Oct. 25, 1932. R. B. STUCKEY 1,884,356

HANDLING MACHINE

Filed Aug. 8, 1929 4 Sheets-Sheet 1

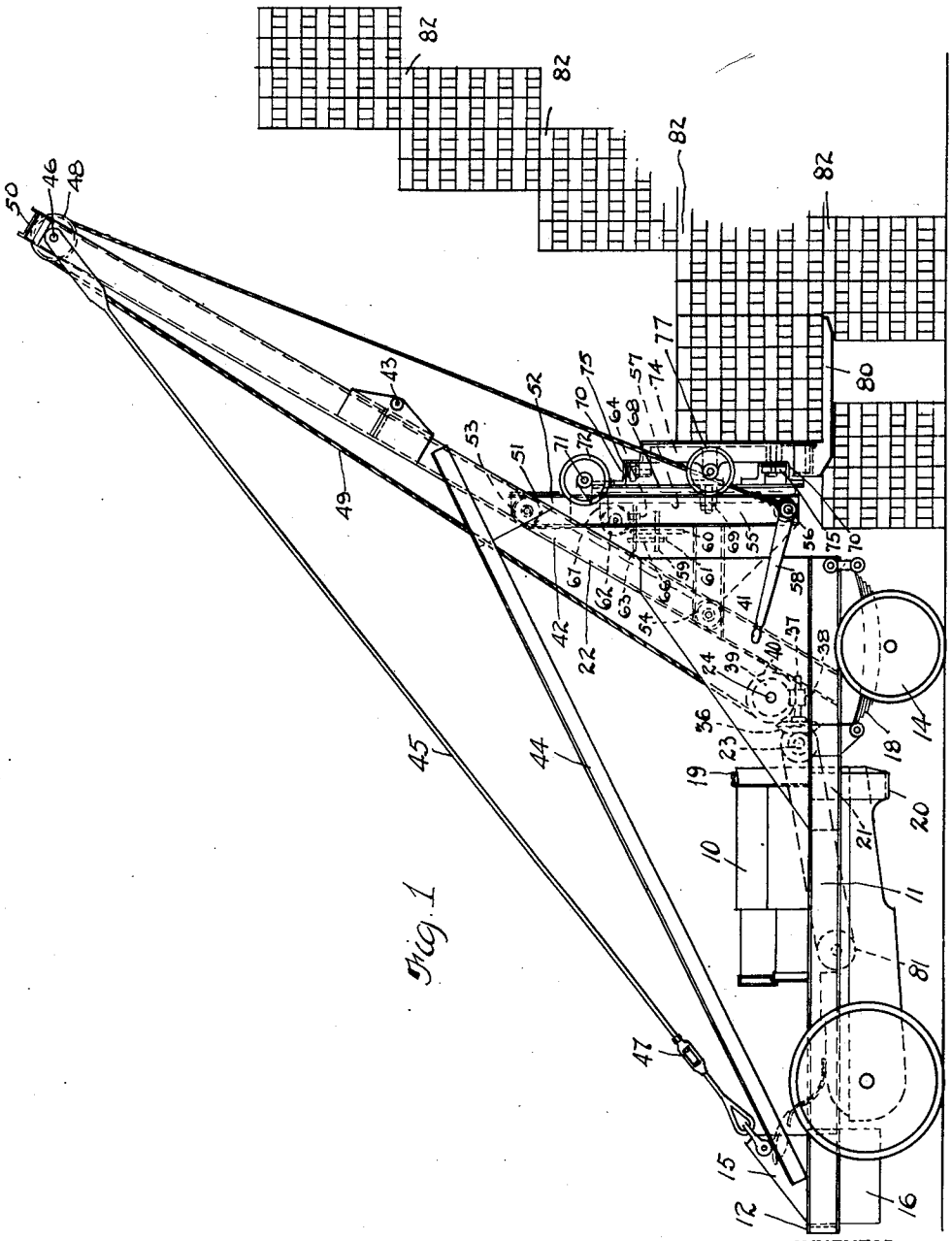


Fig. 1

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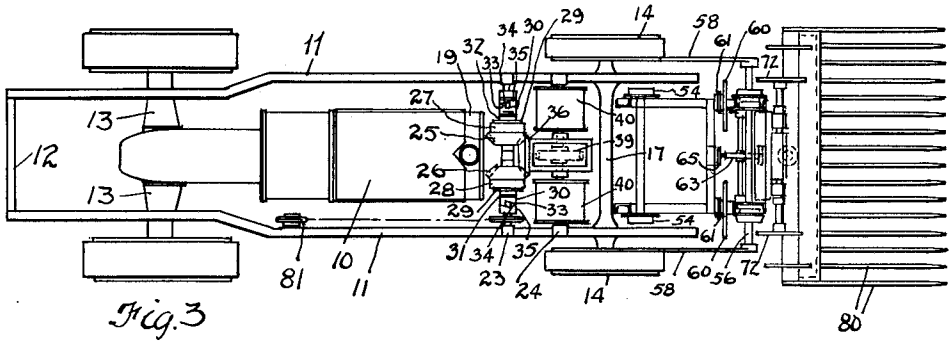


Fig. 3

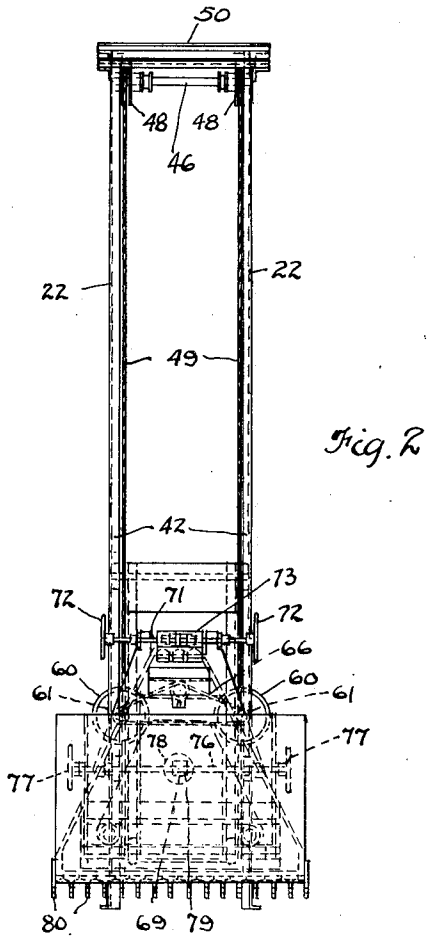


Fig. 2

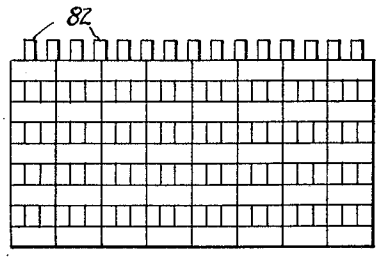


Fig. 4

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HANDLING MACHINE

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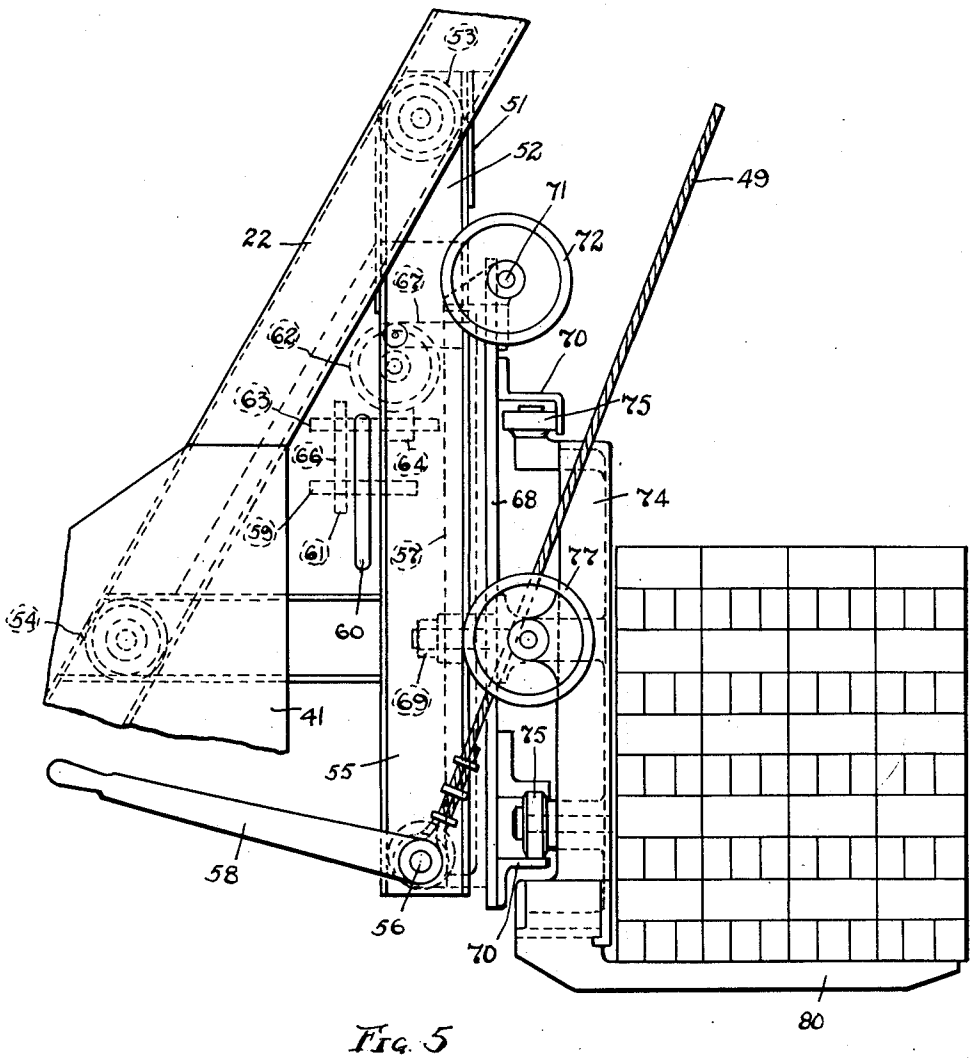


FIG. 5

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HANDLING MACHINE

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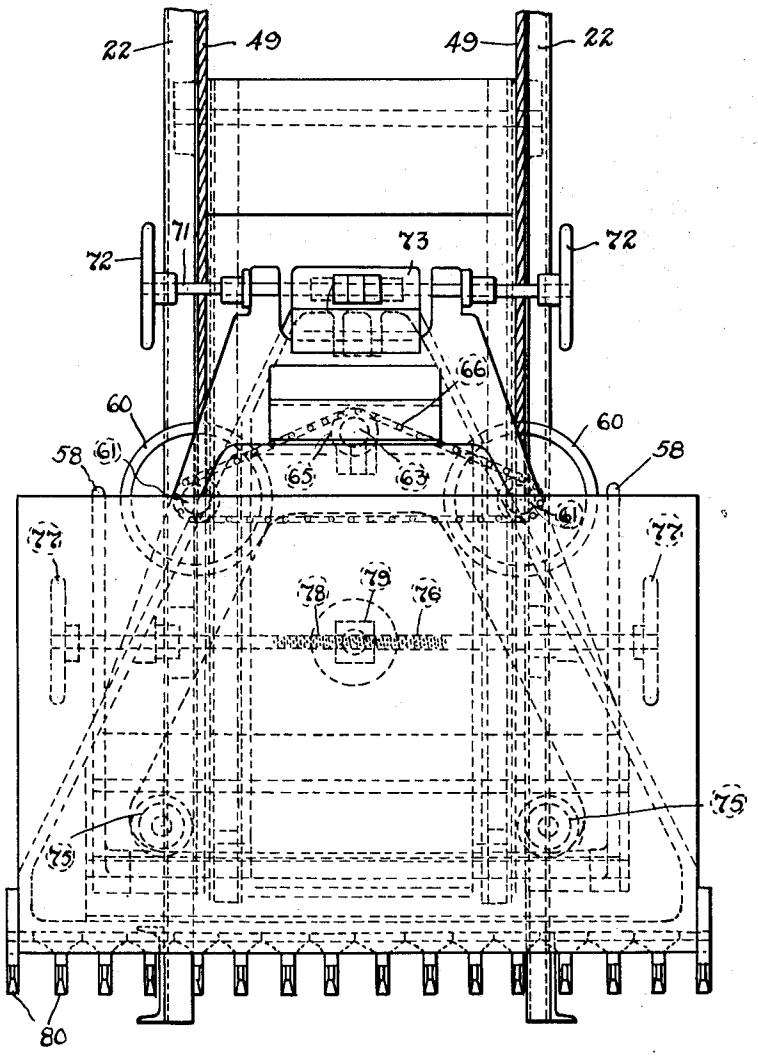


FIG. 6

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Patented Oct. 25, 1932 1,884,356

UNITED STATES PATENT OFFICE

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HANDLING MACHINE

Application filed August 8, 1929. Serial No. 384,367.

The present invention relates to handling machines, and its primary object is to provide an apparatus whereby built-up stacks of bricks can be lifted, transported and placed. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a side elevational view of a machine which embodies the present improvements, it being shown as used for handling stacks of bricks; Fig. 2 is a front elevational view of the machine shown in Fig. 1; Fig. 3 is a partly sectional plan view of the machine shown in the preceding figures; Fig. 4 is an enlarged view of one of the stacks of bricks shown in Fig. 1; and Figs. 5 and 6 are respectively fragmentary front and side elevational views of a portion of the apparatus illustrated in Fig. 1.

As illustratively shown in the drawings, my invention consists of a structure which is operatively associated with the standard tractor 10. This structure includes a framework which is made up of the longitudinally extending side members 11 and a transverse end member 12. The rearward portions of such side members are attached to the axle housings 13, and their forward portions are supported upon the wheels 14. Such rearward portions furthermore are provided with the anchor plates 15, and between their extremities is a counterweight 16. The wheels 14 are mounted upon an axle 17, and between this axle and the side frame members 11 are the springs 18. Such wheels and the axle 17 are located forwardly of their usual position below the radiator 19, and a transverse yoke 20 is provided for supporting the front end of the tractor. This yoke is formed in such a manner as to have a lower cradle part for receiving the tractor and the upwardly directed ends 21 for attaching to the frame members 11. The wheels 14 are arranged for being steered by the usual tractor steering gear (not shown).

The fore part of the frame constituted by the side members 11 forms a support for the carriage ways 22, and between the lower ends of such ways and the radiator 19 is a carriage raising and lowering mechanism which consists of the transverse shafts 23 and 24. Centrally of the shaft 23 are the bevel gears 25 and 26, and outside of these gears are the clutches 27 and 28. These clutches consist of suitable inner parts which are secured to such gears, and the outer parts 29 which are slidable along the shaft 23. The outer clutch parts 29 are secured against rotation with relation to the shaft 23, and interposed between their remote ends and the members 30 are the thrust bearings 31 and 32. The members 30 are provided with inclined faces 33, and these faces are arranged for coacting with the complementally formed faces 34. The faces 34 are formed upon the inner ends of the members 35. One of the members 30 is fixed against rotation, and the other of such members is arranged for oscillation. Similarly, one of the members 35 is fixed against rotation, and the other of such members is arranged for oscillation. These oscillating members are preferably connected to a single operating lever (not shown). When such lever is moved in one direction, the gear 25 will be clutched to the shaft 23; and when moved in the opposite direction, the gear 26 will be clutched to the shaft 23. Such clutching and declutching of the gears 25 and 26 is effected by the inclined faces 33 and 34 and by springs interposed between the inner and outer clutch parts. The pinion 36 is thus driven in one or the other direction according as one or the other of the gears 25 and 26 is clutched to the shaft 23. The pinion 36 is secured to the shaft 37, and this shaft has an extension which is provided with a worm 38. The worm 38 meshes with a worm wheel 39 which is secured to the shaft 24, and on the opposite sides of the casing which encloses this gearing are the winding drums 40.

The carriage ways 22 are arranged in ad-

vance of the reeling mechanism just described, and their lower ends are secured to the side members 11 and braced by the plates 41. Their lower sections 42 are hingedly joined to their upper sections as at 43. The braces 44 extend between the upper ends of the lower sections 42 and the anchor plates 15, and the braces 45 extend between such plates and the shaft 46. The braces or tie rods 45 may be disconnected at 47 when it is desired to lower the upper sections in order to permit the machine to pass under an obstruction. The shaft 46 carries two sheaves 48, and over these sheaves run the carriage raising and lowering cables 49. The extreme upper ends of the ways 22 are connected by a transverse brace member 50.

The carriage 51 consists of a generally triangular framework 52, and the vertical and horizontal parts of this framework at their respective upper and inner ends are provided with the wheels 53 and 54. These wheels run in the channel-like grooves presented by the ways 22. The downward extensions 55 of the vertical members of the carriage 51 support a transverse shaft 56, and this shaft carries two eccentrics which coact with bearings or straps secured to the lower end of a frame 57. On the outer ends of the shaft 56 are two levers 58 by means of which such shaft may be rocked and the frame 57 raised and lowered. On the vertical members of the carriage 51 are mounted two short shafts 59 which carry the hand wheels 60 and the sprockets 61. Between such members is a worm wheel 62 and a shaft 63. The shaft 63 carries a worm 64 which meshes with the worm wheel 62 and a sprocket 65 which, by means of the chain 66, connects with the sprockets 61. A link 67 connects the worm wheel 62 with the upper end of the frame 57. Turning of the hand wheels 60 is thus effective to move the upper end of the frame 57 towards or from the carriage 51 since the lower end of such frame is pivoted on the eccentrics which are mounted upon the transverse shaft 56.

A plate 68 is pivoted as at 69 to the frame 57, and this plate carries the tracks or ways 70. Connecting the upper end of the plate 68 with the upper end of the frame 57 is a mechanism which includes the shaft 71. This shaft is provided with the hand wheels 72. When such wheels are revolved, the plate 68 will be inclined in one or the other direction about its pivot 69, this inclination being effected by the parts enclosed within the housing 73. Forwardly of the plate or frame 68 is another frame 74, and this latter frame has the wheels 75 which coact with the tracks or ways 70 in the manner shown. Extending across the frame 74 is a shaft 76 which at its outer ends carries the hand wheels 77 and which at its central part is provided with the screw thread 78. Such thread coacts with a nut 79 which is associated with the pivot pin 69. Turning of the hand wheels 77 will therefore be effective to move the frame 74 transversely of the longitudinal axis of the machine. The frame 74 at its lower end is provided with a plurality of forwardly extending prongs or tangs 80 which constitute a handling fork. If desired, the surface defined by the upper edges of the tangs 80 may incline from the lateral sides towards the center so that the load will be prevented from toppling during its lifting, transportation and placement.

As before stated, this machine has been primarily arranged for the handling of bricks. When it is being used for setting bricks in a kiln, the operation is substantially as follows: The green bricks are stacked or set on a drying car which has a bottom provided with blocks or piers that extend transversely. These piers are fixed and constitute an integral part of the car. After a car which has been set in the manner shown in Fig. 4 has passed through the dryer and the bricks have been thereby prepared for burning, my machine is employed for lifting such stack or unit and conveying it into the kiln and setting it in a desired relation to the other units or stacks. When lifting stacked bricks off of the dryer car, the machine is moved up towards one side of such car and the fork tangs 80 are entered into the spaces between the bottom piers. If the surface upon which the machine is resting inclines laterally with respect to the car, the fork may be adjusted to a horizontal position by means of the hand wheels 60, and if such surface is inclined in the direction of the car's length the fork may be adjusted to a horizontal position by means of the hand wheels 72. If the ends of the fork tangs do not register with the spaces between the car-bottom piers, the entire fork may be shifted to one side or the other by means of the hand wheels 77.

When the fork tangs have been entered into the car spaces, the stack of bricks may be lifted by operating the power mechanism heretofore described (this mechanism being driven from the tractor pulley 81); or such stack may be first lifted clear of the car by means of the levers 58 and then elevated by the power mechanism, the latter practice being preferable because of the fact that no jarring or jolting of the stack will occur when the load is being lifted, and because of the greater control which is possible when the power is being manually applied.

After the load has been lifted and transported to the kiln, the carriage may be suitably adjusted as to height and the machine then moved into setting position. Here again, the stack may be lowered into place by the power mechanism alone, or by such power mechanism and the levers 58. The forward

inclination of the ways 22 permits of the set-back arrangement of the stacks shown in Fig. 1. The burning of the bricks in a kiln results in uneven settling, and it is during the removal of such burned bricks from the kiln that the various adjustments heretofore explained are the most useful. When the units were being set, the fork tangs were entered into the spaces between the bricks 82, as shown in Fig. 1. When such units are being removed, the same spaces are utilized for receiving such tangs. But, due to the unequal settling which occurred when the bricks were burned one or more adjustments of the fork may be necessary before such tangs assume the desired relation to the stack. Such tangs can be moved laterally and vertically with respect to the longitudinal axis of the machine by means of the hand wheels 77 and the levers 58, and they can also be inclined about the longitudinal and transverse axes of the shafts 69 and 56 by means of the hand wheels 72 and 60; the carriage raising means being operable to lift the stack after the fork tangs have been properly positioned, and such levers 58 affording a means of preliminary raising the load and "setting" it with relation to the fork.

The above-described fork may of course be adjusted whenever an adjustment is necessary to the lifting, setting or transportation of the load; in cases, as when the surface over which the machine is moving is not level, an adjustment may be necessary to keep the load in a safe position, and in other cases, as above explained, it may be necessary to make one or more adjustments before a load can be safely or properly lifted or set. It will be understood that when bricks or other like loads are being handled the particular stacking system or arrangement herein illustrated and described need not esssentially be used; and that my invention is not restricted in its usefulness to the handling of built-up units, it being also adaptable to the lifting, transportation and setting of other articles and materials, and such fork, if necessary, being replaceable by a platform, scoop or other means to enable the machine satisfactorily to handle the particular work in view.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a handling machine, an automotive vehicle, a fork associated with such vehicle, means for bodily shifting such fork from side to side, means for inclining such fork to either side, and means for raising and lowering said fork, said means including power operated means supplemented by manually operable means.

2. In a machine of the class described, a propelling means, wheels for supporting such propelling means, a way associated with such propelling means, a carriage associated with such way, a horizontally pivoted means associated with such carriage, a horizontally pivoted means associated with such last-named means, a horizontally movable means associated with such second-named horizontally pivoted means, and a load lifting means associated with such horizontally movable means.

3. In a machine of the class described, an automotive vehicle, a load-lifting means associated with such vehicle, means for inclining such load-lifting means towards and from such vehicle, means for inclining such load-lifting means to either side, and means for shifting such load-lifting means towards either side.

Signed by me, this 2nd day of August, 1929.

ROBERT B. STUCKEY.