Oct. 29, 1957 F. W. FENTON 2,811,240

MATERIALS HANDLING MACHINES

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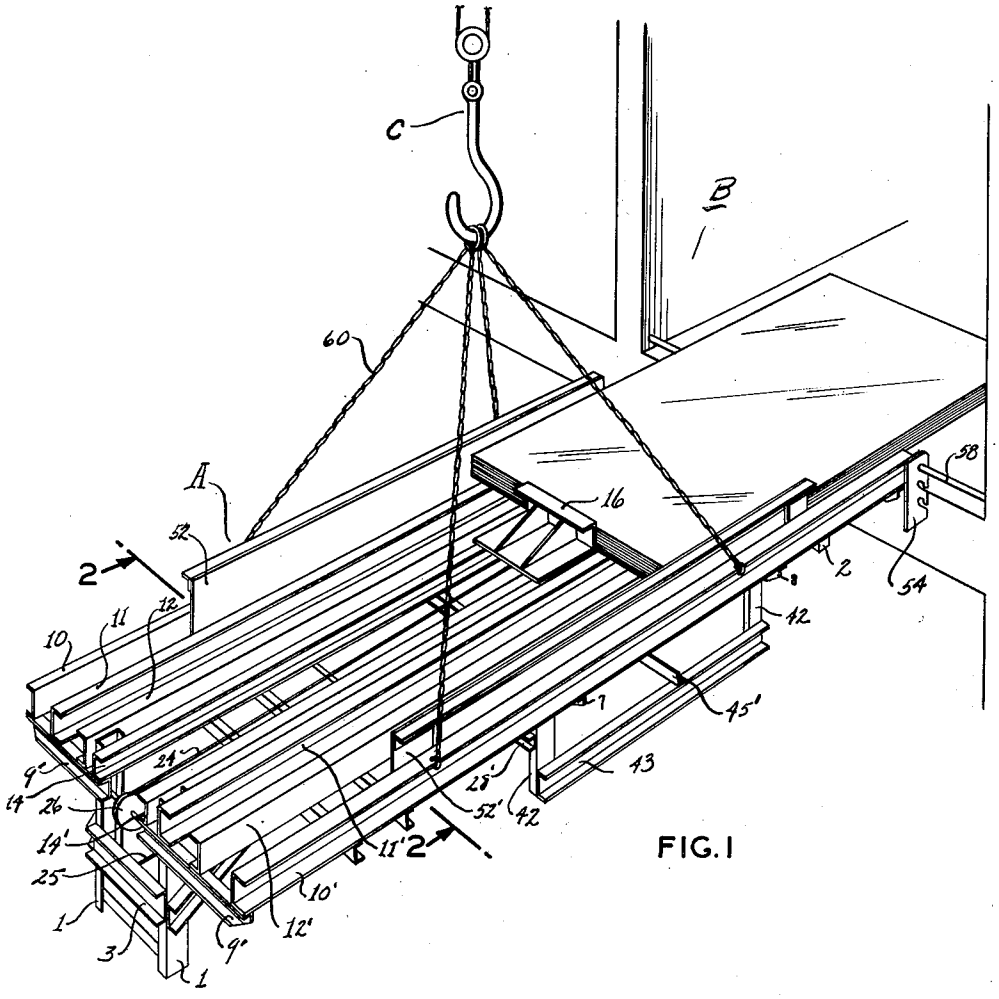

FIG. 1

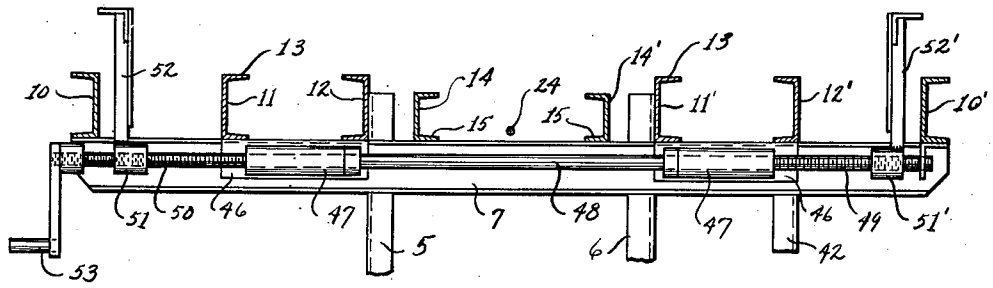

FIG. 2

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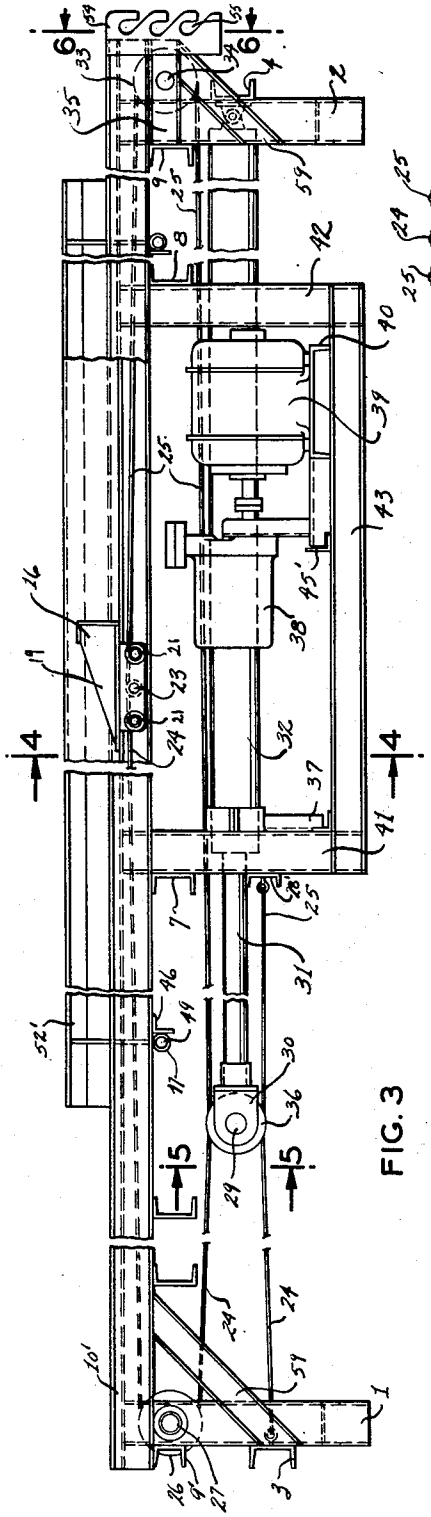

FIG. 3

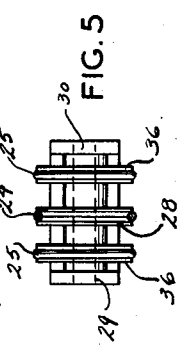

FIG. 5

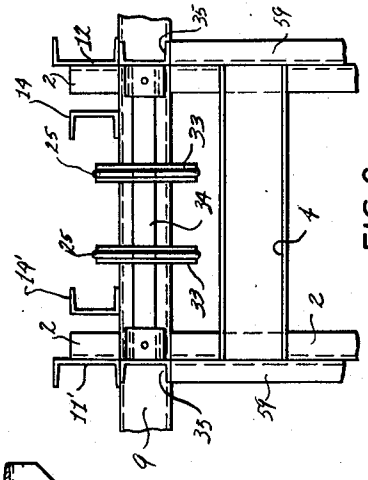

FIG. 6

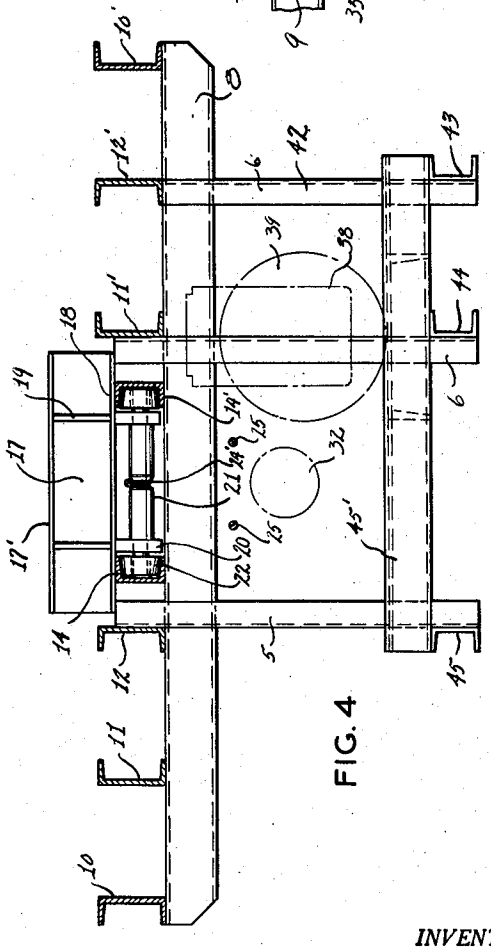

FIG. 4

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MATERIALS HANDLING MACHINES

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Application November 9, 1953, Serial No. 390,905

1 Claim. (Cl. 198—221)

This invention relates in general to materials handling equipment and, more particularly, to a machine for receiving and charging ready stacked material into storage compartments.

Heretofore the removal of heavy, bulky material, such as for example steel sheet, from flat cars, trucks, and the like, and disposing of same in stacked relation in warehouse storage bins which may be located at points considerably elevated above floor level has customarily required the labor of numerous workmen during extended periods of time. Even with the use of cranes for raising the sheet from the ground to the height of the particular receiving bin the orderly stacking of the same within such compartments has been a very difficult and laborious procedure.

Therefore, it is a primary object of the present invention to provide a device which is adapted to receive material for stacking thereon, as sheets in superimposed relation, and which includes means for quickly and effectively discharging the thus stacked material therefrom into a storage receptacle.

Another object of the present invention is to provide a device of the character stated which is compactly constructed for pick-up in fully loaded condition by a crane and having means for engaging elements of the load-receiving compartment for proper alignment therewith.

Another object of this invention is to provide a machine of the character stated which is adapted for effective use with materials of varying dimensions and weights.

A further object is to provide a bin loading machine which may be economically manufactured; which is reliable and durable in operation; and by the use of which marked economy in labor may be effected.

These and other detailed objects are obtained by the structure illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of a materials handling machine constructed in accordance with and embodying the present invention showing the machine in operative position.

Figure 2 is a horizontal transverse section taken on the line 2—2 of Figure 1.

Figure 3 is a side elevational view.

Figure 4 is a horizontal transverse section taken on the line 4—4 of Figure 3.

Figure 5 is a horizontal section taken on the line 5—5 of Figure 3.

Figure 6 is a partial horizontal transverse section taken on the line 6—6 of Figure 3.

Referring now to Figure 1, A broadly designates a materials handling machine comprising an elongated main frame, preferably of channel stock, including a rearward and forward end pair of uprights 1, 2, interconnected by transverse members 3, 4, respectively. Located between, and aligned with, the end uprights are longitudinally spaced pairs of uprights 5, 6, respectively. Secured, as by welding, to the upper ends of uprights 5, 6, are transverse

frame members 7, 8, respectively, which project at their ends therebeyond. A horizontal support member 9 is rigidly secured to upright 2, and projects at its ends therebeyond for alignment at its outer extremities with the respective ends of transverse members 7, 8. A relatively short horizontal member 9' is fixedly secured to each upright 1 and projects at one end beyond the associated upright for alignment at its outer extremity with the adjacent ends of transverse members 7, 8. At their opposite or inner ends, members 9' terminate outwardly of the center line of the machine for reasons presently appearing. Mounted upon the outer end portions of transverse members 7, 8, and horizontal members 9, 9', are side members 10, 10', which extend from end to end of machine A. Also fixed upon transverse members 7, 8, and horizontal members 9, 9', in adjacency, and parallel, to each side member 10, 10', is a pair of longitudinally disposed channel members 11, 12, and 11', 12', respectively, extending the length of machine A; being presented with their channels opening toward each other, with the upper surfaces of their upper flanges being planarwise aligned to provide a load support surface, indicated at 13 (Figure 2). It is obvious that, if desired, the load support surface 13 could be constructed in any suitable manner, such as including a plate or the like. However, the provision of surface-aligned, spaced channel flanges has been found completely effective and most economical in construction.

Intermediate, and parallel to, the channel pairs 11, 12, 11', 12', there is provided a pair of channel members 14, 14', which are rigid upon transverse members 7, 8, and horizontal members 9, 9', and also extending from end to end of machine A. Channel members 14, 14', are of relatively reduced width so that the upper flanges thereof are presented downwardly of the corresponding flanges of the adjacent channels 11, 12, 11', 12', and are presented in confronting relationship so that the lower flanges thereof provide a trackway 15.

Provided for traverse along trackway 15 is a carriage or pusher 16 comprising a transverse forward plate 17 mounted, as by welding, upon the leading edge of a base plate 18 and supported in an upright manner thereon by spaced gussets 19. Depending from the under surface of base plate 18 is a pair of spaced bearing plates 20, each of which is suitably apertured adjacent either end for journaling therein of stub shafts 21. Said shafts 21 project at their outer ends beyond said plates 20 for carrying thereon tapered rollers 22 which render carriage 16 mobile along trackways 15 (Figure 4). Base plate 18 extends laterally beyond channels 14, 14', and in travel of carriage 16 will move across the upper surfaces thereof. For rigidifying purposes a short top plate section 17' is provided.

Intermediate and axially parallel to stub shafts 21 is a rod 23 fixed at its ends in plates 20 (Figure 3). Secured to rod 23 is an end of a center cable 24 and side cables 25. Center cable 24 extends rearwardly from carriage 16, guided by a peripheral groove 24' in rearward stub shaft 21, for extension about a sheave 26 centrally disposed on a rod 27 engaged at its ends in end uprights 1. From sheave 26 cable 24 extends forwardly along a path substantially parallel to the center line of machine A for training about a sheave 28 mounted on a bar 29 secured on a clevis member 30 which is suitably carried upon the outer end of a piston rod 31 of a fluid cylinder 32. Center cable 24 is rearwardly returned from sheave 28 for anchoring at its end to transverse member 3, as by an eye bolt. Side cables 25 extend forwardly along machine A for respective extension about spaced sheaves 33 engaged upon a rod 34 secured at its ends to a plate 35 weldedly engaged to each end upright 2. From sheaves 33, side

cables 25 extend rearwardly for training about sheaves 36 mounted on clevis bar 29 on either side of sheave 28; therefrom side cables 25 progress forwardly for suitable anchoring of their ends on cross member 28' extending between legs 5. Other flexible, elongated means, such as chains, could be as readily used in lieu of the cables.

Fluid cylinder 32 is maintained on supports 37, and extends intermediate legs 5 and 6, with its forward end secured as by a clevis-type mounting on transverse member 4. Said cylinder is operatively connected to a pump 38 driven by a motor 39 mounted on a platform 40 provided laterally of, and adjacent to, uprights 5, 6, by means of longitudinally spaced uprights 41, 42, secured, as by welding, at their upper ends to transverse members 7, 8, respectively, and at their lower ends to each other by a longitudinal section 43 parallel to similar sections 44, 45, between legs 5, 6, for mounting thereon a platform support member 45'. Secured to the lower flanges of each channel 11, 12, and 11', 12', and extending between each pair is an angle member 46 (Figure 2) to the vertical portion of which is secured a bearing collar 47 for a transverse rod 48, being threaded at each end portion, as at 49, 50, for engagement within collars 51, 51', respectively, welded to the lower portions adjacent each end of upwardly projecting side guides 52, 52', which extend a substantial distance along machine A respectively between side members 10, 10', and channels 12, 12'. Engaged on one projecting end of each rod 48 is a crank 53 by operation of which guides 52, 52', may be moved inwardly and outwardly with respect to the load support surface 13 to provide lateral support for material received thereon. It is, of course, obvious that, if desired, one crank 53 may be eliminated and its rod operated by the other crank through suitable motion transmitting means.

Engaged at the forward end of a machine A and on each side thereof is a vertical plate member 54 fixed on the end portion of each member 10, 10', and having a series of vertically spaced, hook-forming recesses 55 for engagement on bars 58 suitably presented at the opening of storage bins or compartments, indicated B in the drawings. The forward and rearward ends of the main frame are respectively strengthened by braces 59.

For purposes more fully described hereinbelow, machine A is adapted for pick-up by a crane C or related device through means of chains 60 affixed on machine A in any desired manner and at proper load distribution points. Crane C may be operated from lift trucks, as well as from overhead means located within the particular building.

In usage, machine A is presented, as by a crane, in immediate adjacency to the support for the material to be serviced. Such material may be of any type or character, regardless of bulk, size or the like, as metal sheets, various metal shapes, lumber, rolled rugs, etc. Thus, machine A may be presented proximate a barge, a railway flat car, a trailer truck, or a storage location, from whence the material is lifted by a crane and deposited upon load support surface 13. Side guides 52, 52', are properly adjusted for the particular material being accommodated. When the load limit of machine A has been reached, the crane is suitably engaged to said machine, as by chains 60, and machine A with its load raised and transported by the crane to the particular bin or storage point for receiving the load. Machine A is presented to the compartment or bin opening for engagement of hooks 55 on bar 58 so that inadvertent movement of machine A away from the bin will be avoided during the load discharging operation. With machine A thus positioned, the operator will cause fluid cylinder 32 to be actuated for movement of piston rod 31 rearwardly or into extended position. Such action will produce a pulling effect upon side cables 25, with consequent travel of carriage or pusher 16 forwardly along trackways 15. Forward plate 17 of carriage 16 will engage the load and push same forwardly as carriage 16 moves along machine A, thus effecting discharge of the same into the receiving compartment in fully stacked condition. After carriage 16 reaches the forward extent of its travel, the action of pump 38 will be reversed through any conventional means to cause piston rod 31 to move reciprocatingly forwardly or into retracted position, whereby a pull upon center cable 24 is effected and carriage 16 is moved returningly rearwardly to its initial or starting position, adjacent the rearward end of machine A. Thus, a single traversing movement of carriage 16 will deliver the load from the machine A to the bin or compartment presenting the same thereto in fully stacked position so that no additional handling will be necessary prior to ultimate withdrawal.

Upon completion of the bin loading operation, the crane is suitably operated so that disengagement between hook-like recesses 55 from bars 58 is effected and machine A is then returned to position for further loading. It will be seen that by the use of machine A a single operator can unload and store during a single working day vast quantities of material which heretofore have required the labor of numerous workmen over extended periods of time. Machine A is adapted to easily load compartments regardless of their particular location in a warehouse. Those which are in elevated positions are serviced in as facile a manner as those at more accessible points.

Machine A is comprised of a simplicity of parts thereby the same is durable and reliable for continuous operation throughout long periods of time without costly maintenance. The same may be economically produced and can be effectively operated by relatively unskilled personnel.

The details of construction can be varied without departing from the spirit of the invention and the exclusive use of those modifications coming within the scope of the claims contemplated.

What is claimed is:

A machine for handling heavy sheet material in stacked relation comprising an elongated frame having a plurality of transversely extending, spaced apart support members, a plurality of channel-shaped members mounted on said support members in axially perpendicular relationship thereto and extending the length of said frames, said channel-shaped members being spaced apart with their upper flanges in surface alignment to provide a load-support surface, a pusher member having rollers and being adapted for reciprocal travel of said frame longitudinally thereof to impel loads across said load-support surface for discharge therefrom, guides for said pusher member rollers located centrally of said frame and parallel with said channel-shaped members, the upper surface of said guides being located below the upper flanges of said channel-shaped members, said pusher having a work-engaging, upstanding plate section projecting above said channel-shaped members, a center and a pair of side elongated, flexible members, each being fixed at one of their ends to said pusher member, said center flexible member extending rearwardly in substantially parallel relation to the axis of said guides, directing means provided on the rearward end of said frame for directing said center flexible member forwardly beneath the under portion of said frame, directing means also located at the forward end of said frame for directing said side flexible members rearwardly beneath said frame, a fluid cylinder mounted on said frame beneath said guides and carrying a piston rod, means for effecting longitudinal reciprocal movement of said piston rod, a plurality of sheave members rotatable about a common, horizontal axis carried on said piston rod, said center flexible member being trained about one of said sheave members on said piston

rod and thence led rearwardly therefrom for securement at its other end to the rearward portion of the under frame, said side flexible members each being trained about a sheave member on said piston rod and being led forwardly therefrom with their ends being fixedly secured to the under portion of said frame spacedly forwardly of the point of securement of the corresponding end of said center flexible member, whereby upon actuation of said piston rod in one direction of its movement a pulling force will be applied on said center flexible member to cause rearward travel of said pusher, while actuation of said piston rod in the other direction of its travel will cause a pulling force to be applied on said side flexible members to effect forward, work-operating movement of said pusher.

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