United States Patent

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[54] **SCAFFOLD PLATFORM**
4 Claims, 7 Drawing Figs.

[52] U.S. Cl. **182/222**
[51] Int. Cl. **E04g 5/08**
[50] Field of Search 182/222, 223, 119, 179; 52/483

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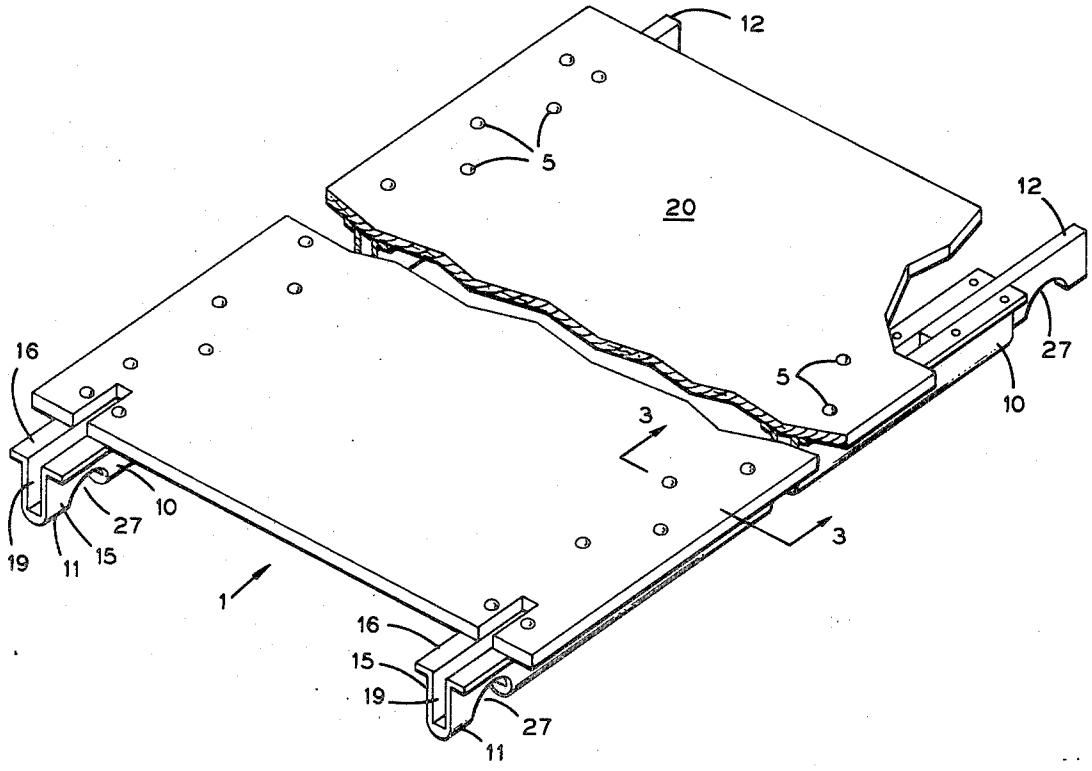
ABSTRACT: A scaffold platform comprising a pair of joist supporting and secured to a deck plate, with their ends so fabricated that they can be disposed on a scaffold to furnish an elongated horizontal platform for the support of building materials and workmen, and for use as a walkway.



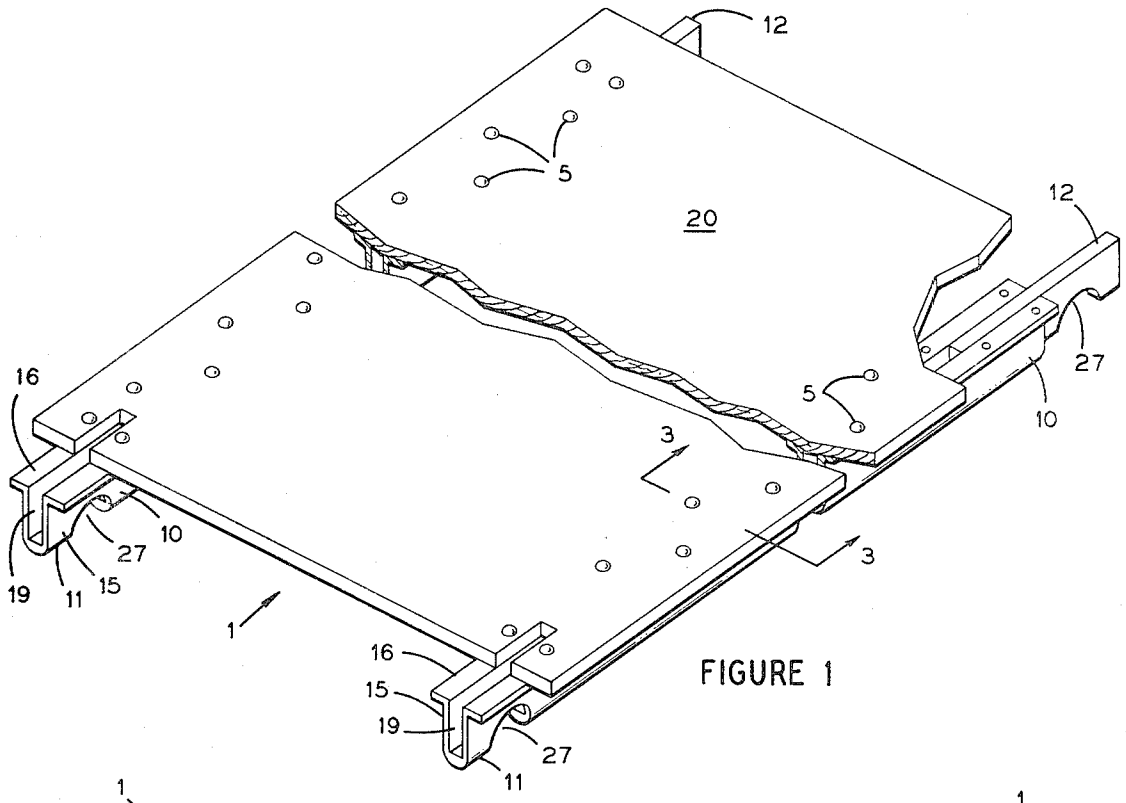


FIGURE 1

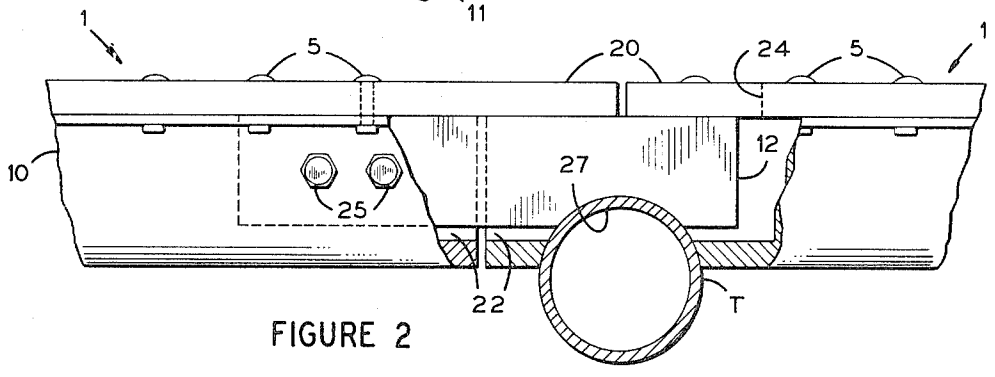


FIGURE 2

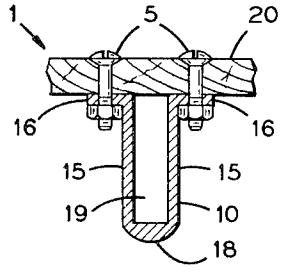


FIGURE 3

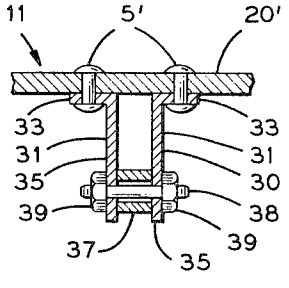


FIGURE 4

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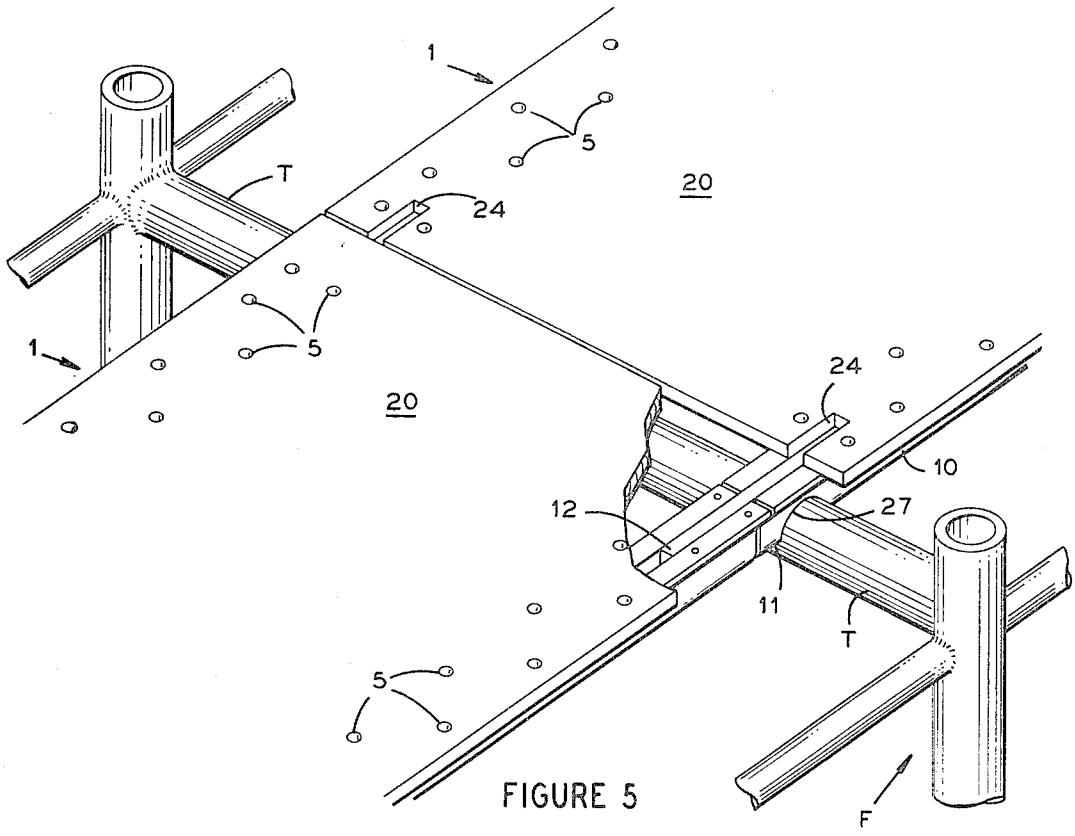

FIGURE 5

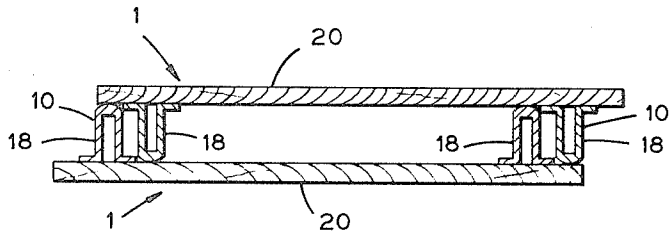

FIGURE 7

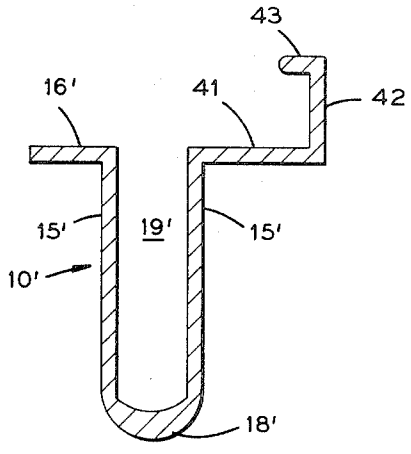

FIGURE 6

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SCAFFOLD PLATFORM

The present invention lies in the field of platforms used as walkways and as a support for working materials and the workmen engaged in construction or maintenance, e.g., bricklayers, carpenters, painters, and the like. The platform of the invention may be used singly, but finds its most typical and widest range of uses when it is one section of an elongated platform formed by the use of a multiplicity of similar platforms, typically disposed on a scaffold or framework so that the upper surfaces of the platforms lie in a common horizontal plane forming an elongated walkway or working space.

One object of the invention is to provide a scaffold platform which is light in weight, easily handled by one workman, and yet is extremely strong under the forces common to scaffold platforms, having a breaking stress under vertical loading well in excess of the loads that can be expected in normal service and even in unusually demanding service, both as to static and dynamic loads.

Another object of the present invention is to provide such a scaffold platform adapted for use in multiples, i.e., with their ends so fabricated that they can be disposed on a scaffold platform with abutting ends to furnish an elongated horizontal platform for the support of building materials and workmen, and for use as a walkway.

Another object is to supply such a platform which includes one or more, typically a pair of lightweight metal joists which may be inexpensively extruded and yet will have all the strength of a much heavier, solid wood beam.

Another object is to provide a scaffold platform using such joist or joists underlying and so secured to a deck plate that the combination produces a unitary structure which is unusually strong under the bending stresses normal in supporting vertical loads imposed thereon in service.

Another object is to provide such a scaffold platform requiring no tie rods, cross bracing, or other members extending transversely between the joists of the structure, the entire platform consisting only of a deck plate and one or more joist underlying and secured to such deck plate.

Another object is to provide such a scaffold platform in which the deck plate may be made of inexpensive and readily replaceable yet quite strong material such as plywood.

A further object is to provide a scaffold platform including a pair of joists supporting and secured to a deck plate of plywood or similar material, such joists being disposed adjacent opposed edges of the deck plate and at least one of them having a flange which is extended and bent around such edge of the deck plate to cover and protect it.

The above objects are generally attained according to the invention by the combination of a thin deck plate and one or more joists of special shape underlying and secured to the deck plate at closely spaced intervals along the length of each joist. When the deck plate consists of a metal member such as commonly used in ships, the extruded metal joist may be continuously attached to the deck plate, as by welding, whereas when plywood is used for the deck plate the two members are secured to one another at close intervals by rivets, screws, or equivalent connecting members. The joists are of special shape, typically a U-shaped member in which the pair of parallel legs or rails of the U terminate in unconnected upper ends each having a flange integrally attached thereto and extending transversely of the rails, such flanges being provided with a multiplicity of holes for receiving the connecting members extending downwardly from the deck plate. In such typical joist, the rails extend normally downwardly from the deck plate and the joist includes a web or base which is integral with the rails and extends between their lower ends. While the base of the U-shaped joist is preferably continuous for the full length of the rails, the invention encompasses within its scope equivalents such as a pair of angle irons in which the lower ends of the downwardly extending rails are provided with a multiplicity of closely spaced connecting means having the effect of rigidly joining the parallel rails together, e.g., a series of longitudinally spaced sleeves each placed transversely between such rails and a stud threaded at both ends and extending through both such sleeve and registering openings in the two rails, with a nut on each end of the stud to draw the pair of rails and sleeve tightly together.

Such a platform may be used by itself, and may be supported on two transverse horizontal bars of a scaffold platform, either with the unmodified joist resting directly on the transverse bars or with grooves provided in such joist to fit snugly over the transverse bars of the framework so that the platform will not slide between transverse bars, but must be lifted therefrom in order to make such movement possible. In a more typical arrangement, where several platforms are to be disposed end to end to form a continuous walkway and working space, at least one end of each joist is provided with a male member or tongue extending beyond the end of the platform, and such a tongue is adapted to be received in the female end of a joist of the adjacent platform, in the slot defined between the downwardly extending pair of rails and the crossbar of such joist. When the joist is provided with a groove to fit over the crossmember of the scaffold framework, the tongue member is provided with a registering groove, so disposed that when the tongue is slid into the joist of the adjacent platform both members may be fitted over the crossbar of the framework to bring the ends of the deck plates of the adjoining platforms into abutting relationship.

The present invention will be more readily comprehended by reference to the accompanying drawing, in which drawing:

FIG. 1 is a perspective view of a complete section of a preferred embodiment of the present invention, partly broken away at one corner to show a detail of one of the joists, at the male end thereof,

FIG. 2 is an enlarged partial elevation showing two abutting sections of the same embodiment resting on a common transverse member of a scaffold framework, partially broken away and sectioned to show certain details,

FIG. 3 is a cross section through one of the joists of FIG. 1, as indicated by the sectioning lines and arrows "3—3" thereon,

FIG. 4 is a section similar to FIG. 3 but showing an alternate joist structure,

FIG. 5 is a perspective view, partly broken away, of a pair of sections of the scaffold platform of the invention disposed end to end and with adjacent ends shown resting on a common transverse member of a scaffold,

FIG. 6 is a cross section of a joist modified to provide protection for the edge of a deck plate, and

FIG. 7 is a cross section of a pair of identical scaffold platforms of the invention nested for shipping or storage, showing that they occupy a minimum of space.

The scaffold platform sections 1 shown in FIGS. 1–3, 5 and 7 consists of a deck plate 20 secured to a pair of underlying joists 10 by a multiplicity of closely spaced connecting members 5. Each joist 10 extends the full length of the deck plate 20 and projects beyond at either end for purposes of intermeshing with adjacent sections so that the adjoining ends of each pair of sections can use a common transverse support furnished by the scaffold structure, although it will be apparent that, in a system where only a single section is required, the joist need not extend beyond the ends of the deck plate. Each joist is preferably disposed adjacent to one of the long edges of the deck plate, as illustrated, and for most of the length of the deck plate and at female end 11 the joist has the cross section of FIG. 3. At the opposite or male end, the portion of the joist 10 having the cross section of FIG. 3 terminates somewhat short of the end of deck plate 20, and has secured thereto a bar or tongue 12 which forms the projecting end of the joist.

The section of the joist 10 for most of its length comprises a pair of rails 15 which extend generally normal to and downward from deck plate 20, a pair of outwardly turned flanges 16 integrally joined to rails 15 at their upper ends, and a thickened web 18 extending between rails 15 and integrally joined to both of them. The rails 15 are essentially parallel, and define between them a slot 19 which, at the male end of

the joist, is set to receive the tongue **12**. Tongue **12** is preferably dimensioned so that it is snugly received between rails **15**, with little or no side play, but is somewhat shorter than space **19**. This permits the preferred mounting of tongue **12** shown in particular in FIG. **2**, wherein bar **12** is fixed to its joist **10** by a pair of machine screws or rivets **25** which are received in registering transverse openings in bar **12** and rails **15** so that the top surface of tongue **12** is parallel to the upper surfaces of flanges **16** but the lower surface of the rail is spaced above the upper surface of web **18** by a small gap or clearance **22**.

In using a series of the scaffold platform sections **1**, as shown in FIGS. **1** and **5**, both the female end **11** and the tongue end **12** of each joist are preferably provided with transverse grooves **27**, dimensioned to fit snugly over the transverse member T of scaffold framework F, in this case a circular pipe member. When a female end **11** of one of the sections is thus mounted, and the tongue end **12** of the adjoining section is mounted on the same transverse member T, the arrangement is as illustrated in FIG. **2**, with the aforementioned clearance **22** also being formed between the tongue of the one section and the female section of the other. This arrangement insures that each section is supported independently of the other, neither requiring any support from its adjacent brother, and makes it possible to readily remove any individual section without disturbing the others. It also insures that accidental damage to one section will not be transmitted to another, as each section is completely independent of of the other. Also, trash which makes its way into a slot **19** is not likely to have the effect of raising tongue **12** from its proper position, although it could have this undesirable effect and the further consequence of a nonlevel transition between adjacent platform sections **1** if there were no clearance **22**.

In forming any one platform section **1**, it is important to use a large number of the connecting members **5**, which may be machine screws and nuts, rivets or other suitable equivalents. As an example, in a section tested as described below **46** aluminum rivets were used in an embodiment like that shown in FIG. **1**, **23** rivets per joist being used to secure a plywood decking **20** to a pair of aluminum joists **10**. The plywood decking was ½ inch thick, and was 19 inches wide by 7 feet long. The rivets were mounted as shown, alternating between the pair of flanges **16** of each joist, and the resulting spacing was on 4-inch centers along the length of the joist. With this close spacing, the deck plate **20** and joist **10** become almost a unitary structure, giving the combination a tremendous bending strength and enabling it to support much larger loads than heretofore.

Connecting members **5** may assume a wide variety of forms. Those shown in FIGS. **1–3** are the combination of filister head machine screws with mating nuts, while those shown in FIG. **4** (connecting members **5'**) are rivets. Any type connecting members may be used which will insure a tight connection between the deck plate **20** and the flanges **16** of the joist, a connection which is not likely to be easily loosened in service but can be readily removed if a wooden deck plate has become worn and is ready for replacement.

The modified joist section **1'** shown in FIG. **4** may utilize a deck plate **20'** of metal, although the combinations of deck plate and joists are not limited to those shown in the drawings, i.e., the wooden deck plates of FIGS. **1–3** and **5** could also use a metal deck plate and vice versa. The FIG. **4** embodiment utilizes a joist **30** which includes a pair of angle irons **31** oriented so that the shorter leg **33** of each member **31** is disposed beneath deck plate **20'** to serve as the connecting flange while the longer leg **35** extends normally below the deck plate to serve as one of the rails of the joist. The pair of rails **34** are disposed in parallel but spaced apart relationship, and between them is disposed a series of closely spaced sleeves **37** which serve as spacers. Each such spacer **37** receives a stud **38** which also projects through a pair of registering openings near the lower ends of rails **35**. The projecting portions of stud **38** are both threaded to receive a mating nut **39**, and the nuts are tightened to tightly draw both rails together with sleeve **37** compressed between them. With such connecting members spaced sufficiently closely, e.g., about 4 inches apart in the example above mentioned, the joist **30** is virtually as solid and strong in bending as the continuously connected joist **10** of FIGS. **1–3** and **5**.

EXAMPLE

In the example referred to above, deck plate **20** was a unitary piece of plywood, ½ inch thick by 19 inches wide by 6 ft. 11¾ inches long. Two aluminum joists **10** were used, disposed 7/8 of an inch from the adjacent edge extending in the longitudinal direction of the deck plate, such joists having the same 6 ft. 11¾-inch length as the deck plate itself. Each was disposed so that its female end **11** projected 1 11/16 inches beyond the end of the deck plate, which of course made its opposite end terminate 1 11/16 inch short of the nearby end of the deck plate. Such joist had an overall depth of 2.000 inches and an overall width, between extremities of flanges **16**, of 1.700 inches. Slot **19** was 1.712 inches deep by 0.500 inches wide. The thickness of each rail **15** and each flange **16** was 0.100 inches, while the maximum depth of web **18**, at its center, was 0.288 inches.

The tongue member **12** was also made of aluminum, and had the shape of a rectangular parallelapiped measuring 1½ inches deep by 7/16 inch wide by 6 inches in length, and it was disposed as shown in FIG. **2**, so that gap **22** measured 0.212 inch in depth. It was mounted in its joist **10** so that 3¼ inches of its length extended beyond the end of the joist, of 1 9/16 inches extended beyond the end of deck plate **20**.

As previously stated, each joist **10** was fastened to deck plate **20** by **23** aluminum rivets, each such rivet being ¼ inch in diameter and measuring 7/8 inch in length under its preformed head prior to upsetting the free end. Such rivets were uniformly spaced along the length of the joist, being alternately disposed in the opposed flanges **16**. The resulting spacing along the length of the deck plate was 4 inches.

A single scaffold platform as thus constructed weighs only 27 pounds, and has an upper surface measuring approximately 11 square feet. It was tested with a uniform loading along its complete length to determine what load was required to produce a permanent set. This did not occur until the uniform loading exceeded 457 pounds per foot of length, or an equivalent of a load exceeding 290 pounds per square foot of platform surface. Such a load by far exceeds the total that may be expected in all foreseeable circumstances, including not only the weight of the workmen and their materials but such dynamic and transitory loads as may be expected from weather conditions and from shock loading resulting from other workmen walking rapidly over a particular section dropping tools and sacks of working material, etc.

Referring back to FIGS. **1**, **2** and **5**, it will be noted that the end of deck plate **20** adjacent the female ends **11** of joist **10** is provided with a pair of slots **24** which overlie slots **19** of the joist in registering relationship therewith. While such slots **24** are not essential, they make it possible to remove one platform **1** completely independently of the other; but for slots **24**, removal of any section **1** would require raising the female end of the adjacent section **1** to provide the necessary from to withdraw the end of a section **1** including the projecting tongues **12**. It should also be noticed that the transverse grooves **27** in tongues **12** and the female ends **11** of the joist are disposed so that the abutting ends of deck plates **20** and the small clearance therebetween are disposed directly over the center of the transverse bar T of the scaffold platform F which is received in the transverse grooves **27**. This arrangement is believed to make for maximum safety, as there is no portion of deck plate **20** which extends to one side of transverse supporting member T from the bulk of the platform section to serve as one end of a lever, i.e., the possibility that the platform section could be rotated about ember T as a pivot is eliminated.

In the modified joist 10' of FIG. 6 the prime numbers designate parts similar to the parts of the FIG. 3 joist, e.g., rails 15' and web 18'. There is only a single short flange 16', as the opposite flange 41 is extended and bent over to fit the edge of a plywood or similar deck plate 20. Thus it includes a vertical portion 42 which butts against the edge of the deck plate and, preferably, a second bent over portion which engages the upper surface of the deck plate. The joist 10' may be dimensioned so that its weight per lineal foot is the same as that of the joist 10 of FIG. 2. This may be accomplished, for instance, by reducing the thickness of web 18', as illustrated.

FIG. 7 illustrates how pairs of the scaffold platform 1 may be nested for packing and storage. With one of the pair inverted as shown, they fit together so that the overall dimensions of the pair are only slightly greater than the corresponding dimensions of a single section. The pair may be tightly packed in a rectangular carton without slipping inside the carton, and many pairs like those shown in the drawing may be stacked on each other, without danger, to a considerable height.

What is claimed is:

1. A scaffold platform comprising a thin deck plate of generally rectangular shape, a pair of joists underlying and secured to said deck plate at closely spaced intervals, said joists being generally parallel to and spaced from each other and each disposed adjacent an edge of said deck plate with opposed ends extending beyond the corresponding ends of the plate, at least a portion of each joist including one of the projecting ends being U-shaped in cross section with a pair of outwardly bent flanges extending in opposed transverse directions from the top of the joist and serving as the portion of the joist connected to said deck plate, said portion being adapted to receive a male end extending from an adjacent platform, the opposite projecting end of the joist being a male member adapted to be received in the U-shaped projecting end of another adjacent platform, said male and female ends having registering notches for supporting the platforms on the cross rods of a scaffolding framework.

2. A scaffold platform comprising decking elongated in one direction, at least one stiffener joist disposed beneath said decking to extend along its elongated direction and protruding from the ends thereof, and a multiplicity of connecting means firmly securing said joist or joists to said decking at closely spaced intervals along said elongated direction, one of said protruding ends of the stiffener joist being a female member receiving and supporting a male member of an adjacent scaffold platform and the other end being a male member receivable in a female member of another adjacent scaffold platform, said members being notched to be received and supported by cross rods of a scaffolding framework extending transversely of said elongated direction.

3. The scaffold platform of claim 2 in which said notches are disposed directly beneath the end of said deck plates.

4. The scaffold platform of claim 4 in which said stiffener joist is a flanged U-shaped member, the flanges extending transversely of the legs in opposed directions and serving as the portions of the joist secured to the decking, and in which one of the flanges of said joist is elongated and bent to fit over and butt against an adjacent edge of the deck plate.

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