April 20, 1943. S. SAUL, JR 2,316,892

REMOVABLE TRAY RACK CONSTRUCTION

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Fig. 1.

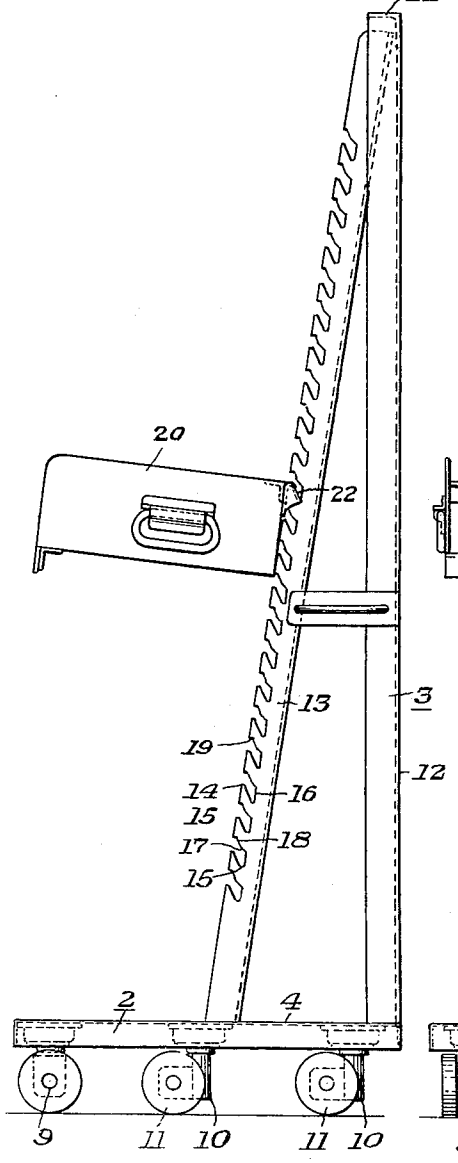
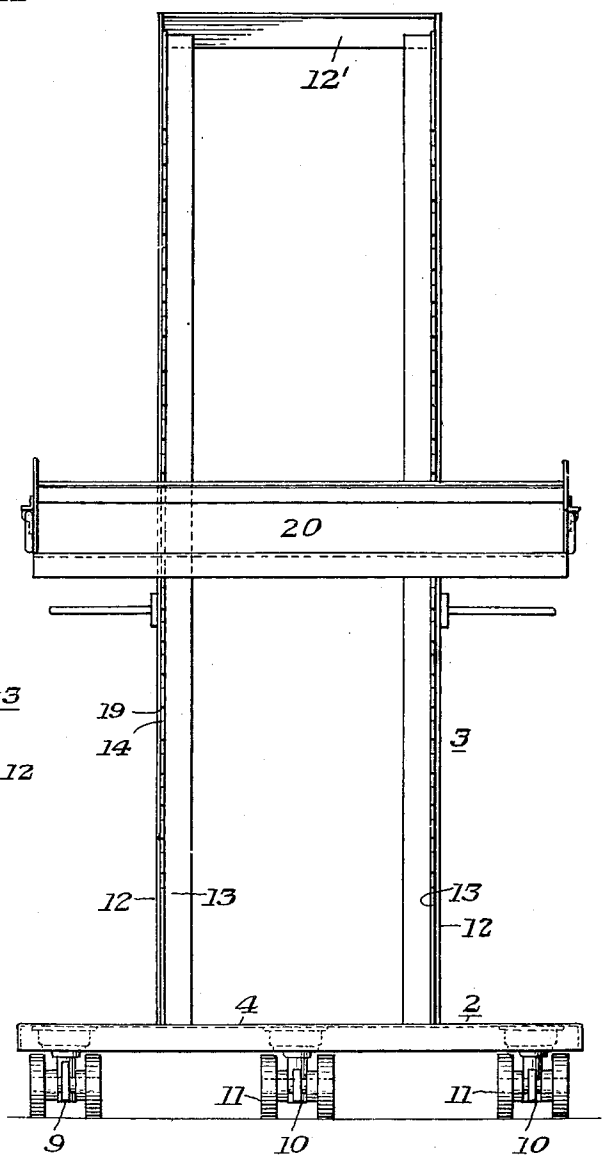


Fig. 2.



INVENTOR

Samuel Saul, Jr.

by his attorneys

Christy, Parmelee & Strickland.

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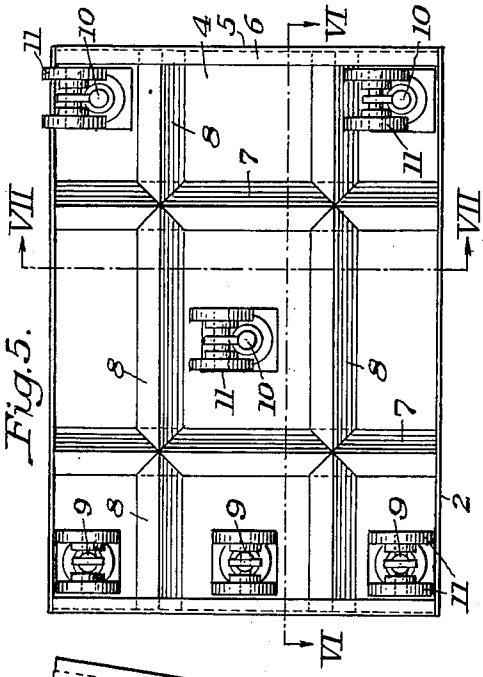

Fig.5.

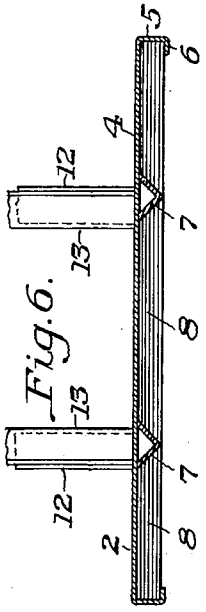

Fig.6.

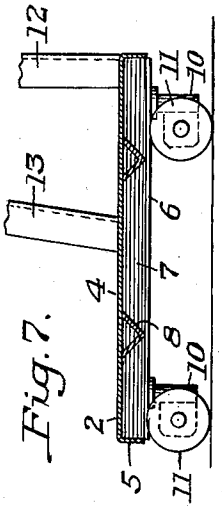

Fig.7.

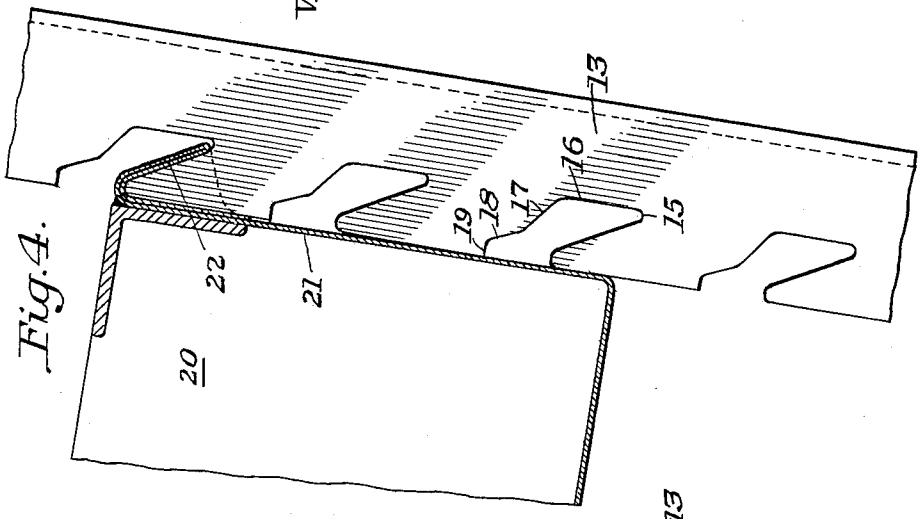

Fig.4.

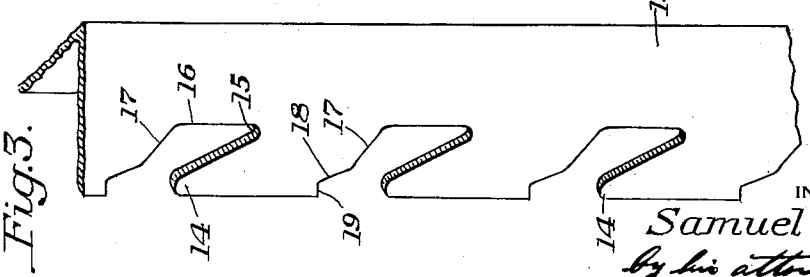

Fig.3.

INVENTOR

Samuel Saul, Jr.

by his attorneys

Christy, Parmelee & Hutchins

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REMOVABLE TRAY RACK CONSTRUCTION

Samuel Saul, Jr., Pittsburgh, Pa.

Application November 14, 1942, Serial No. 465,625

7 Claims. (Cl. 211—71)

This invention relates to rack constructions having removable trays and relates particularly to the construction of the rack.

Racks have heretofore been developed for use in industrial establishments which are mounted on a base. The base may or may not be on casters, depending upon whether the rack is to be more or less permanently located in one position or is to be freely movable about the plant. Removable trays are provided for these racks into which work pieces are placed by a particular machinist, for example, as he finishes some operation on the work piece. For example, in the mass production of various types of machinery and equipment a given machinist may perform a certain machining operation on a succession of like pieces of machinery. He may remove these from one tray, do the work which is necessary and put them back into another tray. When the tray has been filled it may be carried away, either as an individual unit or in conjunction with other trays on the same rack.

As generally constructed, these racks comprise a base having an upright structure, the upright structure having a series of closely spaced hooks thereon onto which the trays may be hung and forwardly from which the trays project. One difficulty with racks of this kind as heretofore designed has been the fact that frequently the work pieces are quite heavy. The machinist who is placing such a piece of work in the tray has to do so with more or less care in order to prevent the tray from becoming unbalanced and thereby lifting itself clear of the hook at one end of the tray. Sometimes the work piece may weigh as much as fifty or more pounds, and the loading of this into one end of the tray would cause the other end to lift off its hook. This required that the operator use care in the loading of the tray more or less evenly. One important purpose of the present invention is to provide a hook which will prevent the tray from releasing itself in this manner.

Another difficulty with such racks has been that the trays have been so heavily loaded as to buckle the base structure, spilling the load and damaging the rack. According to the present invention, not only are the trays designed to receive heavier loads without becoming unhooked but the base is especially constructed to withstand buckling under these heavier loads without materially adding to the cost or weight of the base structures.

My invention may be fully understood by reference to the accompanying drawings, in which:

Figure 1 is a side elevation of a rack constructed in accordance with my invention showing a tray applied thereto;

Figure 2 is a front elevation of the apparatus shown in Figure 1;

Figure 3 is a perspective view of the hook structure on the upright stand;

Figure 4 is a fragmentary detail view showing the hook structure on a larger scale than Figure 1 and showing the tray in position thereon;

Figure 5 is a bottom plan view of the base structure;

Figure 6 is a longitudinal vertical section in the plane of line VI—VI of Figure 5;

Figure 7 is a transverse vertical section in the plane of line VII—VII of Figure 5.

In the drawings, the base of the rack is designated generally as **2**, and the upright structure is designated generally as **3**. The base **2** is formed of a solid metal plate **4** having downwardly turned edge flanges **5** around the periphery thereof, these flanges being in turn turned inwardly at the ends of the base, as shown at **6**, thus forming a reinforcing section around the edge of the plate. Welded to the underside of the plate are transverse angle bars **7**, these angle bars being positioned so that the two flanges contact the under surface of the plate **4** and the apex of the angle points down, forming in effect a reinforcement of V-shaped section. Welded to the under side of the plate to extend in a longitudinal direction are similar angle bars **8**. The angle bars **8**, where they intersect the angle bars **7** are cut and mitered and the mitered ends are welded to the cross bars **7** so that the reinforcement is in effect an integral welded structure on the under side of the base. The placing of the angles so as to provide this V-shaped form of truss or reinforcing member increases the strength of the angles over the strength which would be provided by locating them in the customary manner with one web of the angle horizontal and the other vertical. A very substantial reinforcement for the base is thus provided while the weight of the angles themselves adds very little to the over all weight of the assembly. Preferably, the angles have flanges of such length that the points or apexes of the angles do not project beyond the flanges **6**.

If the base is to be set on the floor it may be set directly on the floor with the inwardly turned flanges **6** making contact with the floor. If, however, the base is to be supported on casters the appropriate casters are secured to the under side of the base. In Figure 5 there is indicated

a row of three casters, 9, along one edge of the base, these casters being ordinary swiveled casters. At the center of the panel is another caster 10 which is also of the swiveled type and which has two wheels 11 which are offset from a point directly in under the axis about which the caster swivels. In the other two corners of the base are two additional caster assemblies 10, similar to the assembly 10 at the center of the plate and also having wheels 11. I prefer to use this combination of casters, although any appropriate arrangement of casters may be employed and, if desired, all of the caster units may be of identical construction.

The upright frame 3 comprises two vertical angle members 12 having their lower ends welded to the base 4 and having their tops joined by the horizontal angle member 12'. Extending downwardly at a slight incline are two other angle members 13 which are substantially in front of the angle members 12, the angles 13 having their upper ends welded to the interior of the uprights 12 and their lower ends welded to the base 4. These inclined supports 13 are provided with specially formed notches or hooks to engage the trays which are removably hung thereon. The exact construction and shape of the hooks can best be seen from Figures 3 and 4. The hooks are formed on the forwardly projecting web of the uprights 13 by notching or cutting away the forward edge of this web. These notches are so formed as to provide a succession of hooks, the tops of which are designated 14. The hooks are of downwardly increasing width to the bottom of the notch, designated 15. There is a vertical back wall forming the inner boundary of the notch, designated 16. Above the portion 16 the upper boundary of the notch, constituting also the lower part of each hook, is sloped upwardly and outwardly as indicated at 17. At 18 this part of the boundary of the notch turns upwardly at a steeper angle terminating in a horizontal shoulder 19 at the extreme outer edge of the point of the hook which is spaced below it.

In Figure 4, 20 designates a tray having a back wall 21 with means 22 by means of which it is hung on the hook. The laterally projecting means 22 is sloped to conform substantially to the curvature of the top surface of the hook. The shape of the notch, particularly the surface 18—17 facilitates the application of the trays to the hooks.

As shown in Figure 2, the trays are substantially longer than the width between the sloping uprights 13 so that opposite ends of the trays project beyond the supporting structure. As shown in Figure 1, these trays preferably hang at a slight incline with the back wall of the tray braced against the notched edge of the upright 13. It frequently happens that workmen using the tray will initially load the tray at one end, tending to over-balance said end, whereupon the opposite end of the tray tends to lift clear of its hook. An important feature of the present invention is the shape of the notch whereby the end of the tray in so lifting will not lift clear of the hook. The overhanging shoulder 19 above the tip of each hook serves as an abutment against which the top of the part 22 of the tray will hit as the tray slides up under this condition. The tray is thus restrained from disengaging itself from the support when overloaded at one end. On the other hand, if the operator in removing the tray slides it outwardly as he lifts it upwardly so as to keep the portion 22 of the tray substantially in contact with the inclined top surface of the hook, the tray can be disengaged from the support and removed without any difficulty. The shaping of the slot therefore prevents the accidental unhooking of the tray without interfering in any way with the intentional removal. An additional advantage of forming the under surface of the hook with the double incline 17—18, is that there is additional metal in the hook over that which would be provided by a straight inclined slope, thereby additionally strengthening the forwardly projecting portion of the hook. In order to keep the structure as light as possible and still have adequate strength to sustain heavily loaded trays it is important to design the hooks so as to be sufficiently strong. For convenience and use, on the other hand, it is desirable to have the hooks spaced as close together as is practical. For these reasons the increase in strength which is gained by shaping the hook in the manner described is also important.

While the drawings illustrate only a single tray on the rack there may be several of these trays and each of them may be very heavily loaded. This load tends to buckle the heavy base plate 4 and the reinforcements 7 and 8 effectually reinforce the base against buckling while incorporating a minimum of additional weight into the base. It will be noted, looking at the front of the rack as seen in Figure 6, that the uprights 12 substantially coincide with the cross angle 7 on the under side of the base to resist buckling strains crosswise of the base. The longitudinally extending angles 8 reinforce the base against the center of the base sagging when the rack is heavily loaded. Where the base is mounted on wheels a further substantial reinforcement is provided by the caster which is at the center of the base as the forces tending to buckle the base are concentrated along the longitudinal and transverse axes of the base. Where the base is not mounted on casters but is to be used in a fixed position or perhaps be moved from place to place by an overhead crane, the fact that the base extends a substantial distance forwardly of the upright stand and projects beyond each end of the upright stand imparts stability to the construction and the base does not have to be bolted to the floor to prevent it from tipping over.

While I have specifically illustrated and described certain particular embodiments of my invention it will be understood that changes and modifications may be made therein within the contemplation of my invention and under the scope of the appended claims. The particular form of tray illustrated is more fully shown and described and is claimed in my copending application Serial No. 476,885 filed February 24, 1943.

I claim:

1. A rack structure of the class described comprising a base plate, an upright support on the base plate, and intersecting reinforcing members under the base plate comprising angle bars set with the edges of the flanges contacting the under face of the plate, said angle bars being welded to the base and being welded to each other at the points of intersection.

2. A rack of the class described comprising a base member formed of metal plate, an upright load-carrying structure on the base, said upright load-carrying structure comprising a rectangular vertical frame and inclined load-bearing members sloped from a point adjacent the top of the said

frame to the base, said load-carrying structure being of less width and less length than the base whereby the base projects forwardly from said structure and beyond each end of said structure, and reinforcing means under the base to resist buckling strains in the base, said reinforcing means comprising intersecting angle bars welded to the under side of the base with the edges of the flanges of the bars contacting the under side of the base, said bars extending longitudinally and transversely of the base and being welded at their points of intersection and being mitered to lie in a plane.

3. A rack of the class described comprising a base member formed of metal plate, an upright load-carrying structure on the base, said upright load carrying structure comprising a rectangular vertical frame and inclined load-bearing members sloped from a point adjacent the top of the said frame to the base, said load-carrying structure being of less width and less length than the base whereby the base projects forwardly from said structure and beyond each end of said structure, and reinforcing means under the base to resist buckling strains in the base, said reinforcing means comprising intersecting angle bars welded to the under side of the base with the edges of the flanges of the bars contacting the under side of the base, said bars extending longitudinally and transversely of the base and being welded at their points of intersection and being mitered to lie in a plane, the bottom of the rectangular frame being welded to the base plate substantially over the transverse angle bars.

4. In a rack structure of the class described, an upright supporting structure including parallel inclined load-carrying bars having forwardly projecting flanges, said flanges being notched to provide a series of hooks which taper upwardly and outwardly to a point, the forward portions of the notches over the points of the hooks being shaped to provide shoulders.

5. A rack structure of the class described comprising a base, an upright load-carrying structure on the base, said load-carrying structure including inclined parallel bars, each bar having a forwardly projecting flange notched at intervals to provide a series of hooks, the under side of each hook having a substantially right angular shoulder thereon spaced over the point of the hook which is under it and being sloped inwardly and downwardly from said shoulder to the back edge of the notch which intervenes between successive hooks, and a removable tray structure having means along its upper edge to engage over selected hooks on said bars with the back wall of the tray braced against the edges of the flanges of the inclined bars.

6. A rack structure of the class described comprising a base, an upright load-carrying structure on the base, said load-carrying structure including inclined parallel bars, each bar having a forwardly projecting flange notched to provide a series of hooks, the under side of each hook having a substantially right angular shoulder thereon spaced over the point of the hook which is under it, the bottom of each hook inwardly from each shoulder extending downwardly and inwardly in stages, the top of each hook being downwardly and inwardly sloped.

7. A rack structure of the class described comprising a base member, an upright load-carrying structure on the base member, said load-carrying structure including parallel inclined load-carrying bars, said bars having a vertical series of spaced hooks formed integrally therewith with a notch between each two successive hooks, the top surfaces of the hooks being inwardly and downwardly sloped, and a tray having a rearwardly and downwardly extending hook-engaging portion thereon at the top of the back thereof for engaging a selected pair of hooks with the back wall of the tray braced against the edges of the flanges of the inclined bars, the under side of each hook and the top edge of each hook engaging portion having surfaces which abut when one end of the tray lifts vertically upwardly along the inclined bar to prevent accidental dislodgement of the tray, the slope of the hook aiding in guiding the top edge of the tray under the hook next above it when the tray is simultaneously pulled forward and lifted.

SAMUEL SAUL, JR.