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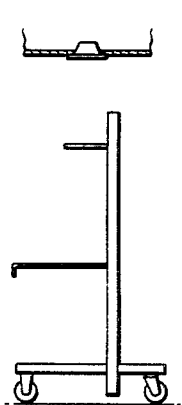
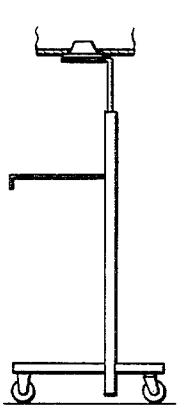
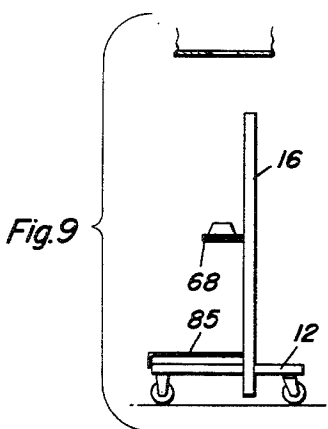
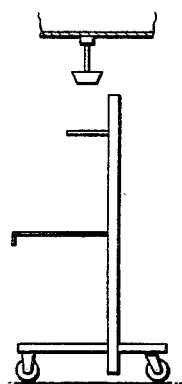
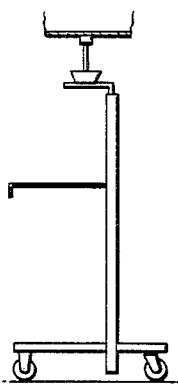
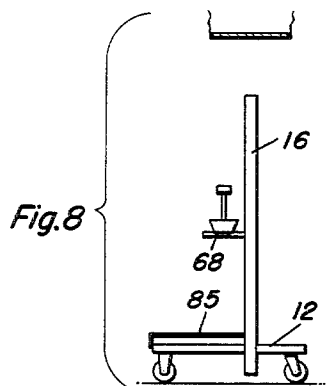
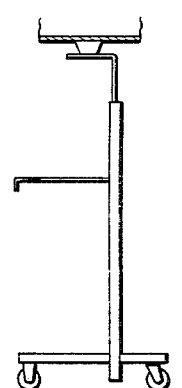
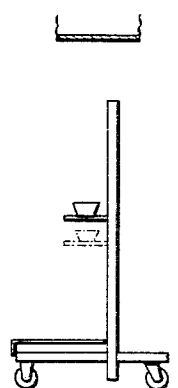
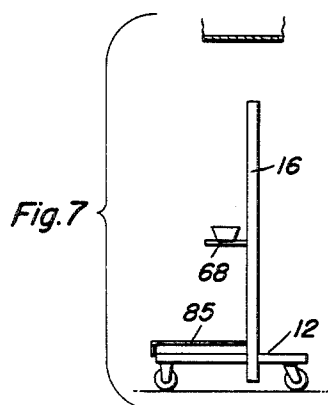
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2,938,595

MULTIPLE LIFT

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3 Sheets-Sheet 3



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2,938,595

MULTIPLE LIFT

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7 Claims. (Cl. 182—129)

This invention relates to an appliance to aid in the installation of high or overhead equipment and also to aid in subsequent repair thereof.

The principal object of the invention is to provide a device to support an article of one type or another, for example an electrical fixture, enabling the fixture to be loaded and worked on at arm's length; raised to working height; and thereafter both the fixture and the man lifted to installation height.

A machine constructed in accordance with the invention can be set to install fixtures on the surface of the ceiling by adjusting the working platform and other parts of the machine to determine the height of the fixture. Electrical power and/or hydraulic power can be used for operating the machine.

The machine has a material platform and an installer's platform. The upper or material platform can be adjusted to any convenient working height while the installer is performing preliminary work on the materials at floor level. Then the materials platform can be raised to ceiling height or below the ceiling height depending on where the worker wishes to place it, carrying the installer's platform and the installer up with it, at such lesser or greater height in relation to the material platform as the installer wishes.

Although the principles of the invention are applicable by many in a greater number of different trades, professions, etc., the invention greatly simplifies and expedites the installation of bus duct, conduit, sheet metal ducts, electrical fixtures, plumbing lines, and maintenance of all high items.

The invention is embodied in a machine that is on wheels so it can be moved from one room to another and one floor to another floor in any construction project. It practically completely eliminates the need for ladders, scaffolding and other cumbersome equipment in installing many materials, and will completely eliminate the use of ladders in the fields mentioned above.

My machine enables one man to do an entire job and to work above, around and beneath the materials involved at the relative height best suited to the individual concerned and the requirements of the job. It also permits the man to vary his working height slightly during the day and thus relax his muscles from the tensions that are necessarily built up by continuous activity at a single height or level. Moreover, the machine obviously adapts to the heights of individual people. There is actually about a one foot spread between workmen, and by use of my machine, each man can select the height that best suits him.

There are second order advantages in the invention among which are the promotion of safety, the reduction of the worker's susceptibility to fatigue and thus enable him to do a more efficient job. It speeds up his work to such an extent as to substantially reduce labor costs in connection with the installations of equipment of the type discussed herein. One of the real hazards—the ladder which has to be moved repeatedly or leaned

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out from a wall or other support while an installer is working in a particular installation and possibly hanging over the end or sides of the ladder, is eliminated.

My machine is capable of being considered as two basic parts because they are separable to enable the machine to be moved up stairways or shafts. The power unit is easily detached from the frame of the machine so that the power unit can be separately transported. In addition, the power unit could function as such in other uses so that it is a stand-by power plant.

Other objects and features of importance will become apparent in following the description of the illustrated form of the invention.

Figure 1 is an elevational side view of a machine constructed in accordance with the invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a perspective view of a stop used in the invention.

Figure 6 is a perspective view of one of the carriages which constitutes a portion of the invention.

Figure 7 is a group of figures showing the suggested operation of the invention in the installation of flush electrical fixtures.

Figure 8 is a group of elevational views showing the suggested operation in connection with the installation of hanging fixtures.

Figure 9 is a group of elevational views showing the suggested operation for the installation of recessed fixtures.

In the accompanying drawings there is a machine 10 constructed in accordance with the invention. This machine is made of a base 12 that has four wheels 14 attached to it. Frame 16 is secured to the base 12 by standard fastening means, as welding gussets 18 in place. The frame is made of two rails 20 and 22 which are channel-shaped in cross-section and which open inwardly toward each other. Upper and intermediate braces 24 and 26 are attached to the back of the channels to hold them rigid. A lower reaction bar 28 is welded or otherwise fastened to the lower extremities of the frame 16 beneath base 12.

Power for operating the machine is derived from a power plant 30 that is separable from base 12. The power plant is installed on a base plate 32 and consists of an electric motor 34 that drives a hydraulic pump 36. The hydraulic pump is part of a closed hydraulic circuit that includes conduits, tank 38 and control valve 40. Cylinder 44 is in the hydraulic circuit but connects to the power plant 30 by quick disconnect hose couplings. Control of the hydraulic system is obtained by operating valve 40, the latter having a valve operating arm 46 connected to arm 48 by a pin and slot 50, the pin being separable from the slot to enable the base plate 32 plus the equipment on it to be easily lifted and removed from base 12.

The hydraulic cylinder 44 is attached to the reaction bar 28 and has its piston rod 52 connected by a transverse pivot assembly 54, to the upper carriage 56. The upper carriage is made of two rectangular frames 57 and 58 connected together by sides 59 at the four corners thereof. The pivot assembly 54 is connected to both of the top members of both frames 57 and 58 and there are clearance recesses 60 in the frame members below it enabling the cylinder 44 to pass freely therethrough.

Two sleeves 62 and 64 extend between the upper and lower members of the two frames of carriage 56 and are welded or otherwise secured thereto. Pins 65 are in

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holes of the sleeves 62 and 64 and pass into holes of the lift arms 66 and 67, these constituting a part of the carriage. Accordingly, the lift arms may be adjusted to a selected position with respect to the frame portion of the carriage. The arms have laterally protruding extensions 68 and 69 on which to support a light fixture or other item. A parts, pieces and tools tray 70 is secured to arms 66 and 67 near the extensions 68 and 69.

A lower carriage 72 is mounted beneath the upper carriage 56. The lower carriage is made of a front and rear rectangular frame 73 and 74 respectively, these connected together by sides 75 (Figure 6). Recesses 76 are formed in the upper and lower members of both frames to enable the cylinder 44 to pass freely therethrough. Lift arms 79 and 80 are welded or otherwise fastened to the lower part of the upper carriage 56 and pass between the front and rear upper members of the frame of the lower carriage. The lift arms 79 and 80 have a number of holes so that stops 81 that are on the lift arms, may be adjusted and held in place. The stops consist of a plate, block or the like that has a hole through it to accommodate a pin. This same pin passes through a selected hole in the lift arm 79 and the same condition exists in connection with the stop on the lift arm 80. In view of this construction the stops 81 can be positioned anywhere along the lengths of the lift arms 79 and 80 and therefore the upper carriage can move a selected distance with respect to the lower carriage before the lower carriage commences to lift because the carriages are coupled together for movement by the stops 81 coming into contact with the lower surfaces of the top members of frames 73 and 74 of the lower carriage.

Both carriages have small axles protruding from their sides and wheels 83 mounted for rotation on these axles. The wheels are confined in the channels of the frame 16 making the ascend and descend of the carriages very smooth.

The worker's platform 85 is secured to the lower carriage 72 by means of brackets 118 and 120. Extension panels 86 and 87 are connected by hinges 88 to the sides of the platform 85. They are held up by beam 89 that has wheels 90 mounted on wheel hangers at its ends. Beam 89 is removably connected, as by being bolted, to base 12 and therefore, it is optionally used. The operation of this particular part of my machine is as follows: Should a worker desire to use only the platform 85, beam 89 and its wheels 90 are removed. The extension panels 86 and 87 drop down because the hinges 88 enable them to so move. However, should a wider working area be desired, the panels 86 and 87 are moved to a horizontal position and beam 89 slid under them and the platform 85. The beam is then bolted to the extension panels and to the platform 85 if the platform is to remain in a down position. If it is to be raised, beam 89 is bolted only to base 12..

The platform 85 automatically operates limit controls for the power plant. A main control rod 92 is mounted on one side of the frame 16. It is pivoted to the ends of links 93 and 94 which, in turn, are pivoted intermediate their ends to a side or frame 16. The ends of links 93 and 94 protrude alongside of the frame 16 and are adapted to be contacted by the platform as it reaches its full up or its full lowered positions. This will cause the control rod 92 to be moved thereby moving arm 48 and operating the valve 40. If an all electric power plant is used, a switch or switches would be operated in practically the same way. The worker on his platform which is connected to the lower carriage 73, may manually operate the control rod 92.

In using the machine for installing flush fixtures, the fixture is placed on the upper carriage while the lower carriage remains low so that the workman may conveniently prepare it for installation. Then by having the

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stops 81 adjusted properly on their lift arms 80 and 79, the upper carriage can be moved as shown in the second part of Figure 7 to obtain the correct distance between the lower carriage and the fixture for the workman to work most efficiently. Then, further operation of the power plant lifts the entire assembly including fixture and workman to the height at which the flush fixture can be installed.

Reference to Figure 8 shows a quite similar operation, but for the installation of a hanger type fixture. Figure 9 shows the installation of a recessed fixture. Space limitations prevent the illustration of many other uses of the invention. Accordingly, since there will be many modifications, alterations and deviations made from the description, many departures may be made without departing from the scope of the following claims.

What is claimed as new is as follows:

1. In a machine to facilitate the installation of overhead equipment by elevating the equipment to the position at which it is to be installed, the combination of a base, a frame attached to said base and having a pair of rails, an upper carriage and a lower carriage carried by said rails, adjustable means establishing a lost motion connection between said carriages so that when one carriage moves a preselected distance the other carriage commences to move in said rails, means for elevating said one of said carriages and thereby lifting both of said carriages when said preselected distance is traversed by said one of said carriages, an article support on said upper carriage, means adjustably connecting said upper support to said upper carriage, said means establishing a lost motion connection between said carriages including a pair of arms, stops adjustably carried by said arms, said arms attached to said one of said carriages and said stops engageable with the other of said carriages.

2. In a machine to facilitate the installation of overhead equipment by elevating the equipment to the desired position for installation, the combination of a base, a frame attached to said base and having a pair of vertical rails, an upper vertical carriage and a lower vertical carriage carried by said rails and having a pair of spaced frame members, adjustable means disposed between said spaced frame members for establishing a lost motion connection between said carriages so that when one carriage moves a preselected distance the other carriage commences to move in said rails, means for elevating said one of said carriages and thereby lifting both of said carriages when said preselected distance is traversed, an article support on said upper carriage, means adjustably connecting said upper support to said upper carriage, said means establishing a lost motion connection between said carriages including a pair of arms, stops adjustably carried by said arms and contacting said spaced frame members, said arms attached to the upper of said carriages and said stops engageable with the other of said carriages, a parts and tools tray attached to said support and thereby being adjustable with said support and in respect to said upper carriage.

3. The machine of claim 1 wherein the means for lifting said carriage include a power plant, means separably mounting said power plant on said base and on the side of said rails opposite to the side occupied by said article support.

4. The machine of claim 1 wherein said lower carriage has a platform provided with at least one extension panel movably connected at one edge thereof.

5. The machine of claim 1 wherein there is a power plant for lifting said carriage and carried by said base, and means located at the upper part of one of said rails to control said power plant by contact by said carriage when it approaches the upper limit of its travel.

6. A mobile machine to facilitate installation of overhead equipment by elevating that equipment to essentially the correct position for installation and holding it while being installed, said mobile machine comprising a

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base provided with wheels, a pair of vertical rails spaced from each other, an upper carriage mounted for vertical movement in said pair of rails, a lower carriage mounted for vertical movement within said pair of rails, said lower carriage having a pair of spaced members, a pair of rods 5 attached to said upper carriage and located between said spaced members, stops adjustably secured to said rods and adapted to contact said spaced members to thereby transmit the motion of said upper carriage after it has exceeded a preselected amount to movement of said lower 10 carriage, means connected to said base and to said upper carriage for elevating said upper carriage, a platform protruding laterally from said lower carriage and on which an individual is adapted to stand when installing the overhead equipment, and a support attached to said 15 upper carriage and on which to carry the equipment.

7. A mobile machine to facilitate installation of overhead equipment by elevating that equipment to essentially the correct position for installation and holding it while being installed, said mobile machine comprising a 20 base provided with wheels, a pair of vertical rails spaced from each other, an upper carriage mounted for vertical movement in said pair of rails, a lower carriage mounted for vertical movement in said pair of rails, said lower carriage having a pair of spaced members, a pair of rods 25

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attached to said upper carriage and located between said spaced members, stops adjustably secured to said rods and adapted to contact said spaced members to thereby transmit the motion of said upper carriage after it has exceeded a preselected amount to movement of said lower carriage, means connected to said base and to said upper carriage for elevating said upper carriage, a platform protruding laterally from said lower carriage and on which an individual is adapted to stand when installing the overhead equipment, a support attached to said upper carriage and on which to carry the equipment, means adjustably securing said support to said upper carriage so that said support is independently adjustable to selected elevations with reference to said 15 upper carriage, an extension wing movably connected with said platform to enlarge the space of the platform, and means including outrigger wheels for laterally stabilizing said mobile machine.

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