April 4, 1961 A. VERHEGGEN 2,978,270

HORSE FOR THE TRANSPORT OF SHEET MATERIALS

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Fig. 1.

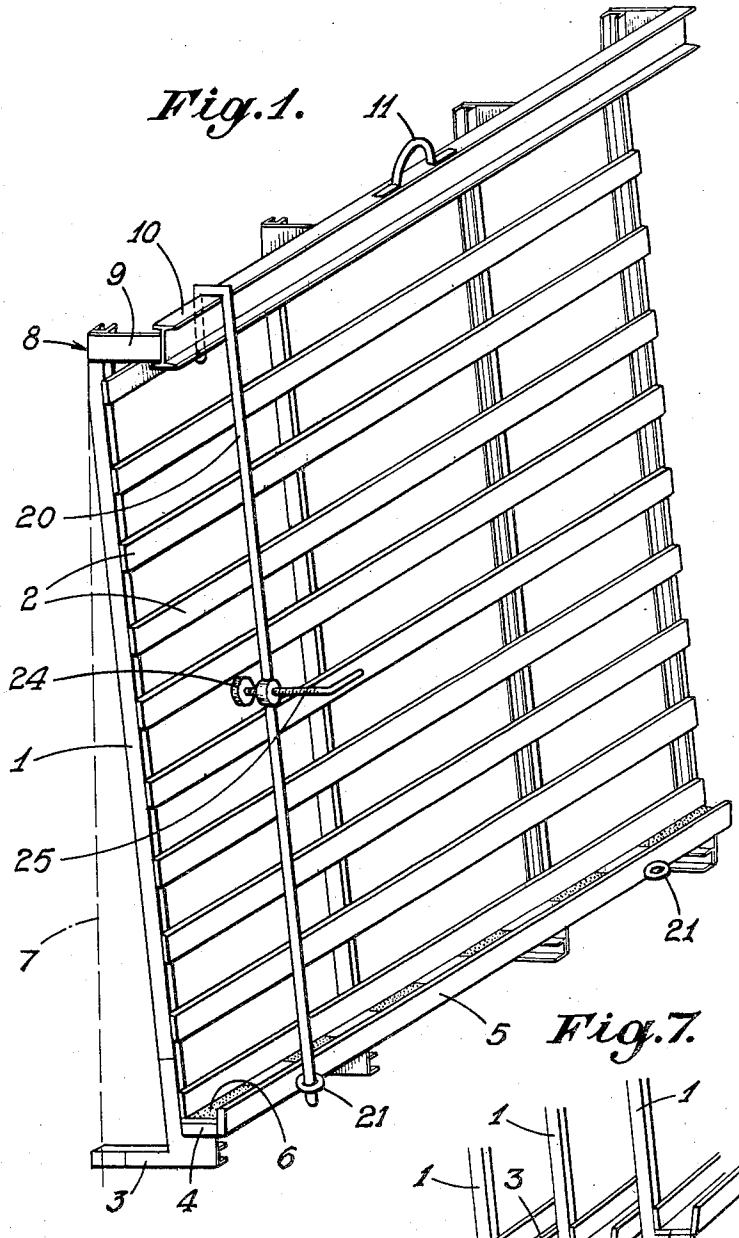


Fig. 7.

INVENTOR
ALBERT VERHEGGEN
BY
Corey, Hart & Stemple

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Fig.2.

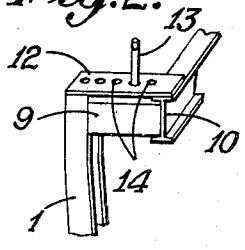


Fig.3.

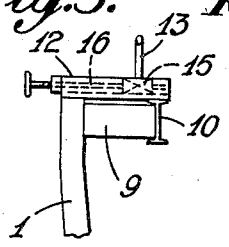


Fig.4.

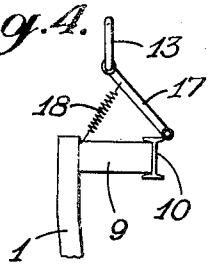


Fig.6.

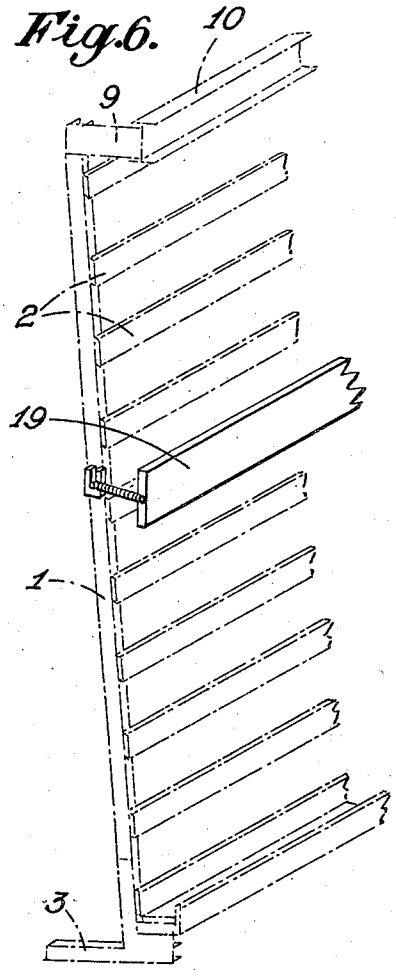
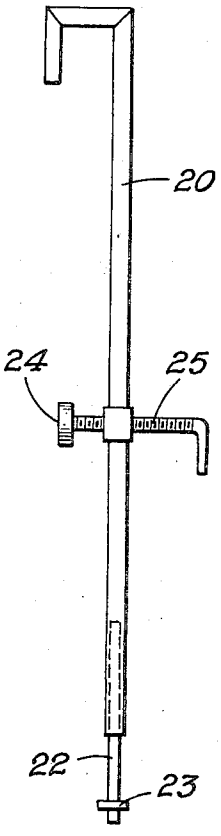


Fig.5.



INVENTOR
ALBERT VERHEGGEN
BY
Corey, Hart & Temple

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HORSE FOR THE TRANSPORT OF SHEET MATERIALS

Albert Verheggen, Lodelinsart, Belgium, assignor to Union des Verreries Mecaniques Belges, Societe Anonyme, Charleroi, Belgium, a company of Belgium

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12 Claims. (Cl. 294—67)

The invention relates to a horse for the bulk transport and storage of materials in sheet form, such as more especially glass sheets.

At present, there are employed for this purpose horses comprising two faces bearing one against the other in inverted V formation, which comprise at the bottom of each face a ledge on which the sheets rest on edge, and which are generally mounted on wheels or rollers. Such travelling horses are bulky, necessitate wide passageways in the stores and finishing workshops, and must be manoeuvered so that the empty face of the horse is presented to the stack of sheets after the loading of the first face in order to balance the load, and it is even frequently necessary therewith for each sheet to be passed around the horse. The storage of sheets on travelling horses is in addition cumbersome by reason of the space occupied and the immobilisation of the running gear, which is costly, and their loading on to trucks or wagons, as also their unloading, requires complicated manipulations in a limited area, which is also badly utilised by reason of the space which must be left clear for manoeuvering. Finally, the presence of the wheels or rollers reduces the utilisable height of the horses with given dimensions, and reduces the stability of the load by reason of the upward displacement of the centre of gravity. In additions, horses mounted on running gear cannot be stacked when empty and occupy considerable space when stored and when transported empty.

The horses according to the invention are not attended by any of these disadvantages. To this end, they comprise a frame having a face inclined in relation to the vertical and comprising a ledge at its lower end and a girder over-hanging the load at its upper end to define a volume which contains the sheets disposed against the substantially horizontal face of the ledge and resting against the face of the frame, suspension members secured to the girder, feet forming a base member for maintaining a space between the ground and the ledge to permit the nesting of the empty frames by engagement of one or more feet of one frame below the preceding frame, the suspension members being so disposed that the vertical line extending through the centre of gravity of the loaded or unloaded horse extends approximately through the said suspension members and falls within the said base.

The horse is provided with devices for retaining the sheets resting against the frame, which advantageously comprises oblique posts each bedded in one foot and provided at the top with a horizontal support, so that the assembly has the form of a Z, and a support structure connecting the oblique posts and constituting the inclined face against which the sheets are rested. The support structure preferably consists of horizontally disposed battens forming a lattice work.

The horizontal supports provided at the top of the oblique posts are connected together by the girder on which are mounted the member or members for suspending the horse from the hook of a lifting gear and disposed either in the plane of symmetry perpendicular to the inclined face or at equal distances on either side of the said plane. They may be fixed and disposed in such manner that the eye receiving the hook of the lifting gear is substantially in the vertical plane containing the centre of gravity of the horse when the latter is fully loaded. These members may also be displaceable in the plane of symmetry perpendicular to the inclined face, or in planes parallel to the said plane of symmetry, between the bar parallel to the upper edge of the inclined face and the vertical plane extending through the tops of the oblique posts, in order that the position of the eye of the suspension members may be modified and brought into the plane containing the centre of gravity of the horse, which varies with the load on the latter. The position of the suspension member or members may be manually changed, for example by introducing a rod to which the eye is fixed into one of the holes of a series of holes aligned in a cross-member perpendicular to the bar parallel to the upper edge of the inclined face, or mechanically by making the said rod fast with a sliding nut mounted on a rotatable screwthreaded rod, disposed perpendicularly to the bar parallel to the upper edge of the inclined face. The displacement of the eye of the member or members may, however, be automatic and may be effected by the action of a lever and of an opposing spring, so that when the loaded horse is raised an eye moves toward the vertical plane containing the centre of gravity resulting from the load. In all cases, the position of the suspended horse is essentially the same as that of the horse resting on the ground, so that it is possible to manipulate the loaded horse within very small spaces, for example to remove any one horse from between the horses disposed in compact rows in a store or workshop, and to deposit it exactly at the desired spot, for example in a free space in a store or on a truck of a wagon. The suspension members may be fixed and arranged to take the maximum load, or displaceable in accordance with the load.

In order to prevent the sheets from tilting accidentally during the handling of a horse, the latter is advantageously provided with a device to retain the sheets against its inclined face. The said device comprises at least one element which extends between opposite edges of the frame, is positioned against the sheets leaning against the inclined face and is fixed on the edges. The said element may be a bar of appropriate material, for example metal or wood, fixed to the outermost posts by an appropriate means, such as a length of cable or cord, a belt or a spring. The said bar may be provided with resilient buffers bearing against the sheets. The retaining device may also consist of a rod bent into the form of a U at one of its ends and provided with at least one resilient buffer mounted on an adjustment screw perpendicular to the rod. The latter is engaged on the parallel bar on the upper edge of the inclined face, while at its other end it is engaged in an eye secured to the bar disposed along the lower edge of the inclined face. The rod may be extensible so that it may be adapted to horses of varying heights.

The accompanying drawing illustrates by way of example a number of embodiments of the invention.

Figure 1 is a view in perspective of a horse according to the invention,

Figures 2 to 4 show various methods of securing the suspension members,

Figure 5 is an extensible device for the vertical retention of the sheets disposed against the horse,

Figure 6 shows a horizontal retaining device, and

Figure 7 illustrates the inter-engagement of the empty frames by means of the feet.

The horse comprises a frame formed of slightly oblique posts 1 and a supporting structure 2 preferably of lattice form, constituting the inclined face against which the sheets, for example of glass, are rested. The posts 1 are fixed to feet 3 which extend forwardly out of the plane of the supporting structure to the extent necessary to receive the horizontal bar 4, which is disposed along the lower edge of the inclined face and provided with a raised edge member 5. The bar 4 on which the sheets rest on edge, may be covered with an absorbent material having slight resilience, such as felt plates 6. The width of the bar 4 between the inclined face and the raised edge member 5 determines the admissible loading of the horse. The feet 3 extend rearwardly beyond the perpendicular 7 drawn downwards from the top 8 of the posts 1, so that the horse is in stable equilibrium when placed on the ground, whether loaded or unloaded, the centre of gravity of the horse and that of the load always being situated in vertical planes extending through the feet, while the space left between the ground and the raised edge member 5 permits the engagement of the feet of empty frame as shown in Figure 7.

The rearward inclination of the posts 1 is relatively slight, while remaining compatible with a correct resting position of the sheets, having regard to the shock to which the horse is normally subjected.

At the top, the posts are provided with supports 9 on which there is secured a girder 10 parallel to the upper edge of the inclined face, at a distance from the latter such that the perpendicular extending down from the forward edge of the said bar passes substantially through the lower edge of the inclined face. The assembly consisting of the foot, the oblique post and the top support is therefore Z-shaped, with the result that the horse comprises only one face which can receive sheets, while all the complicated manoeuvers necessary with double-faced horses for presenting the other face thereof to the stack of sheets to be loaded when the first face has received its load are eliminated. While double-faced horses are generally mounted on wheels or rollers to render these maneuvers possible, despite the bulkiness resulting therefrom, it is more rational with Z-shaped horses to move them by means of a lifting gear, for example the pulley tackle of a travelling crane or of a monorail, it being easy with such gears to reach any place in a finishing workshop or in a store for the purpose of depositing a horse in a clear space therein or for taking a loaded horse therefrom for the purpose of depositing it, for example, on transport means. For this purpose, the horses are provided with one or more suspension members which may be permanently fixed to the bar 10, such as the handle 11 (Figure 1). This fixed handle is positioned substantially on the vertical extending through the centre of gravity of the horse carrying maximum load, in order that, when the horse is lifted by the pulley tackle, the face against which the sheets rest may retain the inclination which they possess when the horse is placed on the ground. The suspension member or members may be displaced in a cross-member 12 perpendicular to the bar 10 for the purpose of bringing the eye receiving the lifting hook towards the vertical extending through the centre of gravity of the horse (or into the vertical plane containing the centre of gravity when a plurality of suspension members are employed). This displacement may be manually effected by introducing the rod 13 (Figure 2). To which the eye (not shown) is fixed, into the hole 14 closest to the vertical extending through the centre of gravity. The displacement of the rod 13 may also be mechanically effected with the aid of a nut 15 (Fig. 3). Sliding in the cross-member 12 and actuated by the rotatable screw 16, or automatically by means of a device comprising a lever 17 and an opposing spring 18, the principle of which is illustrated in Figure 4.

Since the horses may be subject to unforseeable, tilting, the sheets resting against the inclined face are retained for example, by a horizontal cross-member 19 secured by appropriate means on the outer posts 1 (Fig. 6) or by a rod or a tube 20 bent over at the top and engaged on bar 10, the lower end of the said rod or tube extending through an eye 21 (Fig. 1). The rod or tube 20 may be made extensible by means of a rod or tube 22 having a retaining flange 23 (Fig. 5), the said two members sliding one in the other so that they may be used on horses of differing heights.

The rod or tube 20 is provided with an adjustable locking buffer 24 mounted on the screw 25 rotatable in the member 20 (Figs. 1 and 5).

Naturally the invention is not limited to the embodiments described and illustrated by way of example, and modifications may be made thereto without departing from its scope.

I claim:

1. A unitary, self standing horse for the transport and storage of sheet materials comprising a frame having a base and having a sheet supporting face inclined in relation to the vertical and rearwardly from said base, said frame including a forwardly projecting, horizontal, sheet supporting ledge provided at the lower end of said frame, and including suspension means projecting forwardly from the upper end of said frame and composed of holding means by which said frame may be lifted, said suspension means, frame face and ledge defining the space in which is received the sheets to be positioned upon said ledge and supported by said frame face, said base being composed of a plurality of spaced frame supporting feet standing on the ground and extending rearwardly from said frame so as to enable said frame to stand upright by itself, said horizontal ledge being spaced upwardly from the ground and positioned above said rearwardly extending supporting feet to enable the supporting feet of another like horse to be inserted under said horizontal ledge and thereby to permit the nesting of such horses, said holding means being so disposed with relation to said frame face and said base that a longitudinal vertical plane extending through the center of gravity of the loaded or unloaded horse extends approximately through said holding means and falls within said base.

2. A horse such as defined in claim 1, in which said supporting feet project forwardly of said frame face and in which said horizontal supporting ledge is mounted on and supported by said forwardly projecting portions of said feet.

3. A horse such as defined in claim 1, including means engageable with the outer surface of the outermost sheet positioned on said ledge to retain all of the sheets positioned thereon in supported relation with said frame face, and means for detachably connecting said sheet engaging means to said frame.

4. A horse such as defined in claim 1, in which said frame comprises a plurality of spaced oblique posts each of which is mounted on one of said base feet, and in which said suspension means comprises a plurality of spaced horizontal support members, each connected at one end to the upper end of an oblique post and projecting forwardly therefrom, whereby said frame in vertical section has the form of a Z, and a supporting structure connected to the oblique posts and constituting the inclined face against which rest the sheets positioned on edge on said horizontal ledge.

5. A horse such as defined in claim 1, in which said suspension means is composed of a horizontal member disposed in front of and in spaced relation to said front face and in substantial parallelism with said ledge, said horizontal member being so positioned on said frame that a perpendicular drawn downwardly from its forward edge extends substantially through the lower edge of said inclined face.

6. A horse such as defined in claim 1, in which said suspension means is composed of a horizontal member disposed in front of said front face and in substantial

parallelism with said ledge, and in which said holding means is connected to said horizontal member.

7. A horse such as defined in claim 1, in which said suspension means comprises horizontal means projecting forwardly from the upper end of said frame, and means for selectively positioning said holding means relative to the length of said horizontal means.

8. A horse such as defined in claim 1, in which said suspension means comprises means connected to said holding means and movable to shift said holding means in a direction transverse to said frame face to compensate for a change in the center of gravity of the horse, and cooperable means for movably connecting said movable means to the upper end of said frame so as to enable said frame to be lifted by a force exerted through said movable and cooperable means from said holding means.

9. A horse such as defined in claim 1, in which said suspension means includes means connecting said holding means to the upper end of said frame and operable to selectively position said holding means to conform to a shift in the center of gravity of the horse.

10. A horse such as defined in claim 3 in which said detachable connecting means comprises a rigid member extending between opposite edges of the frame and connected at one end to said supporting ledge and connected at its other end to suspension means and closing the front of the sheet receiving space defined by said suspension means, frame face and ledge.

11. A horse such as defined in claim 10, in which said suspension means includes a horizontal member disposed in front of said front face and fixed to said frame, in which said rigid member has a U-shaped upper end adapted to hook on said horizontal member, and including means provided on said supporting ledge for detachably connecting the lower end of the hooked bar to said ledge, and in which said engageable means comprises a sheet engaging member, and means adjustably supporting said sheet engaging member on said rigid member intermediate the ends of the latter.

12. A unitary, self-standing horse for the transport and storage of sheet materials comprising a frame that is generally Z-shaped in transverse section, the inclined body of said frame providing an inclined supporting face for the sheets, and the lower horizontal branch of the Z-shaped frame comprising a supporting base for the frame and for the sheets supported by the horse, said base being composed of a plurality of spaced, horizontally disposed members disposed transversely to said frame body and standing on the ground, said frame body being offset to the rear of the front ends of said horizontal members to enable the front end portions of said horizontal members to function as supports for the sheet material resting against the supporting face of said frame body, the rear end portions of said horizontal members extending rearwardly from said frame body and supporting the latter in inclined relation, the sheet supporting surfaces on said front end portions of said horizontal members being higher than the top surfaces of the rear end portions thereof to support the sheets above such top surfaces and to enable the rear end portions of a like horse to be inserted under sheets supported on said front end portions and between said spaced horizontal members, and thereby to permit nesting of such horses, the upper horizontal branch of the Z-shaped frame constituting suspension means and including holding means so disposed with relation to said frame body and base that a longitudinal vertical plane extending through the center of gravity of the horse extends approximately through said holding means and falls within said base.

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