July 14, 1970 Z. SZOHATZKY ET AL 3,520,506

WORK STOOL

Filed March 13, 1968

FIG. 1

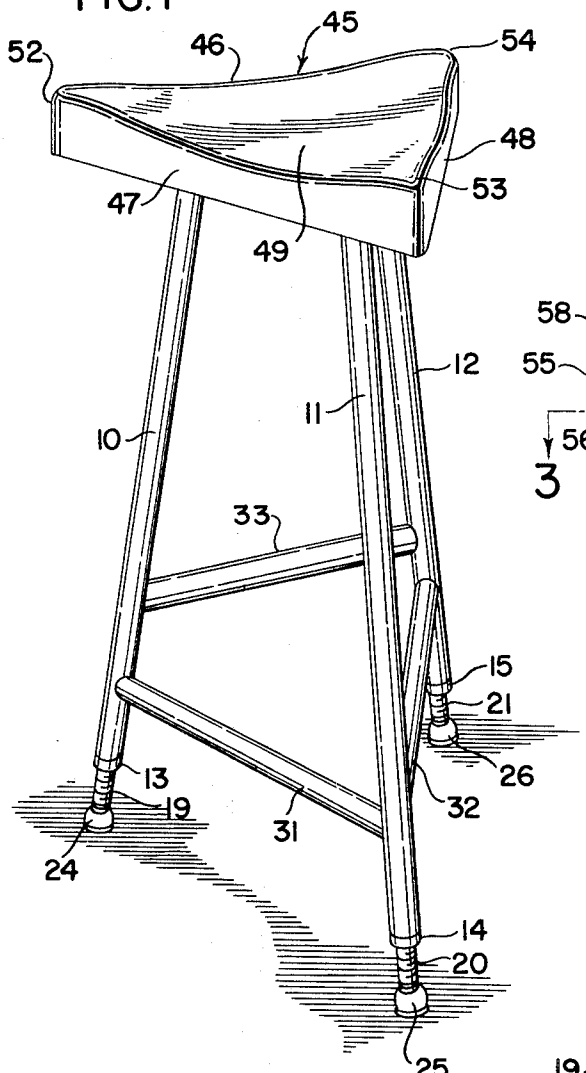


FIG. 4

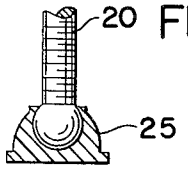
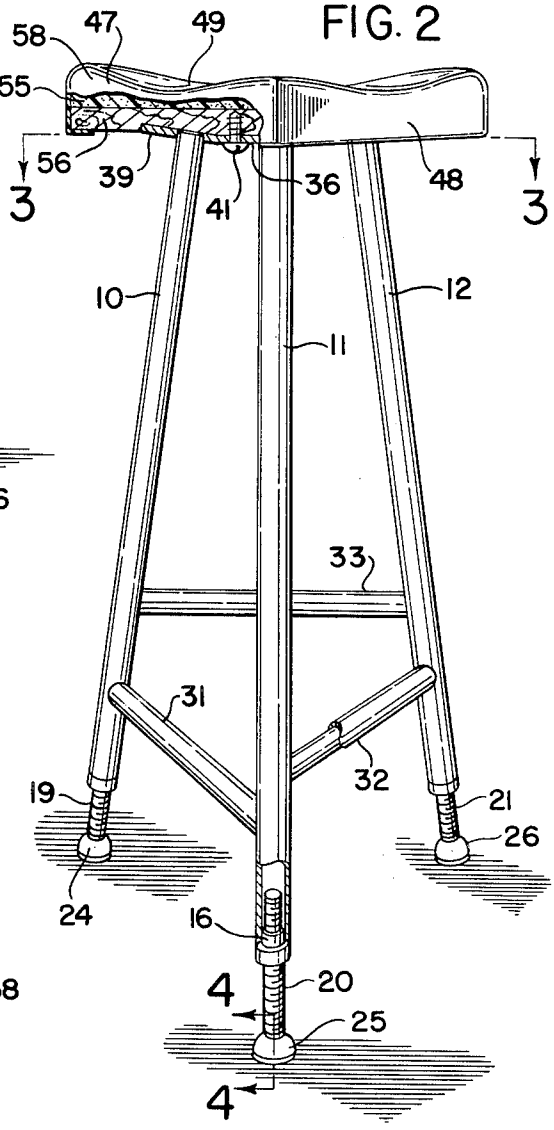


FIG. 2



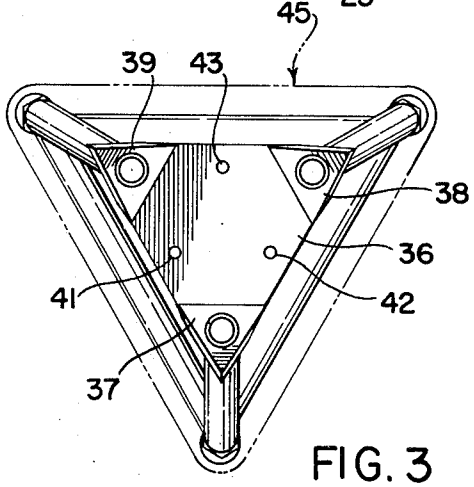


FIG. 3

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WORK STOOL

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U.S. Cl. 248—188 7 Claims

ABSTRACT OF THE DISCLOSURE

A work stool having three elongated upwardly converging legs of substantially equal length. A triangular bracket secures the upper ends of the legs equidistant from one another and a generally triangularly-shaped seat is attached to the bracket. The triangular-shaped seat has each of its corners positioned directly vertically above the point at which the lower end of an associated leg engages the floor or other support surface. Rungs of different height from the floor connect the lower portions of the legs to each other.

BACKGROUND OF THE INVENTION

Fatigue is a formidable problem to operators of complex and high speed machinery. Misjudgment, carelessness and negligence, the products of fatigue, can be extremely dangerous and perhaps even fatal to the operator who permits them to interfere with his judgment. In order to reduce fatigue, operators often use work stools.

The primary requisites of a good work stool are stability, comfort, and the ability to be placed close to the operator's machine. Stability is essential or the operator may be in danger of falling onto the floor or into his machine. The comfort of the work stool is important since the operator would not use it to a desirable extent if it were uncomfortable. Moreover, an uncomfortable stool merely contributes to fatigue. Finally, the work stool should be designed so that the operator may place it as close as possible to his machine. If the legs of the work stool have too wide a base or if the legs extend laterally too far beyond the edge of the stool seat, they will abut the machine, thus forcing the operator to sit back at a distance from his work. He is thus compelled to work with his arms extended which tends to result in premature fatigue.

Prior art work stools have, as a whole, not been entirely satisfactory. They have usually been the result of a compromise between a design for stability and one which permits proximity of the work stool and the machine. Specifically, if the legs had a wide base, or if they extended too far beyond the stool seat, the work stool was stable but it would not permit the operator to work sufficiently close to his machine Conversely, if the base was narrow and good proximity was possible, then stability became a problem.

Four-legged work stools have been proposed, but generally have an inherent defect. They wobble on uneven floors, which are often present in workshops. Three-legged work stools on the other hand, are immune to wobble since the lower ends of the legs always define a single plane. However, the three-legged work stool is stable only as long as the vertical force on the seat is not directed downwardly outside the triangle defined by the three points of engagement between the floor and the lower ends of the legs.

A problem arises when the usual round or square seat is used on a three-legged stool. If the seats are of a sufficient size to be comfortable, there will undoubtedly be a section or corner which will extend beyond the bounds of the triangle previously mentioned. If the operator

should sit on this "extended" portion of the seat, a tipping moment would be created which could cause the work stool and operator to fall.

Another matter concerning the comfort of the operator is the provision for a suitable footrest for the operator. If the operator's legs merely hang over the edge of the stool seat when he is sitting, they have a tendency to fall asleep because of poor circulation. The usual procedure is to provide rungs between and supporting the stool legs on which the operator may prop his feet. However, people have various leg lengths and, therefore, everyone is not comfortable where the height of each rung is the same. While his consideration seems basic, it has apparently been previously ignored.

Most work stools have a flat hard seat which makes sitting for any period of time uncomfortable. In this respect, a properly designed seat providing contours and padding can do much to aid in reducing fatigue.

This invention has satisfied the criteria of stability, comfort and potential proximity between the work stool and machine. This work stool utilizes the stable three-leg configuration with a triangular contoured and padded seat, the edge of which substantially geometrically conforms in size, shape and orientation to the triangular outline defined by the points at which the bottoms of the legs engage the floor. In this manner, the corners of the triangular seat are directly vertically above the ends of the legs and no part of the seat extends horizontally substantially beyond the triangle defined by the leg ends at floor level. Thus, no moments are encountered which would tend to cause the stool to tip. Moreover, since the edges of the seat define a triangle of substantially the same size as that defined at floor level by the ends of the legs, the legs do not extend laterally outwardly beyond the edges of the seat, and the operator may move to a position immediately adjacent his work and the machine.

In order to provide for a universally comfortable foot support for the operator, the rungs connecting the legs are positioned at different heights from the floor. Thus, shorter individuals may use the higher rungs and taller ones the lower rungs to derive an equal degree of leg comfort. Moreover, the use of such rung placement contributes favorably to the comfort of the standing operator, who may relieve fatigue to his back by placing one foot on a selected rung, or by varying the rung upon which he rests his foot.

Further comfort is provided by a contoured padded triangular seat.

SUMMARY OF THE INVENTION

A work stool is anticipated which has three elongated upwardly converging legs of substantially equal height. The upper ends of the legs are secured together at a substantially equal distance from one another and a seat is mounted by appropriate means to the upper ends of such legs. The seat is generally triangularly shaped, and the corners of the triangle extend horizontally no further than the points at which the bottom ends of the legs engage the floor. Rungs of varying heights from the floor extend between the legs and connect them. Leveling screws may be placed at the bottom of the legs to permit compensation for an uneven floor.

FIG. 1 shows a perspective view of the work stool of this invention.

FIG. 2 is a front elevation of the work stool.

FIG. 3 is a sectional taken through 3—3 of FIG. 2.

FIG. 4 is a detailed view in enlarged scale of the connection between the legs and the leveling screws and pads.

The work stool of this invention as illustrated in FIGS. 1–3 includes three metallic, tubular equispaced elongated legs **10**, **11** and **12** of substantially the same length. The bottom ends of the legs **10**, **11** and **12** include nuts

13, 14 and 15, respectively, provided with sleeve portion 16 telescoped within such tubular legs (FIG. 2). Nuts 13, 14 and 15 may be affixed to legs 10, 11 and 12 by any suitable manner, such as by press fitting, welding, or the like. These nuts are internally threaded and cooperate wth externally threaded eveling screws 19, 20 and 21 which in turn are connected by means of a ball-socket arrangement (as seen in FIG. 4) to pads 24, 25 and 26. In this connection, a concave socket formed in each pad engages a ball 28 provided at the end of each leveling screw. Thus, each pad may pivot about its respective ball to compensate for slight variations in floor contour. To compensate for more substantial variations in the contour of the floor, the leveling screws need only be rotated clockwise or counterclockwise to maintain the seat of the work stool in a substantially horizontal plane. A common cause of substantial variations in the contour of the floor is pads which are placed in front of the machines. The work stool legs may rest on both the floor and pad. The leveling screws can thus be adjusted to lengthen the legs which contact the uncovered floor or shorten the legs on the pad.

Above the leveling screws is rung 31 connecting legs 10 and 11, rung 32 connecting legs 11 and 12 and rung 33 connecting legs 12 and 10. The rungs are positioned generally parallel to the supporting surface or floor on which the work stool rests, but are at various heights therefrom. By varying the height of the rungs from the floor or supporting surface, the stool provides a comfortable foot rest for individuals of various heights. A short individual would use high rung 33 to support his feet while he sits on the work stool, a tall individual would use the low rung 31 and an individual of medium height would use rung 32.

The rungs 31, 32 and 33 may be metal tubes and may be coated with plastic, rubber or metal (FIG. 2) to resist abrasion and protect the rungs from the various corrosive materials that are often present in a machine shop.

The upper ends of the converging legs 10, 11 and 12 are secured together in a rigid, spaced relationship from one another by means of a brace 36 formed generally in the shape of an equilateral triangle. Each corner of the triangle brace engages one of the legs and is attached thereto. The preferred method of attaching the seat to the legs is by bending each of the corners 37, 38 and 39 of the triangular brace 36 upwardly out of the normal plane and placing apertures in each corner. In this manner, each leg may be positioned in the apertures at a slight angle relative to the normal plane of the brace, and welded to such brace. It is anticipated that other means such as bolts and nuts may be used to secure the legs to the triangular brace 36 and that the brace 36 may itself be simply a frame.

Circular apertures 41, 42 and 43 are located along the sides of the triangular brace 36 to permit the insertion of screws, brackets or other fasteners therethrough to connect the brace 36 to triangular seat 45. It is possible, however, that the seat 45 could have appropriate means thereon simply to secure the top of the legs in an equally spaced relationship without the use of the separate triangular brace 36.

The triangular seat 45 is in the form of a substantially equilateral triangle having side edges 46, 47 and 48 and a top surface 49. The side edges 46, 47 and 48 are positioned essentially parallel to the rungs 31, 32 and 33. Additionally, each of the corners 52, 53 and 54 is so located, and the triangular seat is so proportioned that each corner lies vertically precisely above the points at which the lower ends of the legs 10, 11 and 12, respectively, engage the floor or other support surface. This arrangement will be more clearly understood by reference to FGI. 3 wherein the relationship of the seat 45 (shown in phantom outline) to the lower ends of the legs is illustrated. Preferably, this relationship would be the case when the leveling screws are threaded into the legs to the fullest extent. This would insure that the corners 52, 53 and 54 of the seat 45 would never extend horizontally outwardly beyond the respective points at which the legs 10, 11 and 12 are supported by the floor.

The concept of a triangularly shaped seat substantially conforming in size, shape and orientation to the triangle formed at floor level by the points of engagement of the leg ends with the floor is very important. This insures that the operator, regardless of the position in which he seats himself on the work stool, will always be adequately supported and that there will be no tendency for the stool to tip. If he prefers to sit along one of the seat sides, his body weight will be distributed over the seat so that his center of gravity will not be directed horizontally outwardly beyond a line connecting the points of engagement between the leg bottoms and the floor, thus eliminating tipping moments. On the other hand, should he prefer to sit straddling one of the corners, his body weight still, by necessity from the design of the work stool, must be concentrated within the bounds of the triangle along which the stool is suppored at the floor.

It is often common for the operator to straddle a corner or lean on the side of the work stool seat while substantially standing with both feet supported by the floor. This half-sitting and half-standing position also does not disturb the inherent stability of this work stool.

As previously discussed, other designs produce a tendency to tip when the operator places himself in a certain position. That is, if a four-cornered seat is used, any weight at one of the corners will be concentrated outside the support zone and therefore a moment is created which would tend to tip the stool. The same problem is encountered with a circular seat unless the diameter of it is so small as to be very uncomfortable. By use of the inventive concept herein disclosed, the maximum amount of area is used for the seat to make it as comfortable as possible without sacrificing the stability which is so important when working with high-speed, potentially dangerous machines. Moreover, by having the seat corners extend to the very limit of stability, the operator may place the stool as close as possible to his machine and thereby be more comfortable when working from it.

In order to make the seat 45 as comfortable as possible and to encourage the operator to sit in the center of the work stool, the seat 45 is contoured and padded. Rubber or some resilient material 55 lays on a flat triangular element 56 and is enveloped by a suitable covering material 58. The covering 58 should be made of a durable material which can withstand the rugged use that the work stool will encounter. The resilient material 55 is preformed to present an upwardly facing concave surface. The three points of the triangle are the highest surfaces on the seat and thus encourage the operator to sit near the center of the seat where it is most stable and safe. The same result is attained if the operator sits facing the side. Moreover, the seat fits the natural contour of the operator to make the stool as comfortable as possible and thus further delay fatigue.

For ease of description, the principles of the invention have been set forth in connection with but a single illustrated embodiment. It is not our intention that the illustrated embodiment nor the terminology employed in describing it be limiting inasmuch as variations in these may be made without departing from the spirit of the invention. Rather we desire to be restricted only by the scope of the appended claims.

We claim:

1. A work stool comprising:

three elongated substantially equispaced converging legs of substantially the same length;

a generally triangular brace, having its corners turned up, an aperture provided in each corner, the upper ends of said legs secured in said apertures;

a seat connected to said triangular brace, said seat having a generally triangular shape providing edges con-

forming in shape and orientation essentially to the triangle formed by the points of engagement between ends of said legs and the floor, each corner of said triangular seat being positioned substantially above the lower end of one said leg.

2. A work stool comprising:

three elongated substantially equilength, equispaced, upwardly converging legs;

means securing the upper ends of said legs substantially equidistant from one another;

said means for securing the upper ends of said legs including a generally triangular brace having its corners turned up, an aperture provided in each corner, each leg having its upper end secured in one said aperture;

a seat operatively connected to the upper end of said legs, said seat having a generally triangular shape providing edges conforming in size, shape and orientation essentially to the triangle formed by the points of engagement between ends of said legs and the floor, each corner of said seat being positioned substantially, directly vertically above the lower end of one said leg;

rungs between said legs and connecting them, said rungs, one to another, being located at various heights from the floor on which the stool is adapted to stand;

said legs including leveling screws at the lower ends thereof to permit them to compensate for an uneven floor, each leveling screw having a ball at its outer end, a floor contacting pad having a socket therein, said ball being pivotally secured in said socket.

3. The work stool of claim 1 including rungs between said legs and connecting them, one to another, being located at various heights from the floor on which the stool is adapted to stand.

4. The work stool of claim 1 wherein said legs include leveling screws at the lower ends thereof to permit them to compensate for an uneven floor.

5. The work stool of claim 4 wherein each leveling screw is provided with a ball at its outer end; a floor contacting pad having a socket therein, said ball being pivotally secured in said socket.

6. The work stool of claim 2 wherein said seat is padded and contoured to form a resilient, upwardly opening concave surface providing high areas at the corners of said triangular seat.

7. The work stool of claim 3 wherein said rungs have a protective plastic covering thereon.

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JAMES T. McCALL, Primary Examiner

U.S. Cl. X.R.

248—188.2, 188.91