May 31, 1932. A. C. GILBERT ET AL 1,860,835

HOISTING APPARATUS

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Fig.1.

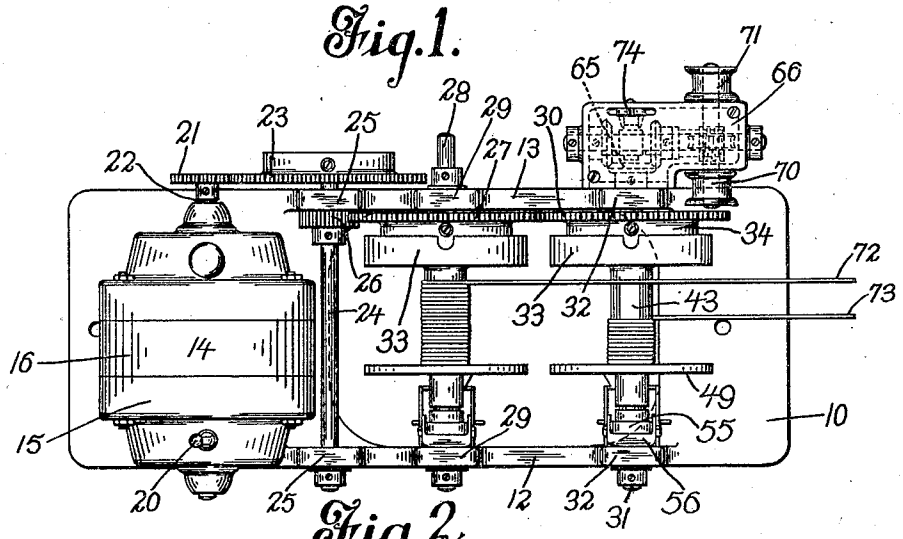


Fig.2.

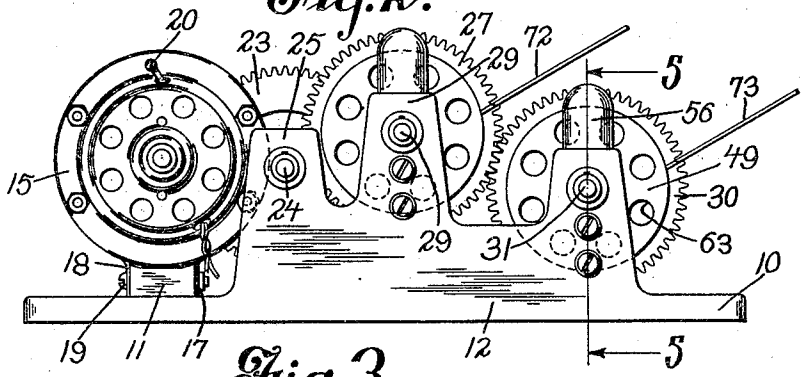
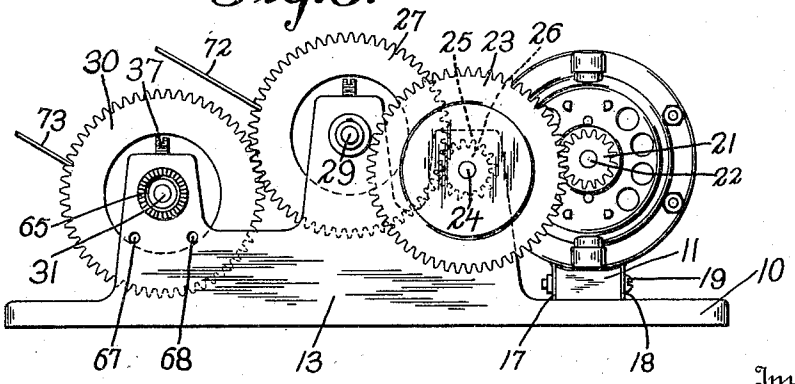


Fig.3.



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Fig. 4.

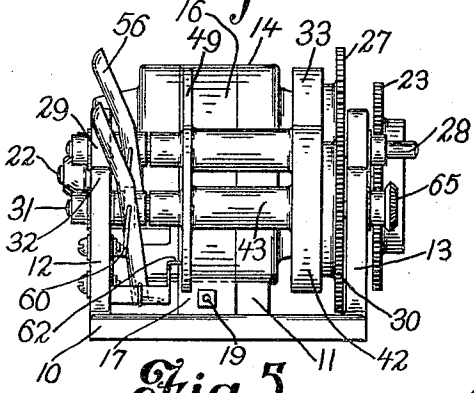


Fig. 7.

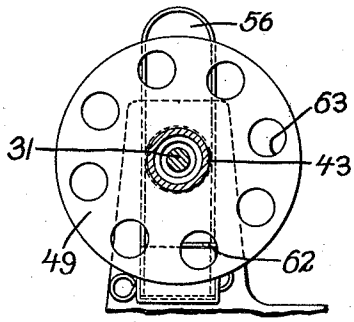


Fig. 5.

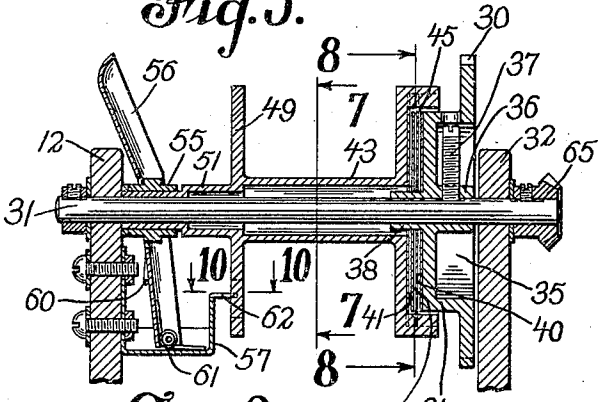


Fig. 8.

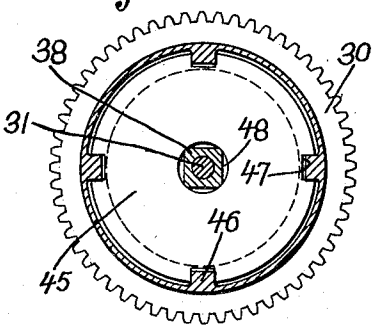


Fig. 6.

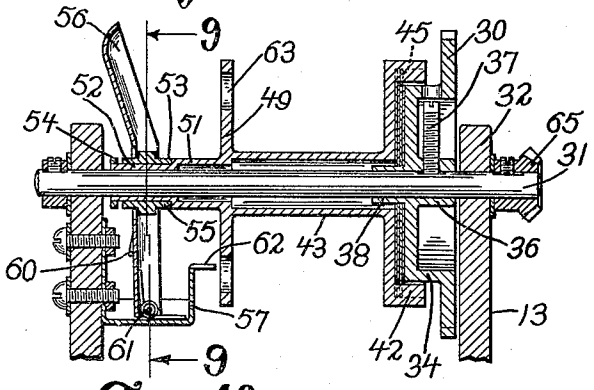


Fig. 9.

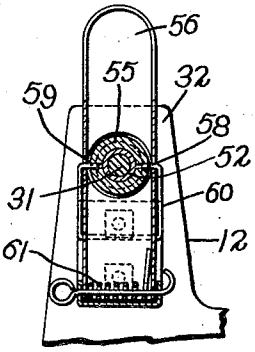
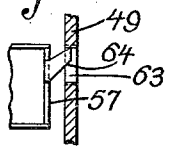


Fig. 10.



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Patented May 31, 1932 1,860,835

UNITED STATES PATENT OFFICE

ALFRED C. GILBERT, OF HAMDEN, AND EDWARD N. ANKETELL, OF NEW HAVEN, CONNECTICUT, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE A. C. GILBERT COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF MARYLAND

HOISTING APPARATUS

Application filed April 5, 1928. Serial No. 267,683.

This invention relates to mechanical toys, and more especially to a toy simulating a hoisting unit adapted to raise, lower and operate other toy devices such as toy grab buckets. The novel toy hoisting unit of this invention is also useful for use in combination with other toy elements in the construction of revolving, swinging, traveling and universal cranes, dredges, derricks and other toy models wherein a hoisting mechanism is required.

One object of this invention is to provide an improved power driven hoisting or like mechanism, which will be economical to manufacture and efficient in use.

Another object of this invention is to provide in such a mechanism a plurality of rope receiving drums with improved driving and controlling means therefor.

Another object of this invention is to provide improved means to individually clutch each drum to a driving mechanism.

A further object of this invention is to provide improved clutch operating means in a device of this character.

A still further object of this invention is to provide improved means for retaining either of a plurality of drums against rotation, and which is automatically inoperative when the clutch operating means is operated to cause a rotation of the drum.

A still further object of this invention is to provide a mechanism of the above type, which will be suitable for use in toy structures to operate various mechanical devices thereof by its combination with an electrical motor and suitable connecting means therebetween.

Still another object of this invention is to provide a suitable base or supporting member, for a mechanism of this type, and including provision for mounting an electrical motor and other associated mechanisms thereon.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a plan view of a device embodying the features of our invention;

Fig. 2 is a side view of the same;

Fig. 3 is another side view of the same;

Fig. 4 is an end view of the same;

Fig. 5 is a section on lines 5—5 of Fig. 2;

Fig. 6 is a section similar to Fig. 5, showing the parts in clutched position;

Fig. 7 is a section on line 7—7 of Fig. 5;

Fig. 8 is a section on line 8—8 of Fig. 5;

Fig. 9 is a section on line 9—9 of Fig. 6, and

Fig. 10 is a section on line 10—10 of Fig. 5.

In the embodiment illustrated in the drawings, a base 10, preferably cast in one piece, is provided. The motor supporting member 11 is formed upon the base 10 adjacent one end thereof. Along each side of the base 10 are formed vertically directed side members 12 and 13, in which are journaled the shafts of the hoisting mechanism supported thereby.

An electrical motor 14, having an outer sheet metal casing 15, formed in this instance of three parts, is mounted upon the member 11. The intermediate casing part 16 is provided with depending lugs 17 and 18, which are adapted to straddle the member 11 and be clamped thereto by means of a bolt or bolts 19. The part 16 is formed of one strip of sheet metal, which embraces the motor and has its ends bent downwardly to form the lugs 17 and 18, whereby when the same are clamped to the member 11, the motor will also be securely clamped to the member 11 and within the embracing strip 16.

It will, of course, be understood that the motor 14 is provided with the usual rotatable armature and stationary field magnets and other parts, suitable for its operation. A controlling switch of suitable design, a portion 20 of which protrudes through the casing 15 at one end of the motor in an accessible position, is also provided.

A pinion 21 is secured to the armature shaft 22 and meshes with a gear 23, secured to a shaft 24, journaled in a bearing member 25, formed on each of the side members 12 and 13. A pinion 26 is secured to shaft 24, between the members 12 and 13, adjacent member 13.

Pinion 26 meshes with a gear portion 27 of a combined clutch and gear structure, se-

cured upon a shaft 28, journaled in a bearing member 29, formed on each of the side members 12 and 13. The gear portion 27 meshes with a similar gear portion 30 of another combined clutch and gear structure secured upon a shaft 31 journaled in a bearing member 32, formed on each of the side members 12 and 13.

A combined drum and clutch structure 33, adapted to receive a rope, cable or the like is rotatably mounted upon each of the shafts 28 and 31. Suitable mechanism is provided whereby each drum may be operably connected or clutched to the clutch and gear structure 27 or 30 adjacent thereto.

Inasmuch as the drum and clutch structures 33, and the mechanisms associated therewith by the manipulation whereof they are operated, are the same in each instance, only one will be described in detail, reference being made to Figs. 5 and 6 which show the drum structure 33 and mechanisms controlling the same for its operation by the gear portion 30.

The combined clutch and gear structure is provided with a cylindrical clutch portion 34, which extends axially and outwardly from a face of the gear portion 30. A recess 35 is formed in the other face of the gear portion 30, in which is disposed a hub member 36, which extends axially from one face of the clutch portion 34. A set screw 37, threaded through the hub member 36, is adapted to engage the shaft 31 to secure the member thereto. A shaft engaging portion 38, which in this instance is rectangular in cross section, extends from the opposite or operative face 40 of the clutch portion 34, and forms a support for a plurality of clutch disks which are disposed between the operative face 40 of this clutch portion and the operative face 41, formed at one end of the combined drum and clutch structure 33.

The end face 41 is disposed within and forms the bottom of a cup-shaped end flange 42 of the rope receiving portion 43 of structure 33. The internal periphery of the cup-shaped end flange 42 is of sufficient diameter to clear the periphery of the cylindrical clutch portion 34. The thin sheet metal disks interposed between the faces 40 and 41 of the clutch portions 34 and 42, comprise disks 44 which, by means of the cooperation of the portion 38 in a rectangular opening formed in each disk, are connected thereto for rotation thereby, and disks 45 which axially alternate with disks 44 and are connected to the flange 42 by the cooperation of radially and inwardly directed lugs 46, formed upon the internal periphery thereof with the disks in notches 47 formed in the periphery thereof.

The disks 45 are provided with a centrally disposed opening 48 of sufficient diameter to permit them to be rotatably supported on the member 38. A movement of the flange 42 axially toward the combined clutch and gear structure 30 and 34, will cause the faces of the disks 44 and 45 to engage with each other and with the clutch faces 40 and 41, and be clamped therebetween. When this action occurs, the combined drum and clutch member 33 will be drivingly connected to the clutch and gear structure for rotation thereby.

The drum structure 33 is also provided with an end flange 49, disposed at an end of the rope receiving portion 43, the end flange or clutch portion 42 being disposed at the other end thereof. A sleeve portion 51 extends axially and outwardly from the flange 49, toward the side member 12 in this instance, and is provided with a portion 52 adjacent its outer end, which is reduced in diameter to form opposing shoulders 53 and 54. The sleeve portion 51 is rotatably and axially slidably mounted upon the shaft 31. An operating sleeve 55 is rotatably and axially slidably mounted upon the portion 52, being disposed thereon between the shoulders 53 and 54. A clutch operating lever 56 is pivoted at one end thereof for swinging movement axially with respect to the shaft 31, to a supporting member 57, which is secured to the side member 12 and projects inwardly and axially with respect to the shaft therefrom. The lever 56 is provided with an opening to permit the operating sleeve 55 to pass therethrough without being engaged thereby to cause binding.

The lever 56 intermediate its ends is pivotally secured to the operating sleeve 55 by means of pins 58 and 59, which enter opposed openings formed in the periphery of the sleeve. The outer ends of pins 58 and 59 are connected together by a bail 60, formed of resilient material and which is adapted by spring tension to retain the pins in the openings and due to its form permitting the same to be radially removed therefrom.

A coiled spring 61, one end of which engages the member 57 and the other the lever 56, tends to urge the lever swingingly away from the flange 49 and toward the side member 12. This action causes the combined drum and clutch structure 33 to normally remain in clutch disengaged position.

A finger 62 is provided upon the supporting member 57, and projects therefrom toward the flange 49, and is adapted to engage the same within any one of a series of openings 63, provided therein, when the combined drum and clutch structure 33 is in its unclutched position. Such engagement prevents rotation of the drum structure. The finger 62 is provided with a cam surface 64 on one of its edges, so that the drum structure 33 may be rotated manually in one direction when such action is desired.

By manipulation of the lever 56 while shifting the drum structure to operate the

clutch mechanism, the finger 62 is released from engagement within the opening 63, whereby manual rotation thereof is permitted before the clutch mechanism is placed in operation. When disposed in such position, the rope or cable wound upon the portion 43 of the drum structure will be permitted to unwind when such action is desired. In this instance, the fingers 62 are arranged relatively to the flanges 49 so that the drum 33 mounted upon shaft 28 will be permitted to rotate in a direction opposite to the direction of the drum, which is mounted on shaft 31.

Shaft 31 is extended beyond the side member 13 and has a bevel gear 65 secured thereto, which is adapted to mesh with suitable bevel gears in a gear box 66, secured upon the side member 13, by means of screws which thread into openings 67 and 68, provided therefor in this side member. Pulleys or small drums 70 and 71 are driven by means of the gearing in the gear box 66 for the purpose of turning the boom support of a crane or like device.

When the above described mechanism is in use, ropes or cables 72 and 73 may be secured to the drums 33 and wound thereon by the rotation thereof. Either cable may be wound upon its drum while the other drum remains in a stationary position or both may be wound simultaneously. By proper manipulation of the clutch lever 56, either drum may be released from the catch or finger 62 and permitted to allow the unwinding of the cable, there being clearance provided axially upon its shaft so that the clutch mechanism thereon will not immediately be operated.

A lever 74 extending upwardly from the gear box 66 is adapted to actuate suitable clutch mechanism therein, whereby the pulleys 70 and 71 may be rotated in either direction or permitted to remain at rest.

While we have shown and described a preferred embodiment of our invention, it is understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What we claim is:

1. In a hoisting mechanism, a base, a shaft rotatably mounted on said base, a combined gear and clutch part secured to said shaft, driving means for said gear to rotate said shaft, a combined rope receiving drum and clutch part rotatably and axially slidably mounted on said shaft, the drum portion of said part having a flange at one end thereof and a shaft embracing sleeve extending from said flange, said sleeve being provided with a pair of opposing shoulders upon the periphery thereof, and an operating sleeve surrounding said shaft embracing sleeve between said shoulders, a lever secured to said operating sleeve and pivoted to said base, means to swing said lever to slide said combined drum and clutch part away from said gear and clutch part, and a member adapted to engage said flange to prevent rotation of said drum portion when the same is in such position.

2. In a hoisting mechanism, a rope receiving drum rotatably mounted upon a shaft for axially directed sliding movement thereon, said drum having an axially directed opening in one end thereof and a stationary finger directed axially with respect to said drum and adapted to enter the opening therein to retain said drum against rotation.

3. In a hoisting mechanism, a base, a shaft rotatably mounted on said base, a rope receiving drum rotatably mounted upon said shaft for axially directed sliding movement thereon, said drum having a flange at one end thereof, said flange having an axially directed opening therein, and a shaft embracing sleeve extending therefrom, said sleeve being provided with a pair of opposing shoulders upon the periphery thereof, an operating sleeve surrounding said shaft embracing sleeve and disposed between said shoulders, a lever secured to said operating sleeve for moving the same to slide said drum upon said shaft, and a member secured to said base and adapted to enter the opening in said flange to prevent rotation of said drum.

4. In a hoisting mechanism, a base, a shaft rotatably mounted on said base, a rope receiving drum rotatably mounted upon said shaft for axially directed sliding movement thereon, said drum having a flange at one end thereof, said flange having an axially directed opening therein, and a member secured to said base and adapted to enter the opening in said flange to prevent rotation of said drum.

5. In a hoisting mechanism, a base, a shaft rotatably mounted on said base, a combined gear and clutch part secured to said shaft, driving means for said gear to rotate said shaft, a combined rope receiving drum, a clutch part rotatably mounted on said shaft and axially movable thereon toward and away from said combined gear and clutch part, said drum portion having an opening therein, pivoted means swingable axially with respect to said shaft to move said drum and clutch part, and means directed axially of said shaft and comprising a stationary member adapted to enter the opening in said drum part to prevent rotation thereof when the same is in a position away from said combined gear and clutch part.

6. In a hoisting mechanism, a drum having an opening in an end thereof, a support on which said drum is mounted for rotary and axial movements, driving means for said drum, means comprising a stationary member adapted to enter the opening in the end of said drum for locking said drum against

rotary movement, said drum being axially movable in one direction into engagement with said driving means and in the opposite direction into engagement with said locking means, and means for controlling the position of said drum.

7. In a hoisting mechanism, a base, a shaft mounted on said base, a combined gear and clutch part on said shaft, a combined rope receiving drum and clutch part rotatably mounted on said shaft and axially movable thereon toward and away from said combined gear and clutch part, said drum part having an axially directed opening therein, means to move said drum and clutch part, and means comprising an axially directed finger adapted to engage the drum part within the opening therein to prevent rotation thereof when the same is in unclutched position.

8. In a hoisting mechanism, a base, a shaft mounted on said base, a combined gear and clutch part on said shaft, a combined rope receiving drum and clutch part rotatably mounted on said shaft and axially movable thereon toward and away from said combined gear and clutch part, said drum part having an axially directed opening therein, means to move said drum and clutch part, and means secured to said base and adapted to enter the axially directed opening in said drum part upon the axial movement thereof into unclutched position to prevent rotation thereof.

In witness whereof, we have hereunto set our hands this 28th day of March, 1928.

ALFRED C. GILBERT.
EDWARD N. ANKETELL.