

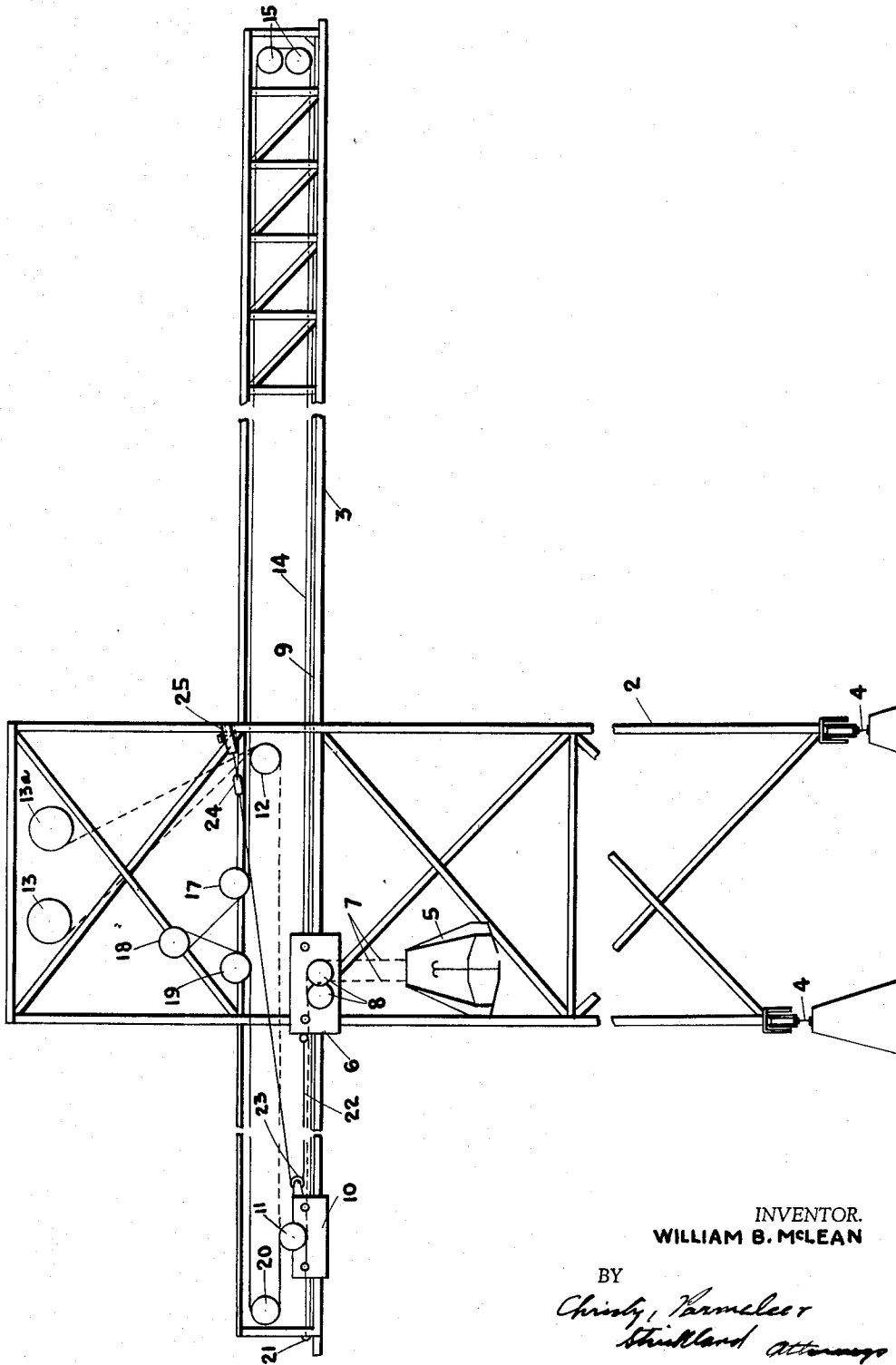
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BUCKET UNLOADER

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BUCKET UNLOADER

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This invention relates to material handling, and is for an improvement in unloaders of the clam shell bucket type. More specifically my invention is for an improvement in apparatus of this kind disclosed in a copending application of Howard E. Dykeman, Serial No. 591,310, filed June 14, 1956, now abandoned.

The aforesaid application discloses a horizontally extending boom supported near one end on a tower. A main trolley moves horizontally along a trackway on this boom, and the bucket is suspended from this trolley by cables. It is necessary that the bucket may be raised or lowered when the trolley is stationary, and that the trolley may be moved horizontally without raising or lowering the bucket. At times both motions may be simultaneously necessary. The raising and lowering of the bucket is referred to as "hoisting," while the horizontal motion is referred to as "racking."

In the aforesaid Dykeman application there is disclosed a simple system for securing the desired operation wherein there is an auxiliary trolley on the same track as the main trolley and the hoisting and racking cables are engaged in pulleys on this secondary trolley in such manner that the change in distance between the trolley and the hoisting drum, which occurs as the trolley moves in one direction or the other, results in a movement of the secondary trolley. The movement of the secondary trolley is automatically coordinated to the speed of the main trolley to keep the bucket from raising or lowering.

While the cable system shown in said application is satisfactory, there are times when slack may suddenly develop in the lines, as for example when the bucket is lowered to the ground, creating a possibility of the lines becoming fouled. An important object of the present invention is to provide a compensating cable that will assure the racking lines being taut at all times. Also, the cables in an unloader must be frequently replaced, and the present invention further provides a power reeving arrangement for replacing the racking cable.

These and other objects and advantages are secured by my invention as will be more fully apparent by reference to the accompanying drawings, in which the figure is a conventional view of a bucket unloader using a secondary trolley movable along the same track as the main trolley with a compensating line connected to the main trolley and passing over a sheave on the secondary trolley in accordance with my invention.

Referring to the figure, 2 is a supporting tower that carries a horizontally extending boom 3 that passes through the tower. The tower is here shown as having wheels for movement along track 4.

There is a clam shell bucket 5 suspended from a main trolley 6 by a double cable system of cables 7 reeved through the bucket in a well-known manner for opening and closing the bucket. These cables are shown in dotted lines. The cables are reeved over sheaves 8 in the main trolley 6. This trolley is movable along a trackway 9 in the boom. There is an auxiliary trolley 10 on the same trackway between the main trolley and the rear

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end of the boom. The bucket hold and close cables 7 pass over one of two independent sheaves located side by side at 11 on the auxiliary trolley. These cables then extend forwardly, passing around a sheave 12 located along the boom forwardly of the most forward limit of travel of the auxiliary trolley. After passing around this sheave these cables wrap around hoist drums 13 and 13a in the tower.

The main trolley is moved along the trackway 9 in the boom by a racking cable 14 attached to the front end of the main trolley, and which extends forwardly, passing around sheaves 15 at the forward end of the boom. It then extends rearwardly above the track 9, under guide sheave 17, is wrapped around racking drum 18. From this drum it passes under guide sheave 19 and then around a sheave 20 at the very rear end of the boom. From here racking cable 14 extends forwardly to the auxiliary trolley where it passes around another of the sheaves at 11 on this trolley, then extends rearwardly to an anchor 21 at the rear end of the boom.

So much of the construction here described is known in the art. When the racking cable is operated to move the main carriage, the auxiliary carriage will move just half as far and half as fast as the main trolley, this being the result of the racking cable passing forwardly and then rearwardly around the sheave at 11 according to the well-known principle of the pulley. At the same time, since the cables 7 pass rearwardly and then forwardly around sheaves at 11, they will not raise or lower the bucket when the main trolley is moved since the movement of the auxiliary trolley at half the rate and distance, resulting in the cable being taken up or paid out at the same rate as the main trolley is moving, also in accordance with the same well-known pulley principle.

According to the present invention a compensating cable 22 is attached to the main trolley and extends rearwardly opposite from the racking cable 14. It passes over a sheave 23 on the auxiliary trolley and then it extends forwardly and is anchored through a turnbuckle 24 to the tower at 25. It is adjusted so that it is always taut so that it is always acting opposite the cable 14, keeping it also taut. It provides a connection between the auxiliary carriage and the main carriage independent of the connection through the bucket cables 7. Hence if the bucket is rested on the ground or elsewhere, so that the pull of its weight is not effective to keep the cables taut, the compensating cable will still be effective to keep the racking cable under tension and exert tension between the two trolleys. It therefore avoids the difficulty of the cables whipping or becoming fouled when the bucket comes suddenly to rest, and adds practically nothing to the cost of the system or introduces no complicated mechanism.

It will be understood that I have shown schematically only the elements of the unloader with which my invention is concerned, the various accessories and controls being omitted for purposes of simplicity and clarity, and that these parts may take various forms.

I claim:

1. In a bucket unloader wherein there is a boom, a bucket-carrying main trolley movable along the boom having sheaves thereon, a clam shell type of bucket suspended from the trolley cables passing over the sheave to the bucket by means of which the bucket is suspended and which are also for raising and lowering and operating the same, an auxiliary trolley movable along the boom having sheaves thereon around which the bucket cables pass, said bucket cables extending forwardly again from the auxiliary trolley to a sheave located beyond the forward limit of travel of the secondary trolley and from the last-named sheave to operating drums, there being a racking cable attached to the main trolley extending

forwardly around a sheave at the forward end of the boom, thence rearwardly along the boom around a racking drum, the racking cable from the racking drum then extending over a sheave at the rear end of the boom, forwardly over a sheave on the auxiliary trolley and to the rear end of the boom where it is anchored, the arrangement being such that the racking cable and bucket-operating cables coact in the auxiliary carriage to cause said carriage to move in the same direction as the main carriage but at half the speed and distance, the weight of the bucket exerted over the sheaves on the auxiliary normally acting in opposition to the tension on the racking cable, the herein-defined invention comprising a compensating cable extending rearwardly from the main car-

riage around a sheave on the auxiliary carriage, then forwardly along the boom to a fixed point forward of the forward limit of travel of the auxiliary carriage and effective to prevent slack in the racking cable if the weight of the bucket is ineffective for such purpose.

2. The invention for an unloader as defined in claim 1 in which means is provided for adjusting the tension of the compensating cable.

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