Oct. 23, 1956 A. M. HOWARD ET AL 2,767,662

APPARATUS FOR PROPELLING TRUCKS

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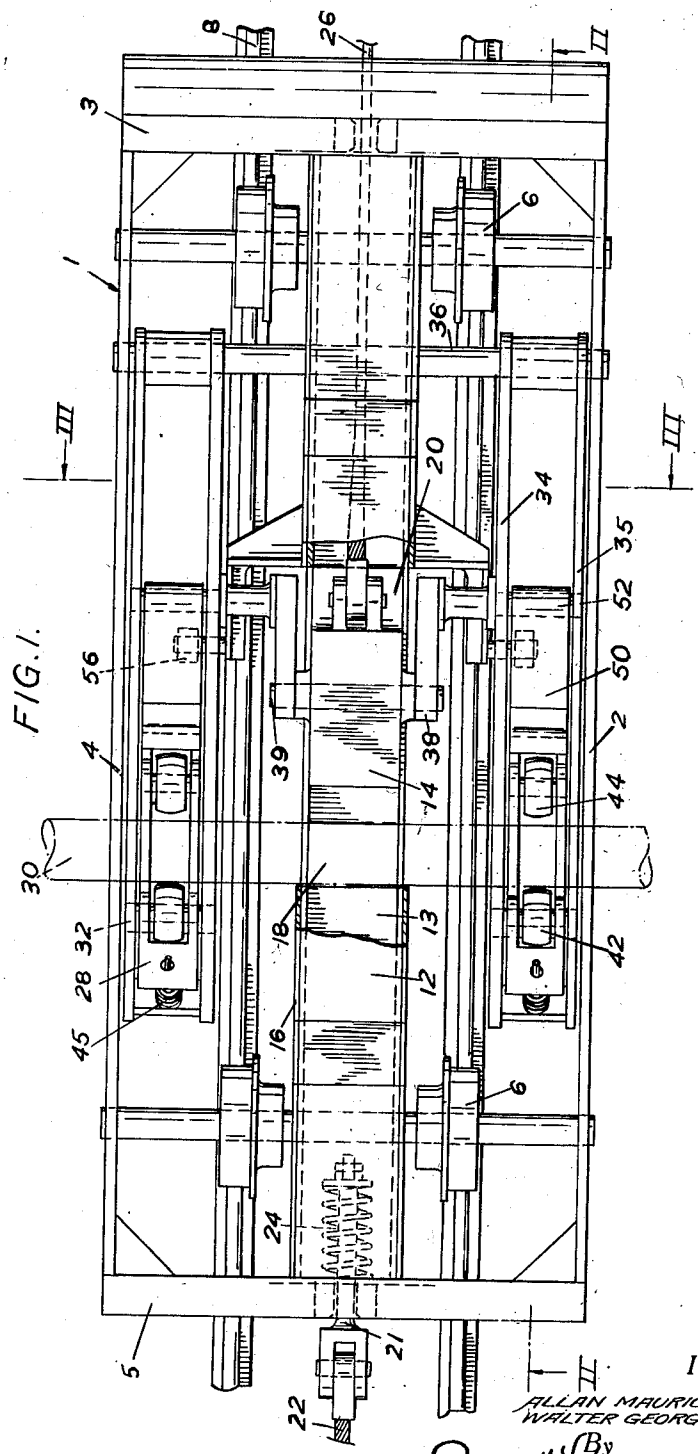


FIG. 1.

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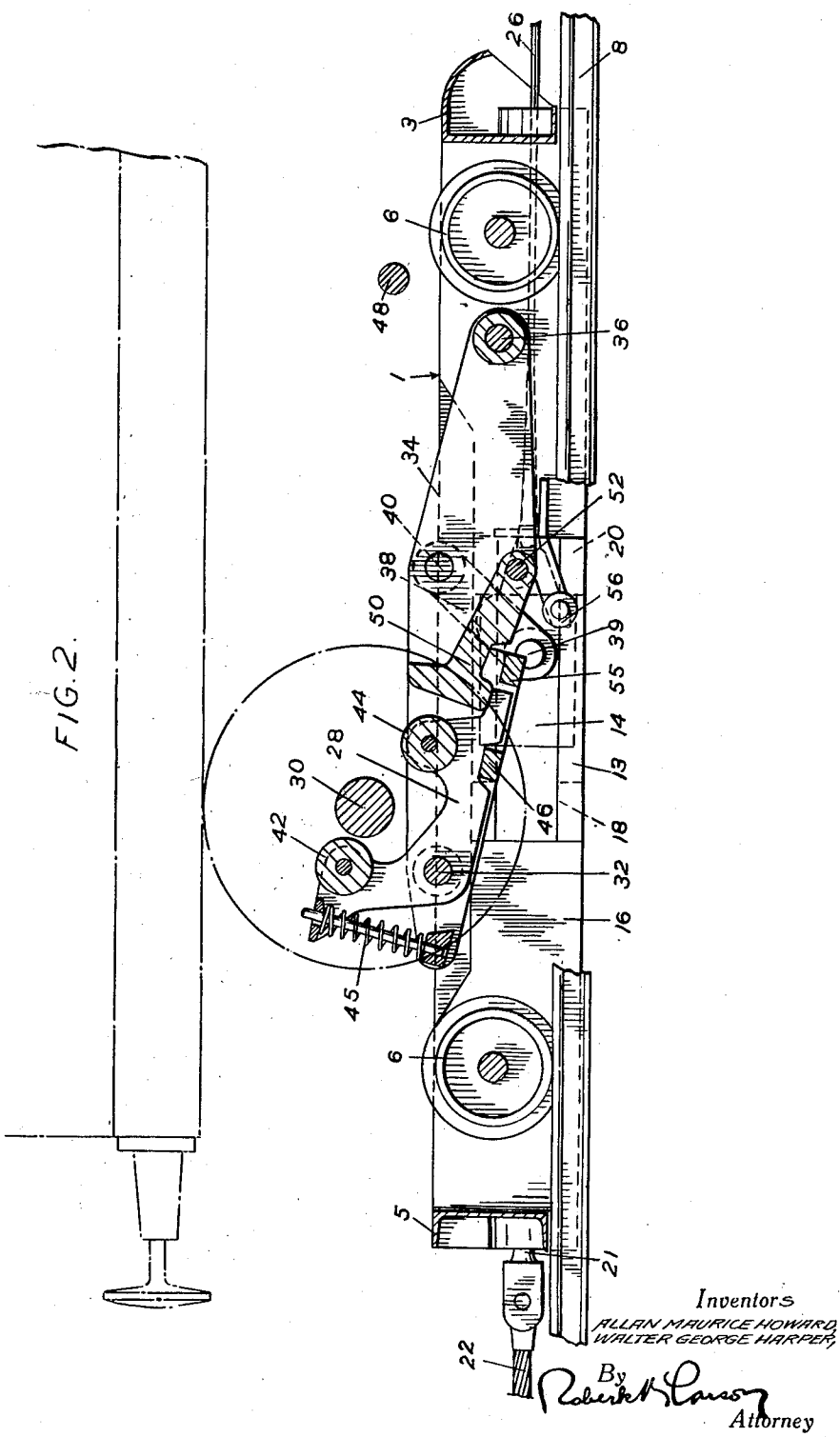


FIG. 2.

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APPARATUS FOR PROPELLING TRUCKS

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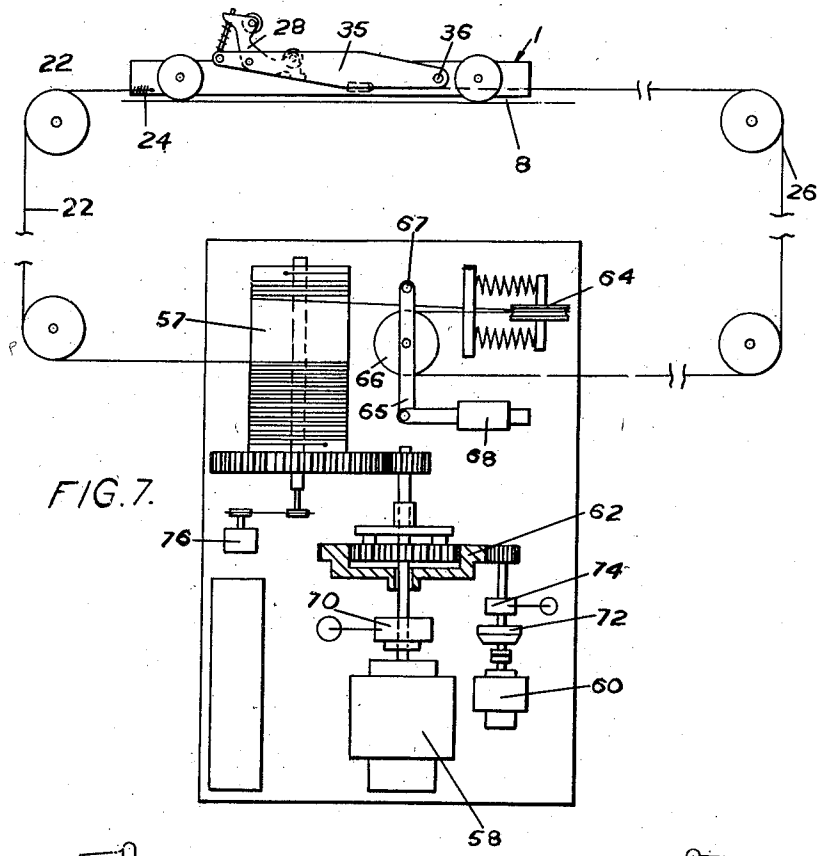
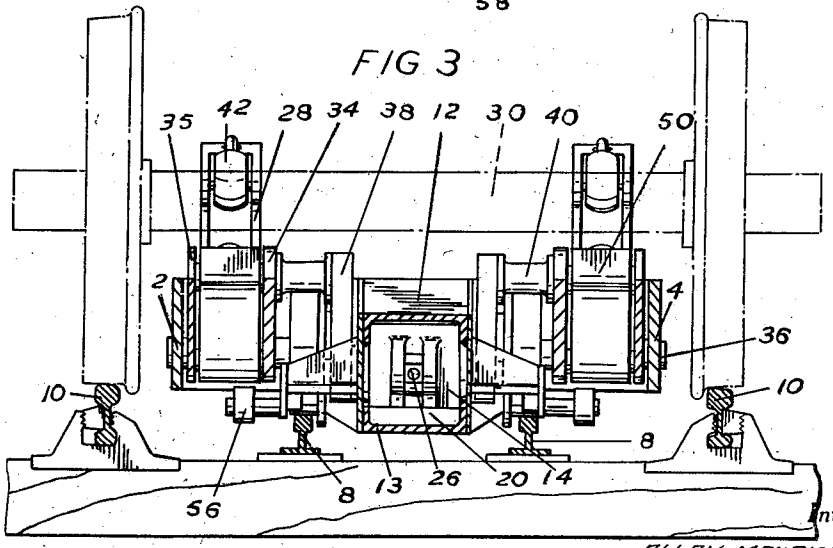


FIG. 7.

FIG 3



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FIG. 4.

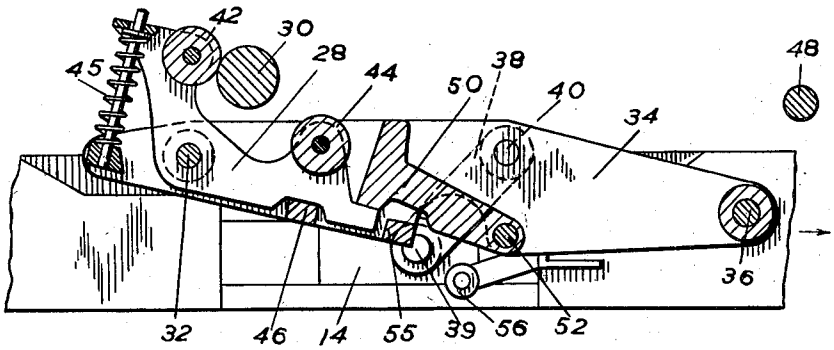


FIG. 5.

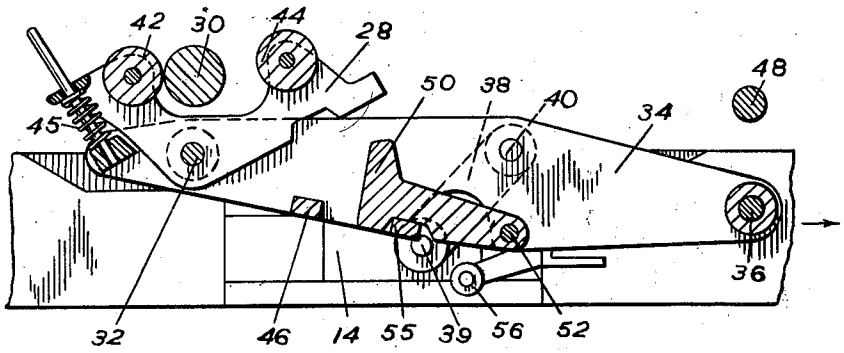
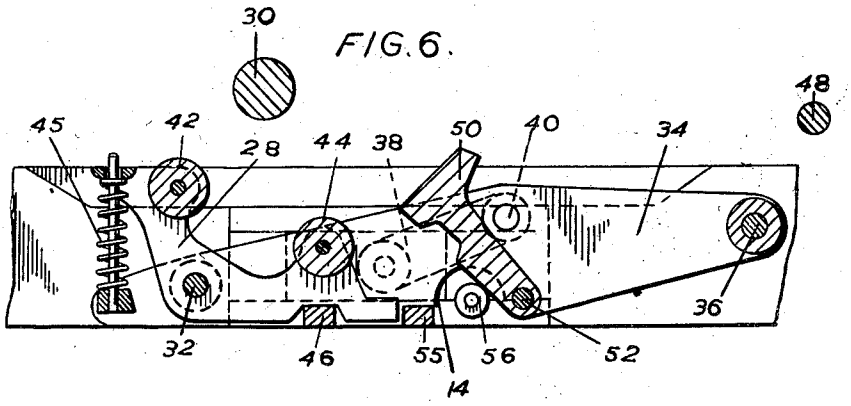


FIG. 6.



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APPARATUS FOR PROPELLING TRUCKS

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Application October 16, 1950, Serial No. 190,394

7 Claims. (Cl. 104—183)

This invention relates to apparatus including a travelling body propelled by rope traction and containing mechanism which it is desirable to control from a distance. It relates particularly but not exclusively to apparatus for hauling railroad trucks in collieries, steelworks, and quarries.

It is an object of the invention to provide apparatus including a rope-hauled travelling body and mechanism in the body operated by means acting on the rope at a fixed remote point.

It is a further object to provide apparatus for hauling trucks comprising a bogie running on a track between the wheels of the trucks and equipped with movable means for engaging the under side of a truck.

It is a further object to provide apparatus for hauling trucks comprising a bogie having a rope connected to each end and control apparatus to vary the tensions in the ropes and so both move the bogie and engage and disengage it from trucks.

The accompanying drawings show the preferred embodiment of the invention in an apparatus for hauling railroad trucks successively in one direction. In these drawings:

Figure 1 is a plan of a hauling bogie with part broken away;

Figures 2 and 3 are sections on the lines II—II and III—III in Figure 1;

Figures 4 to 6 are diagrams of some of the parts in Figure 2 in different positions; and

Figure 7 is a diagram of the rope drives for the bogie.

The apparatus shown is designed particularly for moving freight trucks along a main railroad track **10** of standard gauge, shown in Figure 3, from right to left, as seen in the remaining figures. A narrow gauge track **8** is secured to the sleepers of the main track between the rails of the main track, and a bogie **1** runs on this track **8**, being connected to two lengths of rope **22** and **26** by which it can be pulled in one direction or the other. Two identical pairs of arms **34** and **35** are mounted on pivots **36** in the bogie and each pair carries a double-jawed hook **28**. When a truck is to be moved the arms **34** are rocked to raise the hooks to the level of the leading axle of the truck. This is done by means of two links **38** respectively connected to the two arms, each being pivoted at **40** to the arm with which it is associated and at **39** to a cross-head **14** which can slide longitudinally in the bogie, the links being rocked and in turn rocking the arms when the cross-head moves. Whereas the rope **22**, which is the main hauling rope, is connected to the bogie through a spring buffer **24** so that in effect the connection is direct, the rope **26**, which is the trailing rope, is connected to the cross-head **14** and therefore only indirectly connected to the frame of the bogie. The cross-head is, it will be seen, a part of the mechanism for lifting the hooks and to operate this mechanism the tension in the rope **26** must be increased. This is done by rocking a pivoted frame **65** about its pivot **67** by means of an electric thrustor **68** at a remote control point, the

frame carrying a pulley **66** around which the rope **26** passes.

Turning now to the details of construction, the frame of the bogie is rectangular, being made of longitudinal members **2** and **4** and end members **3** and **5** and it runs on flanged wheels **6** on the track **8**. The rod **21** of the spring buffer **24** to which the rope **22** is coupled passes through the end member **5** and the rope **26** passes through a flared opening in the end member **3**. Two channel members **12** and **13** run the length of the bogie with their flanges extending towards one another vertically and form a cage-like guide for the cross-head **14**. Towards the ends of the bogie these channel members are joined together by plates **16** and within the lower channel member **13** there are two stops **18** and **20** which limit movement of the cross-head **14**. Each hook **28** is pivotally mounted on the respective arms **34** and **35** by a pin **32**. Each hook **28** has two jaws formed by rollers **42** and **44** and is normally rocked by a spring **45** into a position in which the roller **42** is considerably higher than the roller **44**, being held in this position by a stop **46** extending between the arms **34** and **35**.

In Figure 2 parts of a truck running on the track **10** are indicated in chain lines. The position of the mechanism when the bogie is not engaged with the truck is shown in Figure 6. In this position the hooks are lowered sufficiently to clear a brake rod **48**, which is the lowest transverse member of the truck. When the truck is to be engaged, enough tension is applied to the trailing rope **26** to cause the cross-head **14** to slide from one end of its travel to the other so that the hooks take up the position shown in Figure 4. In this position the rollers **44** can pass beneath an axle **30**, but the rollers **42** are sufficiently high to engage the axle. The bogie is then pulled until the hooks engage an axle. Thereafter the bogie is pulled further to the right, and each hook **28** rocks against its spring **45** until the mechanism takes up the position shown in Figure 5. In so rocking, the hook **28** displaces a catch member **50** which can rock about a pin **52** carried by the arms **34** and **35**. As the hook rocks, this catch is tipped upwards and then falls back onto a stop **55** and serves to support the hook **28** in a position in which both rollers **42** and **44** are at the level of the axle **30**. When the mechanism is in this position, forces in either direction can be applied by the bogie to the axle. Since the hooks **28** are close to the truck wheels only a small bending moment is applied to the axle **30**. To disengage the bogie from the axle the tension in the rope **26** is reduced and the weight of the raised parts then causes the cross-head **14** to return to its left-hand extreme position so that the arms **34** and **35** are lowered, as seen in Figure 6. As this movement occurs the catch members **50** engage fixed abutments **56** which cause them to tilt so far that they release the hooks **28** and allow them to rock back onto the stops **46**. The mechanism thus resumes its initial position in which it can pass freely under the truck.

It will be apparent that the position of the mechanism within the bogie depends on the tension in the trailing rope **26** while the force which the bogie can apply to the truck depends on the difference between the tensions in the ropes **22** and **26**. These tensions are controlled by the traction mechanism shown in Figure 7. The hauling and trailing ropes **22** and **26** are wound separately on a grooved drum **57** which can be driven by either of two motors **58** and **60** through epicyclic gearing **62**. The trailing rope **26** passes around a pulley **64** which is spring-loaded to take up irregularities of winding, as well as round the pulley **66**.

In one complete cycle of operations, the bogie is moved to the right towards a truck to be hauled by applying a brake **70** to the shaft of the motor **58** and driving the

drum **57** from the motor **60** to wind in the trailing rope **26** and pay out the hauling rope **22**. As the bogie approaches the truck the thrustor **68** is operated to apply sufficient tension to the trailing rope **26** to raise the hooks **28** to the position shown in Figure 4. The bogie then continues to move until the hooks have engaged the leading axle of the truck and been rocked into the position shown in Figure 5. A fluid transmission **72** is incorporated in the drive from the motor **60** so that insufficient power can be applied to the drum **57** to move the truck to the right once the hooks are fully raised. As soon as the fluid transmission begins to slip, the bogie is ready for hauling. The motor **60** is then switched off and a brake **74** applied to its shaft while the brake **70** is released and power applied to the motor **58**. This motor, which is considerably larger than the motor **60**, winds in the hauling rope **22** and pulls the truck and any others coupled to it to the left as far as is required. The tractive force is imparted to the truck through the rollers **44** on the hooks **28**. If at any point there is an incline where a truck tends to accelerate it is restrained by a braking force applied by the trailing rope **26** through the rollers **42**. When the trucks have reached the required position the thrustor **68** is released. Thereupon, the mechanism in the bogie returns to the position shown in Figure 6 and the motor **60** can then be used to withdraw the bogie from under the truck and return it to the right for further use. The rotation of the drum **57** serves to operate limit switches **76** which prevent the bogie over-running at either end of its travel.

It will be seen from the description of this example that the invention provides a simple method of remotely controlling mechanism in a travelling body and also simple mechanism for engaging a truck and applying forces to it in both directions of motion. While this mechanism has been described in the example in connection with railroad trucks and a bogie running on rails, it may also, for example, be applied to the haulage of trailers for road vehicles which are guided by any suitable track. In such an application a skid running in a channel may be preferable to a bogie on rails.

It should be understood that the ropes extending from the ends of a travelling body may actually be separate ropes or may be parts of a single rope or of an endless rope.

We claim:

1. Apparatus for hauling trucks comprising, a traveling body, a movable member mounted within said body, two ropes extending one from each end of said body, one of said ropes being connected to said member, the other of said ropes being connected to said body, a drum at a fixed location around which both ropes are wound, pulleys leading said ropes to said drum, means for positively displacing one of said pulleys to vary the tension in said first named rope without substantially affecting the tension in the rope connected to the body whereby the movable member is actuated, and means operably connected to said movable member and actuated by said movable member for engaging said truck.

2. Apparatus as claimed in claim 1 for hauling trucks in succession in one direction wherein said drum is driven alternatively through a positive drive by a relatively strong electric motor and through a fluid coupling by a relatively weak electric motor.

3. Apparatus for hauling trucks comprising a first track for trucks, a travelling body, a second track for said body parallel to said first track and lying within the first track, first and second ropes extending from opposite ends of said body, an arm pivoted about a transverse axis in said body and carrying a double-jawed hook for engaging both sides of a truck axle when the arm is raised, and said body when said arm is lowered can pass clear beneath a truck on said first track, means limiting the travel of said arm, said arm being connected to said first rope and independent of said second rope, said second rope being connected to said body, driving means for said ropes, and tension varying means associated with said driving means independently causing variations of tension in said first rope to move said arm into and out of engagement with trucks.

4. Apparatus as claimed in claim 3 wherein said hook is pivoted to said arm, means biasing said hook into a position with one jaw higher than the other, said hook being adapted upon engagement with the underside of a truck to rock into a second position in which both jaws are level, and means for releasably retaining said hook in said second position.

5. Apparatus for hauling trucks comprising a first track for trucks, a travelling body, a second track for said body within said first track, means for propelling said body along said second track, a movable member in said body and a double-jawed hook carried by said member, means for moving said member to raise said hook into and lower it out of the path of axles of truck on said first track, means pivotally connecting said hook to said member, means for biassing said hook into a position in which its mouth is upwardly directed but one jaw is higher than the other, and being adapted to engage a truck axle by said higher jaw and become thereby rocked into a second position in which both jaws embrace the axle, and means for releasably retaining said hook in said second position.

6. Apparatus according to claim 5 in which said connecting means comprises a link and means pivoting said link to said member and said hook whereby the force required to maintain said hook in raised position is less than the force required to raise said hook from lowered position.

7. Apparatus as claimed in claim 5 including means mounted on said body for releasing said retaining means by lowering of said hook.

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