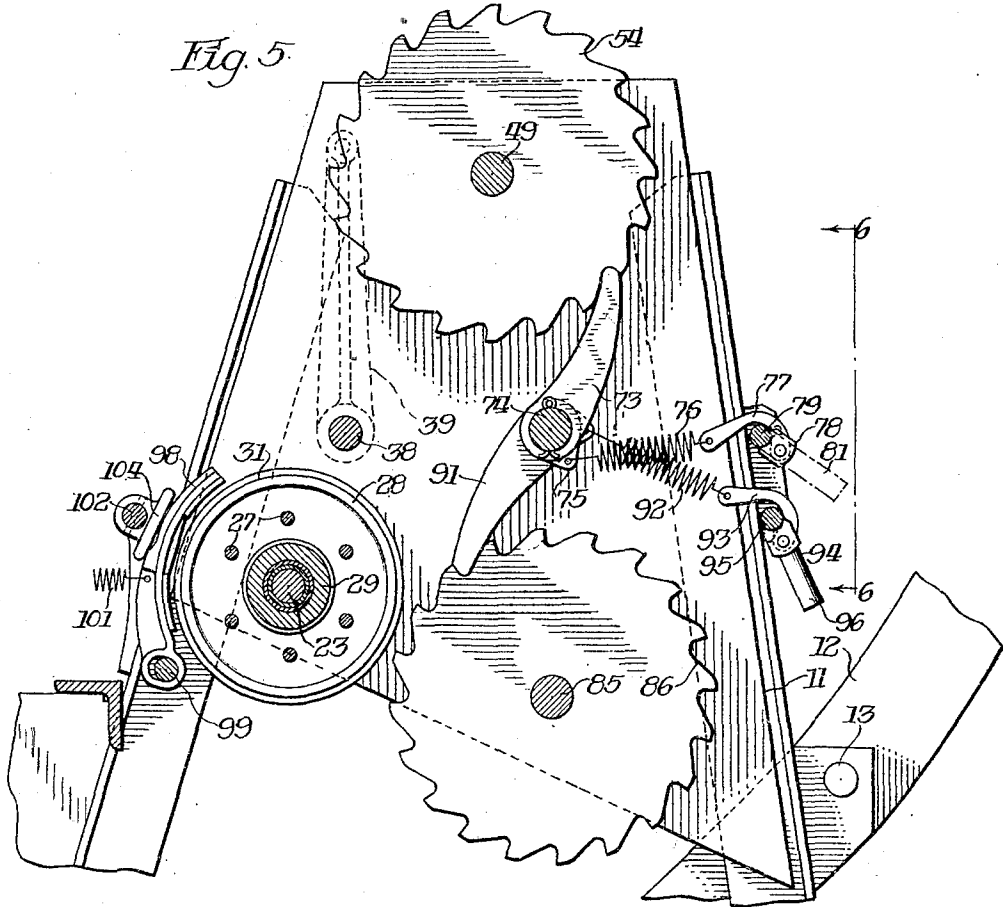
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4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

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## WRECK CRANE

Application filed May 26, 1928. Serial No. 280,811.

Our present invention concerns features of improvement and betterment in cranes or hoists, especially those designed for use on trucks or service cars for handling wrecked automobiles, whereby to place the latter properly on the roadway or to convey them to service stations for repairs.

In its preferred embodiment, the invention comprises a self-contained, compact structure which can be easily and quickly attached to any service car, since it is merely necessary to mount the appliance in place and to connect the circuit of the starting motor to the battery of such car, the motor being provided to start or crank an internal-combustion engine forming part of the appliance and which furnishes the needed power to do the work.

Stated a little differently, one of the objects of the invention is to provide a crane having power-driven means and designed to be mounted on the rear of an automobile-truck, or any other vehicle to be used in wrecking service, or any other type of service for which an appliance of that character would be adaptable.

A further aim of the invention is to supply a construction of the indicated character which is simple in structure, relatively economical to manufacture, effective in service, and easily operated to perform the various functions for which it is intended.

To enable those acquainted with this art to have a full and complete understanding of the invention, in the accompanying drawings, forming a part of this specification, a present, preferred embodiment of the invention has been illustrated in detail, and, for simplicity, like reference numerals have been employed to designate the same parts throughout the several views.

In these drawings,—

Fig. 1 is a perspective view of the entire appliance;

Fig. 2 is a fragmentary, substantially-horizontal, cross-section on line 2—2 of Fig. 3, the parts being viewed in the direction indicated by the arrows;

Fig. 3 is a fragmentary, side elevation of the device;

Fig. 4 is a vertical cross-section on the broken section-line 4—4 of Fig. 3;

Fig. 5 is a vertical section on line 5—5 of Fig. 4; and

Fig. 6 is a partial elevation of the apparatus as viewed from the position 6—6 of Fig. 5.

Referring to these drawings, it will be perceived that the improved and novel crane comprises a skeleton frame of suitable structure and form adapted to be mounted on the rear portion of the body of a service car or truck, a boom 12 being hinged thereon at 13, its degree of inclination being adjustable by means of supporting or sustaining bars 14, 14 of any suitable type, but capable of elongation or shortening.

A bracket or ledge 15, outstanding from the frame 11, carries a one-cylinder, internal-combustion engine 16 fed by fuel from a supply-tank 17, a starting motor 18 being mounted directly on the protruding portion of the engine crank-shaft, its electric circuit being controlled by an electric switch operated by a conveniently-positioned, actuating button 19 (see Fig. 1).

The engine crank-shaft has a sprocket-wheel 20 (Fig. 3) thereon connected by a chain 21 to a larger sprocket-wheel 22 revolvable on a shaft 23 (see Fig. 4) slidable in bearings in the side-walls of the frame 11, the shaft being movable lengthwise by means of a handle 24 fixed thereon and having a hub with a cam face co-operating with a cam surface 25 on the end of the bearing member 26 secured to the frame, and which supports and accommodates one end portion of the shaft.

Sprocket-wheel 22 is bolted directly at 27 to a cone clutch-member 28 having an elongated hub 29 revolvably mounted on the shaft, such member being arranged to coast with an adjacent, companion, cone clutch-element 31 having a hub 32 rotatable on the shaft and equipped with a pinion 33, a spring 34 coiled around the shaft between the clutch-members tending to separate them in the usual way, but being capable of compression to allow their conical faces to frictionally bear on one another whereby to clutch or operatively connect the sprocket-wheel and the pinion to—

gether, ball thrust-bearings 35 and 36 being provided at opposite ends of the two hubs to take the strains.

The united members 22 and 28 are prevented from moving to the right, as viewed in Figure 4, by means of a sleeve 123 engaging the bearings 35 and 26 at its opposite ends.

Pinion 33 is in constant mesh with a gear 37 fixedly mounted on a shaft 38 revoluble in appropriate bearings in the frame side-walls and equipped at one protruding end with a spring-retracted handle 39 having a ratchet or notched end 41 designed to co-operate with a pin 42 through the shaft when the handle is pushed in against the action of its spring 43, the handle being normally free on the shaft under ordinary conditions, but capable of use for turning the shaft by hand if, for any reason, the internal-combustion engine fails temporarily as a source of power.

If, for any cause, the electric motor cannot be employed, either temporarily or permanently, to crank the engine, such handle may be used also for that purpose, provided the clutch is in action.

Shaft 38 carries a pinion 44 always in mesh with and revolving a gear 45 (see Figs. 3 and 4) on what may be termed a drive-shaft 46 fitted with a drive-pinion 47.

The side of frame 11 adjacent to pinion 47 has a vertical slot 48 (Fig. 4) accommodating an end portion of an upper shaft 49, the opposite end of which is in a bearing 51 in the other side-wall of the frame and has sufficient clearance to allow the other end of the shaft to be raised or lowered the amount permitted by the length of the slot 48.

A united gear 52, a winding-drum 53 and a ratchet-wheel 54 are mounted to revolve as a unit on shaft 49 and to be driven by such gear from pinion 47 when these two latter elements are in mesh, and to be freed from such power rotation when the shaft is raised to release gear 52 from such pinion.

Such bodily movement of one end of shaft 49, that is to say, the right-hand end as the parts are viewed in Fig. 4, to mesh its gear with and to unmesh it from the drive-pinion, may be manually accomplished by means of a handle 55 (see Fig. 2) loosely fulcrumed on the frame side-wall by a slot and pin connection 56, and having a cylindrical cavity 57 for the reception of the extended end of the shaft, in which it is fastened by a suitable cross-pin 58.

To hold or maintain such handle 55 in either one of its two positions, that is, with the gear 52 in or out of mesh with the pinion 47, it is provided with a hand-operated, spring-pressed locking-plunger 59 designed to enter either one of two holes 61 or 62 in the frame.

When the handle is in such position that its holding or locking plunger 59 is in cavity 61, gear 52 will be in its down position in

mesh with the pinion 47, and, under these circumstances, the engine can drive the drum 53, provided the clutch 28—31 is operative, but when such handle is in its raised position, so that the locking-plunger is in hole 62, gear 52 is elevated sufficiently to free it from the drive-pinion 47.

Drum 53 co-operates with a cable 63 which passes over a sheave-wheel 64 swiveled on the top end of the boom, which arrangement facilitates handling a wrecked automobile while parallel to it without obstructing the road, the end of the cable being attached by a hook 65 to the end of the boom, a pulley and its hook 66 being mounted on the cable for attachment in any approved manner to the wrecked car.

To prevent the cable 63, when being paid out from the winding-drum, from spinning such drum sufficiently to unwrap or unwind all or an excessive length of the cable on it when the pulling action has ceased, an appropriate friction means has been supplied comprising (see Fig. 4) a coiled spring 67 encircling the shaft 49 and bearing at one end against a pin 68 extended through the shaft and into slot 69 in a hollow casting or sleeve 71 at the side of the ratchet-wheel 54, and slidable on the shaft, such spring also pressing against an inner shoulder of such sleeve.

A like structure, characterized as a whole 72, is employed at the other end of the shaft, except that it incorporates no spring.

Such spring, therefore, affords a suitable amount of friction resistance to prevent or preclude the occurrence of the objectionable spinning action referred to and without imposing any force tending to spread apart the side-walls of the frame.

To hold the load with more or less cable wound on the drum, a dog or pawl 73 (Fig. 5), rockingly mounted on a shaft 74 supported in the frame, is provided to co-operate with the teeth or notches of the ratchet-wheel 54 and to prevent the latter from turning in one direction, a short tail 75 of such pawl having one end of a coiled spring 76 connected thereto, the opposite end of the spring being joined to the terminal portion of a bent or curved link 77 hinged to an arm 78 outstanding from a shaft 79 oscillatory in convenient bearings and equipped with an operating handle 81 at one end.

By moving such handle upwardly, the pivotal connection of the curved link with the arm is thrown over the center of the shaft, thus removing the tension of the spring from the pawl and allowing the latter to drop out of the ratchet-wheel recess by its own weight when the load has been released from the drum, or when there is no longer any pressure on the dog or pawl by the ratchet-wheel due to the pull on the cable.

Of course, when the spring is strained, the pawl is maintained in co-operative relation

with the ratchet-wheel, locking the latter against turning in that one direction corresponding to the paying out of the cable.

The appliance includes also a lower winding-drum 82 and its cable or chain 83 equipped with a terminal hook 84 (see Figs. 1 and 4) for connection to the wrecked vehicle.

Such drum is rotatable on its shaft 85, the construction including also a ratchet-wheel 86, gear 87, slot 88 in the frame, lowering and raising handle 89 and its locking-plunger 90, locking-pawl 91, spring 92, curved link 93, arm 94, shaft 95 and handle 96 corresponding to the like or similar elements directly or indirectly associated with the upper winding-drum.

Obviously, by shifting handle 90 from co-operation with its lower locking cavity 97 (Fig. 3) to its corresponding upper cavity, gear 87 may be moved up into mesh with the drive-pinion 47, and, reversely, when handle 89 is rocked down, the gear is unmeshed from the pinion.

Handle 96, of course, controls the operation of the corresponding holding pawl 91 to release the drum to permit unwinding of its cable when occasion requires.

In order to control and regulate the lowering of the load, whether the latter is imposed on either cable alone or the two cables conjointly, a suitable and appropriate brake-mechanism is made a part of the appliance.

This includes a properly-lined, curved brake-shoe 98 loosely hinged on the frame at 99 and adapted to bear on the outer, cylindrical surface of the clutch-element 31, such shoe being normally retracted by a coiled, contractile spring 101 fastened thereto and to any stationary part of the structure.

To force such shoe into braking action, the device includes an appropriately-journalled shaft 102 fitted at one end with a convenient operating handle 103, and equipped also with a bar portion 104 designed to bear at two, spaced points on the shoe (see Fig. 5) and push it away into frictional engagement with the companion clutch-member, when the shaft is turned by its handle.

Thus, this braking device may be used with either of the winding-drums individually, or with both together, it being understood, of course, that the clutch as such is inoperative during the use of the brake.

In such a construction of brake mechanism, the spring constantly holds the brake-shoe against the bar 104 at two points and indirectly acts on the handle 103, thus keeping out rattles and objectionable looseness of the structure.

As is indicated in Fig. 3, the clutch-controlling handle 24 has a downward extension 105 terminating in an eye or loop 106, to which, if desired, a rope may be attached and played out to the wreck.

When the operator, who may be at or near the wreck, at some distance from the crane, pulls such rope, the clutch is thrown into action, and the winding-up operation of the one or the other, or both, of the cables takes place.

This enables the operator to watch the movement of the wreck from a suitable point and without loss of control of the clutch, and without requiring the presence of an assistant.

From the foregoing, it will be apparent that the novel crane is simple in structure and easy to operate, much like driving an automobile.

After the engine is cranked by the motor, by pressing the self-starter button, the upper or lower drum, as desired, is thrown into engagement with the drive-shaft, by means of the one or the other gear-shift lever, and the cone clutch is engaged by holding down the clutch lever handle until the load is raised to the desired height, where it is held stationary by the ratchet dog or dogs, as previously mentioned.

The clutch is automatically disengaged as soon as the lever-handle is released, this, of course, representing an important safety feature, as the use of the clutch makes it possible to raise the load as slowly or as quickly as desired and to exactly the required height.

After disengaging the holding dog, the lowering of the load is controlled by means of the brake, as has been indicated.

It may be noted that the gear shift, clutch and brake levers, and starter button are all operated from the same side of the crane and can be conveniently reached by the operator while standing on the ground, thus giving him a clear view of the work to be accomplished and as it proceeds.

The power operation of the crane not only saves time and labor on ordinary work, but enables one mechanic to deal with extremely difficult jobs which otherwise could not be handled at all or which would require the presence of several mechanics or workmen.

The possibility of taking the pull from either winding-drum singly or both at the same time greatly facilitates handling difficult wrecks.

When the disabled car is at some distance from the road or overturned in a ditch, and a long, straight pull is necessary to right it, such result can be accomplished through the operation of the lower drum, using it as a winch.

Both drums can be used, either individually or at the same time, to suit the convenience of the operator, in order to get the car on to the road to best advantage, and the upper drum is used to raise the car for towing purposes after it has been brought to proper position with respect to the service car on which the crane is mounted.

As has been indicated, it is sometimes desirable that both winding-drums be operated conjointly during a part of the wrecking operation, and it is at the same time desirable that each one be capable of separate operation during some other portion of the same wrecking work; consequently, it is necessary or desirable that simple and convenient means be provided for throwing the winding-drums into and out of contact with the driving-pinion, and in the mechanism illustrated and described this has been accomplished in a commercially feasible manner.

The method described above of lifting the winding-drum gear into and out of mesh with its driving-pinion overcomes certain mechanical difficulties ordinarily present in a device of this general kind; that is to say, difficulty is ordinarily encountered in lifting a gear out of mesh with its pinion when a load is pulling against the drum through the companion cable, thus tending to rotate it, but in the present instance the drum is held against rotation by the ratchet-wheel and its co-operating locking-pawl, both of which are located near the hinged mounting of the shaft, so that the relative movement, when the gear is pulled out of mesh with its pinion, between the ratchet-wheel and its pawl is comparatively small, resulting in little or no tendency to rotate the drum during the unmeshing action.

Furthermore, the pull on the cable is at substantially right-angles to the longitudinal dimension of the slot 48 or 88, as the case may be, and the strain of such pull is borne by the wall of the corresponding slot of the frame side rather than by the means, including the handle 55 or 89, by which the shaft is raised or lowered to shift its gear out of or into mesh with the driving pinion.

We claim:

1. In a wreck-crane, the combination of a slotted frame, a revoluble winding-drum, a cable adapted to be wound upon and unwound from said drum, a shaft on which said drum is mounted rockingly supported on said frame near one end of the shaft and occupying said slot near its other end, releasable means to hold said drum from turning to pay out the cable, a gear on said shaft near that one of its ends capable of the greater rocking movement, a drive-pinion with which said gear is adapted to mesh and unmesh by the rocking movement of said shaft, means to revolve said drive-pinion, a slotted handle fastened to said shaft, a fulcrum lug rigid with said frame occupying said handle slot, and means to lock said handle in either of two positions corresponding to the meshed and unmeshed relation of said gear and pinion.

2. In a wreck-crane, the combination of a slotted frame, a revoluble winding-drum, a cable adapted to be wound upon and to be

unwound therefrom in a direction substantially at right-angles to the lengthwise dimension of the slot of such frame, a shaft on which said drum is mounted rockingly supported on said frame near one end of the shaft and occupying said slot near its other end, means to hold such drum from turning to pay out the cable, a gear on said shaft near that one of its ends capable of the greater rocking movement, a drive-pinion with which said gear is adapted to mesh and unmesh by the rocking movements of said shaft in said slot, means to revolve said drive-pinion, and means to rock said shaft in said slot, the wall of said slot relieving said shaft-rocking means of strain due to pull on the cable.

3. In a wreck-crane, the combination of a frame, a revoluble winding-drum on said frame, a cable associated with said winding-drum, a ratchet-wheel connected to said winding-drum, a holding-pawl co-operating with said ratchet-wheel, a spring tending to hold said pawl to its work, and means to vary the tension of said spring only to render said pawl active and inactive in relation to said ratchet-wheel.

4. In a wreck-crane, the combination of a frame having opposite side-walls, a shaft hinged near one of its ends to one of said frame side-walls, the opposite end of said shaft having substantial movement in the other side-wall, means to raise and lower the unhinged end of said shaft, a winding-drum revoluble on said shaft, a cable associated with said winding-drum, a pin projecting from said shaft, a sleeve slidable on said shaft and having a slot co-operating with said pin to prevent the sleeve from rotating on said shaft, a spring in said sleeve bearing against said pin and pressing the sleeve lengthwise the shaft to impose friction on one end of said winding-drum, an abutment on said shaft with which the opposite end of said winding-drum co-operates, whereby the friction applied to said winding-drum by said spring prevents spinning of the drum and undue paying out of the cable without putting strain on said frame side-walls, a ratchet-wheel connected to said winding-drum near the hinged end of said shaft, a holding-pawl adapted to co-operate with said ratchet-wheel to prevent said drum from turning to unwind the cable, a gear on said shaft to rotate said winding-drum, a drive-pinion with which said gear is adapted to mesh and unmesh by the swinging movements of said shaft, and means to revolve said drive-pinion.

In witness whereof we have hereunto set our hands.

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