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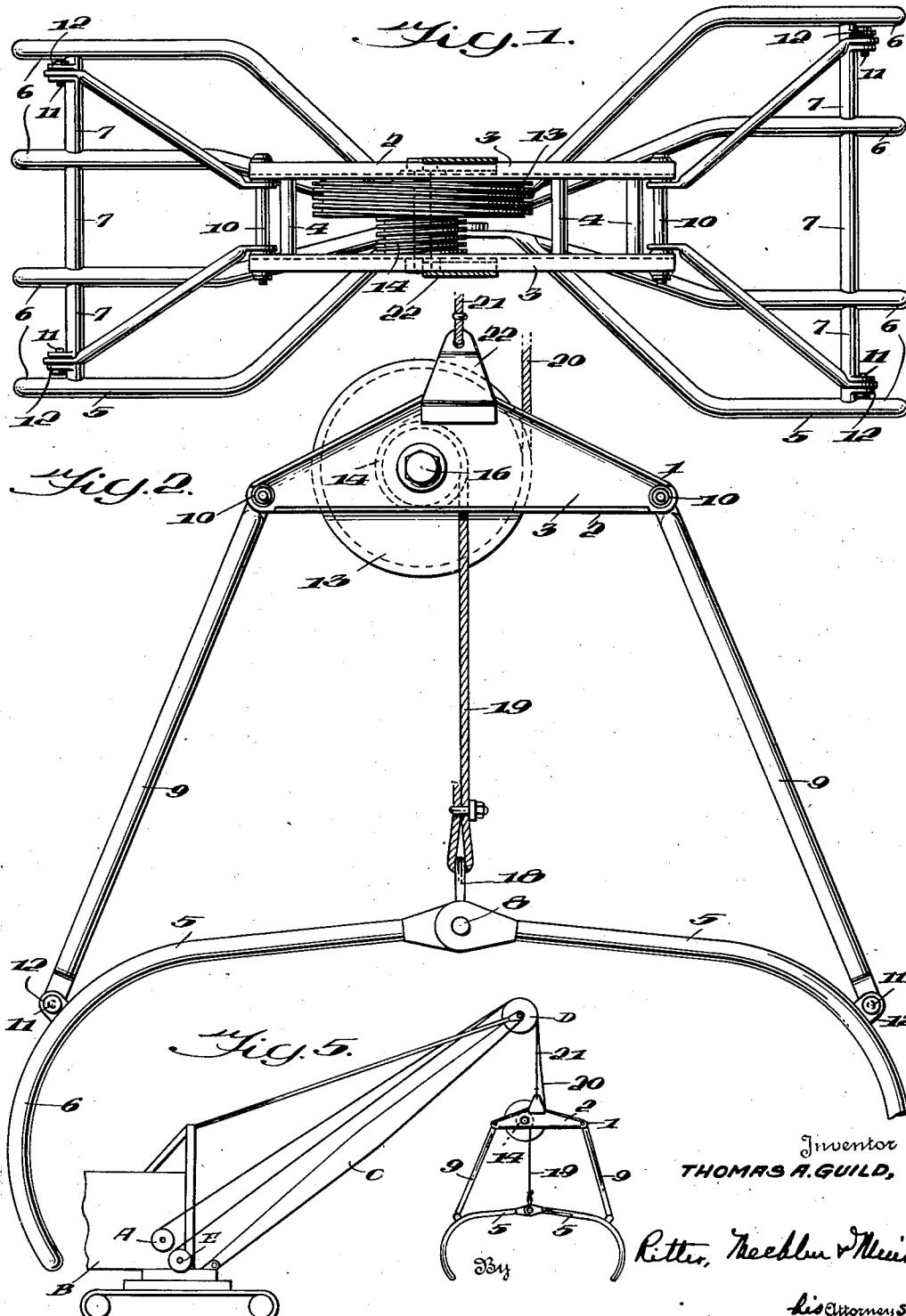
T. A. GUILD

2,259,376

CANE GRAB

Filed Sept. 23, 1940

2 Sheets-Sheet 1



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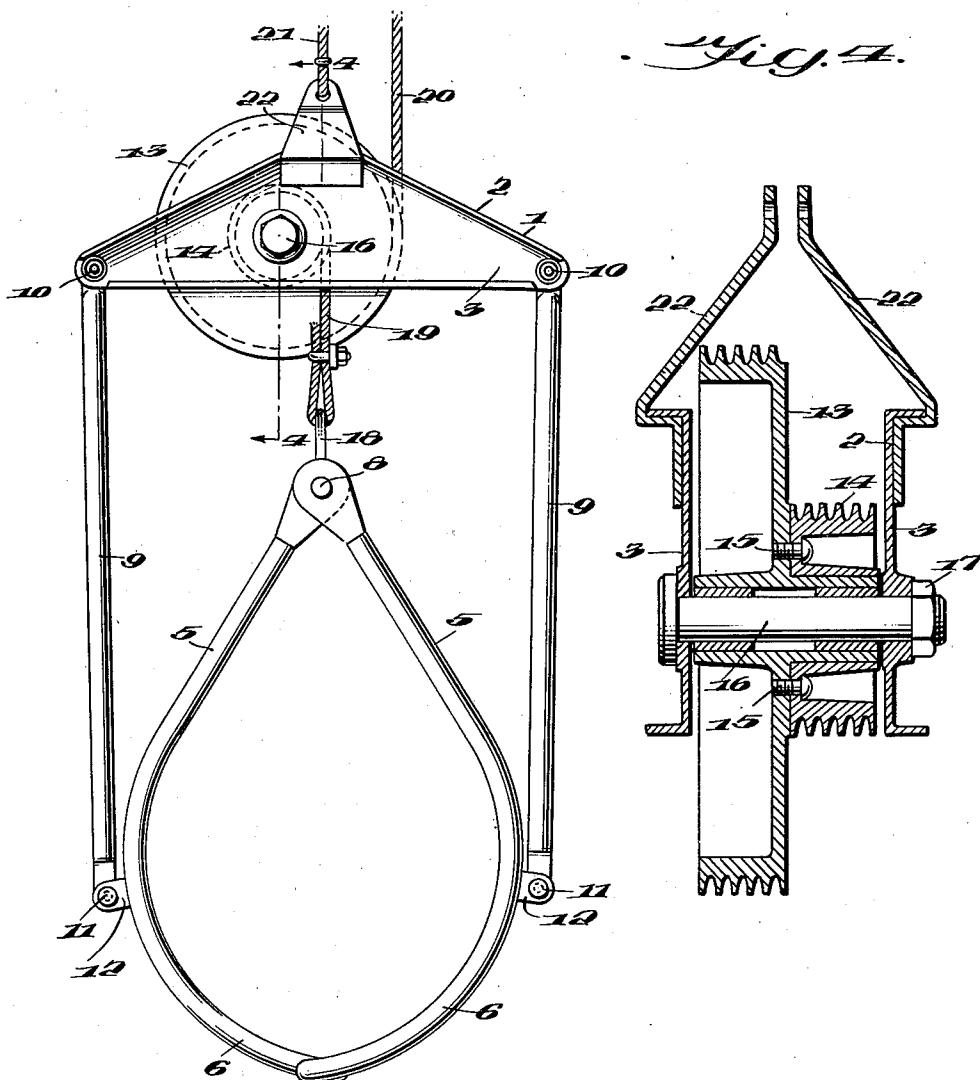
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Fig. 3.



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UNITED STATES PATENT OFFICE

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CANE GRAB

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4 Claims. (Cl. 294—112)

My invention relates to improvements in grabs or the like and more particularly to grabs employed in gathering and picking up sugar cane for loading it in transporting vehicles.

The principal object of the invention is to provide a grab wherein the grab arms are unencumbered with sheaves, drums or other devices commonly employed to obtain increased power and thus are left free to more readily and effectively perform their intended functions.

Another object of the invention is to provide a more efficiently operating grab requiring a minimum of wire rope or chain for operating it.

A further object of the invention is to provide a grab with improved operating means so that the grab arms may be opened with facility and thereby enable the load to be readily and quickly discharged at the will of the operator.

A primary feature of the invention consists in providing the grab with a lifting and supporting frame to which a pair of pivotally connected grab arms are movably attached by links or the like, a pair of operatively connected drums being rotatably mounted on the frame in spaced relation to the grab arms, one of said drums being adapted to have a wire rope wrapped around it for operating both of the drums and flexible means being connected to the other one of said drums and to the grab arms adjacent their point of pivotal connection so that, when the drums are rotated in one direction, the flexible means will be wound around the drum to which it is attached and thus cause the grab arms to close.

Another feature of the invention consists in rigidly connecting the two drums mounted on the lifting and supporting frame of the grab and in making the drum which is operatively connected to the grab arms of smaller diameter than the other drum.

A still further feature of the invention consists in providing the larger of the two drums with a rim of substantial mass so that it may function in the manner of a fly wheel and thus permit the grab arms to readily open by assisting in overcoming the inertia of the power drum around which is wrapped the wire rope leading to the larger diameter drum on the grab.

Other and more specific features of the invention, residing in advantageous forms, combinations and arrangements of parts, will hereinafter appear and be pointed out in the claims.

In the drawings, illustrating a preferred embodiment of the invention,

Figure 1 is a plan view of the grab in open position.

Figure 2 is a side elevational view of the grab in open position.

Figure 3 is a side elevational view of the grab in closed position.

Figure 4 is an enlarged sectional view of the grab taken on a line corresponding to line 4—4 of Figure 3.

Figure 5 is a diagrammatic view of the grab and an operating crane.

Referring more particularly to the drawings, 1 indicates the grab generally, having a lifting and supporting frame 2 which may be conveniently formed of two suitably shaped laterally spaced side members or plates 3 rigidly connected in any convenient manner, such as by being welded to the ends of a plurality of interposed tubes or rods 4.

Movably associated with the lifting and supporting frame are a pair of grab arms 5 which may be formed of steel tubing so as to provide a plurality of tines 6 rigidly connected by tubes or rods 7. The arms are pivotally connected to each other adjacent one end by a pivot pin 8 and intermediate their ends each is movably connected to the lifting and supporting frame 2 by a pair of links 9, the links being respectively connected to the frame by pins 10 and to the arms by pins 11 mounted in lugs or brackets 12 formed rigid with the arms.

Mounted on the lifting and supporting frame intermediate the side plates thereof are two drums 13 and 14, respectively. These drums are operatively connected so that rotation of one will induce rotation of the other, the connection between the drums in the present embodiment being a rigid one effected by screws or the like 15. As is apparent from the drawings, the two drums are of unequal diameters and it has been found advantageous for the diameter of drum 13 to be approximately two and one-half times that of drum 14. It will be understood, however, that the relative diameters of the two drums may be varied to suit operating conditions.

Being rigidly connected, the two drums are concentric with respect to each other and they are revolvably mounted on a single shaft 16 which is in the form of a bolt and is supported at opposite ends in the side members 3 of the frame 2, a nut 17 being threaded on one end of the shaft 16 so as to hold the latter rigidly in place. For a purpose which will hereinafter appear, the periphery of the large diameter drum 13 is provided with a rim of substantial mass.

Connected to the pivot pin 8 which connects the grab arms 5 is a link member 18 which affords convenient means to which one end of a wire rope or cable 19 may be suitably secured, the other end of the rope being fastened to the drum 14 so that, when the latter is rotated, the rope will be wound about its periphery to raise the connected ends of the grab arms and thus cause the arms to move to closed position.

Rotation of drum 14 is effected by a wire rope

or cable 20 which is anchored at one end to the large diameter drum 13 and at its other end is wound around an operating drum A which, when the grab is used for gathering and collecting cane, may be conveniently located on a crane B having a boom C provided with a sheave D over which the wire rope 20 may pass.

The periphery of each of drums 13 and 14 is provided with a spiral guide groove for receiving the particular cable which is intended to be wound therearound, the groove on one of the drums being arranged opposite to the groove on the other.

The grab is preferably supported by a wire rope or cable 21 which is connected at one end to brackets 22 rigidly attached to the frame 2 and passes over a sheave on the end of the crane boom C to another drum E on the crane.

It will be readily understood that by suitable operation of the crane and its boom the grab may be moved from one location to another, and by suitably operating the drum E the grab may be caused to move vertically in the desired direction.

In connecting the "closing" wire rope or cable 19 to its associated parts, it will be found convenient to connect one end thereof to drum 14 and without wrapping it around the drum make its other end fast to the grab arms 5 when the latter are disposed in open position; while in connecting the operating rope 20 to drum 13, it will be appreciated that the grab arms should be fully closed.

To place the grab with its arms in open position over a pile of sugar cane (not shown), the crane operator sets crane drum E in motion so as to wind up rope 21 and releases the brake (not shown) on crane drum A, thus leaving slack in the "operating" rope 20. To close the grab arms on the cane pile (not shown), the operator starts crane drum A in operation thus taking up the slack in line 20 and causing drum 13 to rotate in a clockwise direction as viewed in Figure 2. Drum 14 being rigid with drum 13, rotates in the same direction as the latter and thus causes the "closing" line to be wound therearound. Such movement of the closing line causes the pivotally connected ends of the grab arms to move upwardly which, in conjunction with the links 9, results in closing the arms. With its arms in this position, the grab is lifted from the ground by continued operation of crane drum A.

Unloading of the grab is accomplished by winding up the "supporting" line 21 on crane drum E sufficiently to take up the slack in that line and then applying a brake (not shown) to drum E. The operator then releases a holding brake (not shown) on crane drum A which results in relieving the tension in the "operating" line 20 and in the "closing" line 19 and in relieving the cane held by the grab from the pressure of the grab arms. The cane is thus free to fall and in doing so forces the grab arms open suddenly. This sudden forced opening of the grab arms exerts a downward pull on line 19 which accelerates drums 13 and 14. The acceleration of drum 13 builds up considerable energy in its heavy periphery which, when transmitted through "operating" line 20, serves to overcome the inertia of cane drum A and thus enables a sufficient amount of the line to be rewound on drum 25 so that the grab will be in condition for another cycle of operation.

From the foregoing, it will be perceived that a grab has been provided in which the grab arms are unencumbered with any parts of the grab operating mechanism and that the mechanism is so disposed that it cannot be fouled by the material which is to be gathered and supported by the grab.

What I claim is:

1. A cane grab comprising a lifting and supporting frame, a pair of pivotally connected grab arms, links movably connecting said arms to the frame, a pair of rotatable drums mounted on said frame with their axes of rotation fixed with respect thereto, said drums being operatively connected so that rotation of one will induce rotation of the other, means for rotating one of said drums, and flexible means attached to the other of said drums and to said arms adjacent their point of pivotal connection so that upon rotation of said last named drum said flexible means is caused to wind therearound and thus close said arms.

2. A cane grab comprising a lifting and supporting frame, a pair of pivotally connected grab arms, links movably attached to said arms intermediate their ends for movably connecting them to the frame, and means for moving said arms to closed position including a pair of operatively connected drums spaced from said arms and rotatably mounted on said frame with their axes of rotation fixed with respect to the frame, a flexible member connected to one of said drums for rotating both of said drums, and flexible means independent of said flexible member connected at one end to said arms adjacent their point of pivotal connection and connected at the other end to the other one of said drums so as to be capable of being wound therearound upon rotation of said drums by said flexible member to close said arms.

3. A cane grab comprising a lifting and supporting frame, a pair of pivotally connected grab arms, links movably connecting said arms to the frame, and means for moving said arms to closed position including two drums of unequal diameters rotatably mounted on said frame with their axes of rotation fixed with respect to the frame, said drums being adapted to be rotated by means cooperable with the drum of largest diameter, and flexible means attached to said arms adjacent their point of pivotal connection and attached to the drum of smallest diameter so as to be wound therearound upon rotation thereof and thus close said arms.

4. A cane grab comprising a lifting and supporting frame, a pair of pivotally connected grab arms, links movably connecting said arms to the frame, a pair of rigidly connected drums rotatably mounted on said frame with their axes of rotation fixed with respect thereto, said drums being of unequal diameters and having spirally grooved peripheries, a flexible member adapted to be wound in the grooved periphery of the larger diameter drum for rotating both drums, and flexible means attached to said smaller diameter drum and to said arms adjacent their point of pivotal connection to each other whereby upon rotation of said drums in one direction said flexible means is caused to wind around the grooved periphery of the smaller diameter drum and thus close said arms.