United States Patent [19]

Holopainen

[11] **3,893,728**

[45] **July 8, 1975**

[54] **MATERIAL HANDLING APPARATUS**

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[52] **U.S. Cl.** ..... **296/65 R;** 180/77 S; 297/240; 297/349

[51] **Int. Cl.** **B60n 1/02**

[58] **Field of Search** ..... 180/77 S; 296/65 R; 297/240, 349; 214/140

[56] **References Cited**

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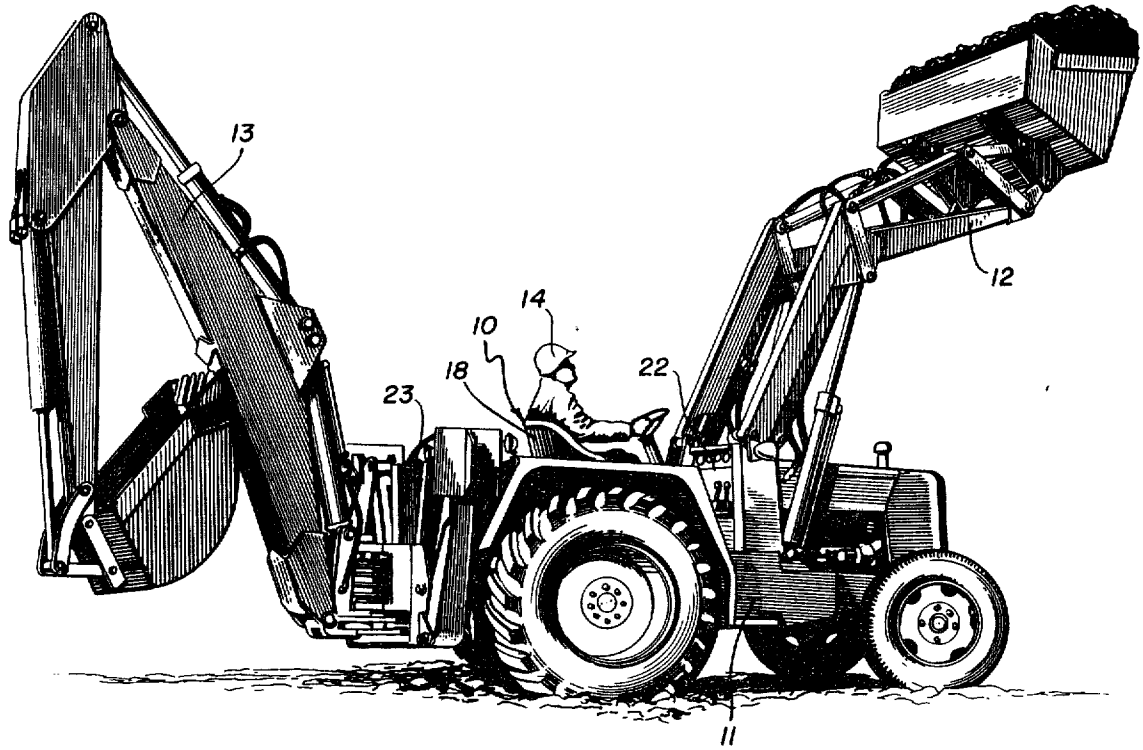
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Assistant Examiner—Lawrence J. Oresky
Attorney, Agent, or Firm—Norman S. Blodgett; Gerry A. Blodgett

[57] **ABSTRACT**

Material handling apparatus having a seat which is mounted on a swinging arm for movement from a forwardly-facing position to a rearwardly-facing position.

11 Claims, 7 Drawing Figures



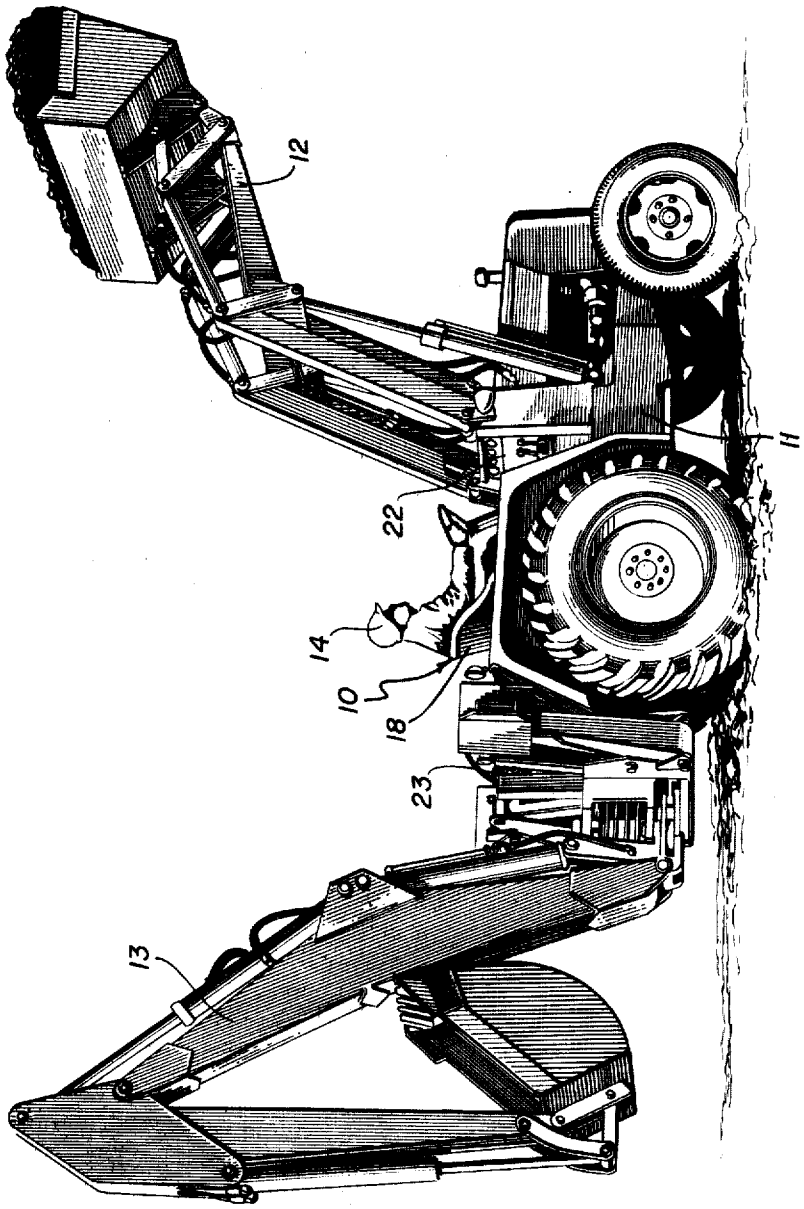


FIG. 1

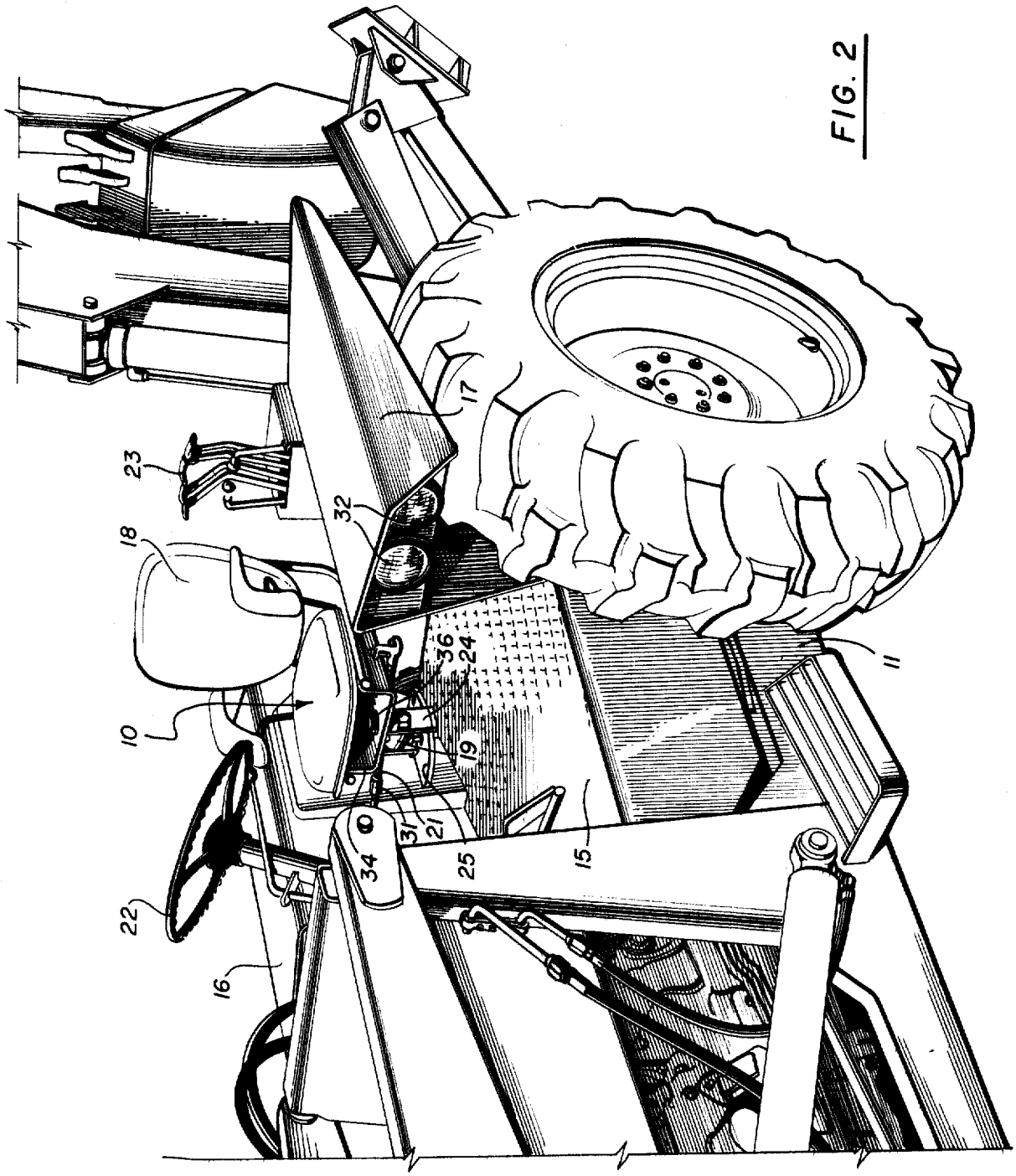


FIG. 2

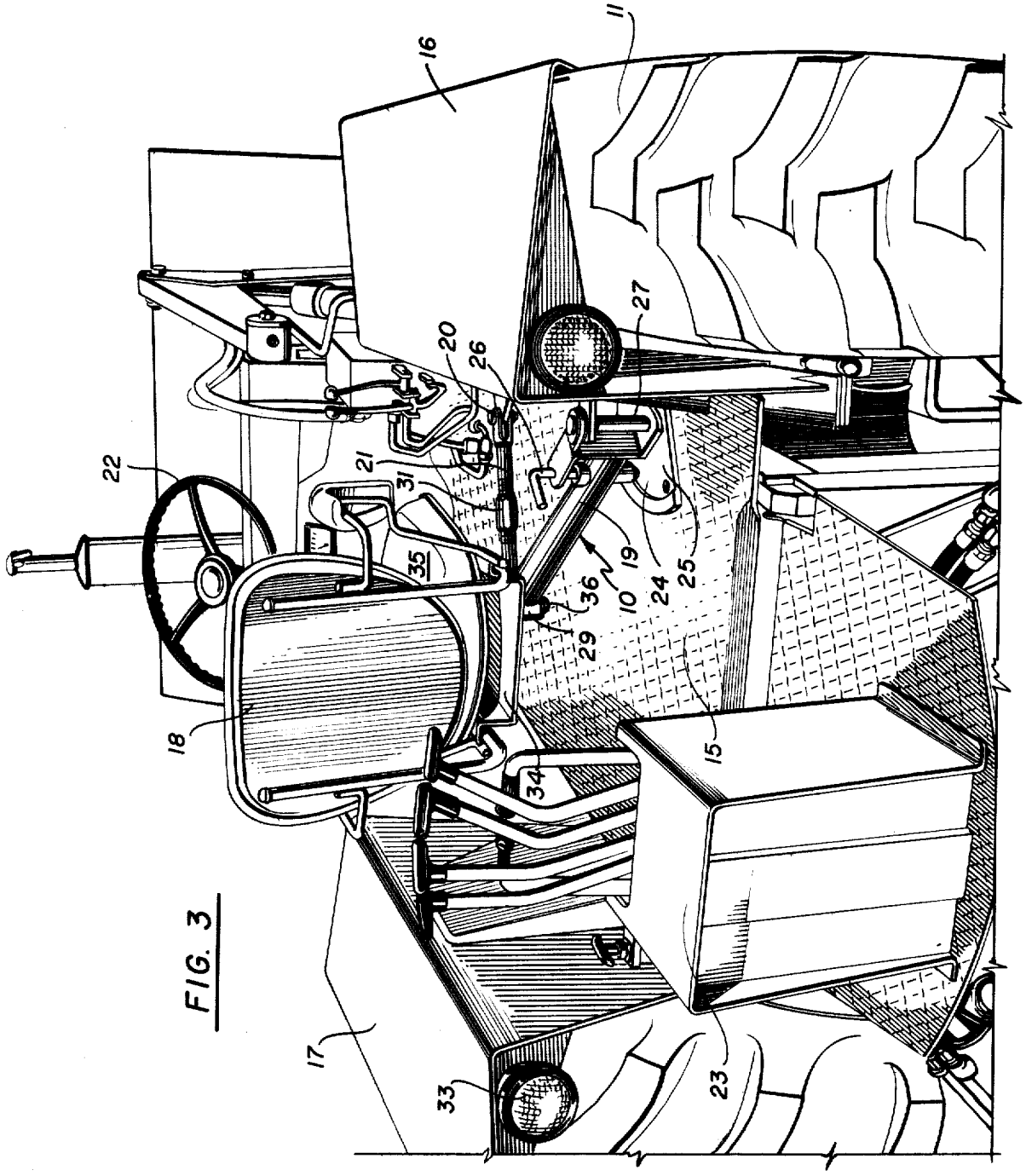


FIG. 3

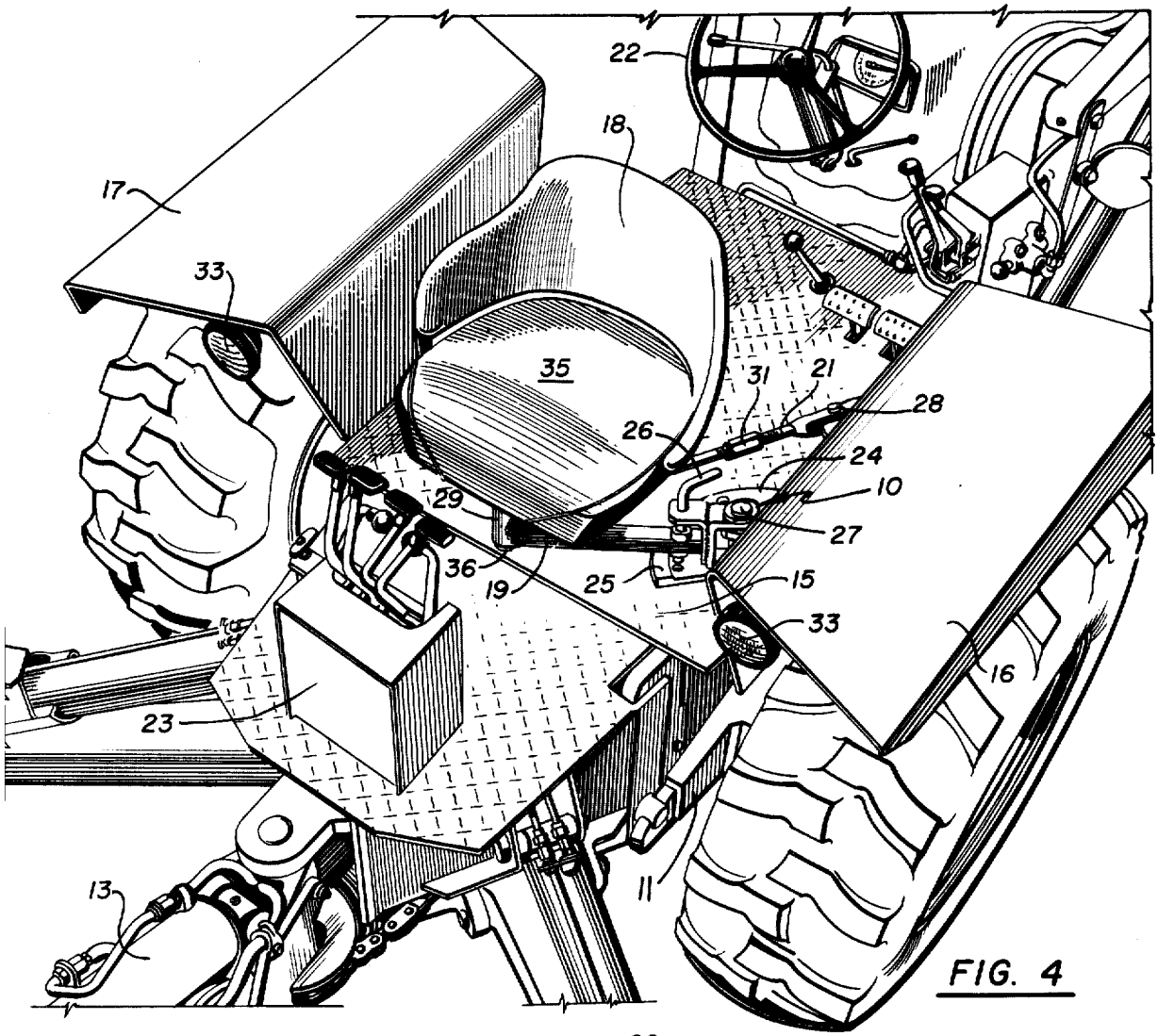


FIG. 4

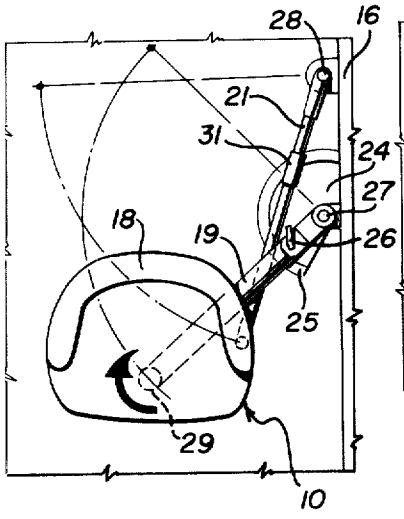


FIG. 5

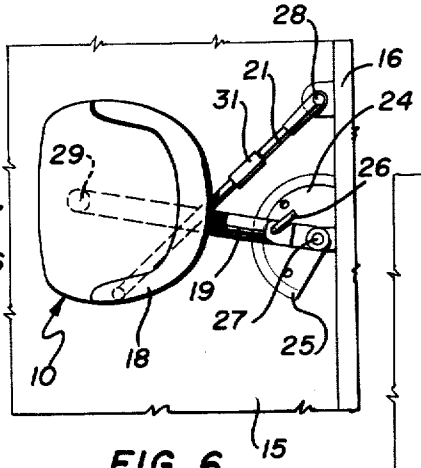


FIG. 6

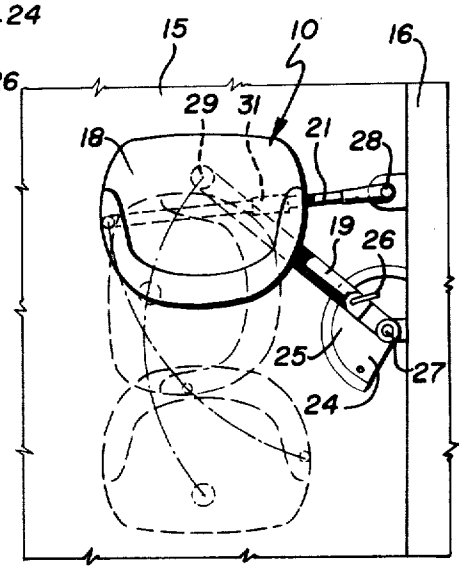


FIG. 7

MATERIAL HANDLING APPARATUS

BACKGROUND OF THE INVENTION

It has become common practice to provide material handling apparatus, particularly for earth-moving operations, which consists of a tractor to which are mounted various attachments. For instance, it is common practice to provide a heavy duty tractor with a front end loader at one end and with a back-hoe at the other end. The efficient use of apparatus of this kind requires that the operator face in the foreward direction in order to manipulate the tractor and to use the front end loader. He must face to the rear in order effectively to operate the back-hoe. Furthermore, he must move from one position to the other quite frequently during the working day. For instance, if he is digging a trench with the back-hoe, he must face forwardly while moving the vehicle forward and then he must face rearwardly in order to operate the back-hoe; he must alternate these operations every few minutes in order to produce an elongated trench. In order to facilitate this operation, some material handling apparatus has been provided with a seat which may be converted from a forwardly-directed condition to a rearwardly-directed condition. One way of accomplishing this has been to mount the seat pivotally on the top of a vertical post in the center of the tractor with a detent associated with the pivoted action to lock the seat in one position or the other. A similar arrangement has the seat mounted on the transverse horizontal hinge so that it may be flipped from one position to another, the operator sitting on the portion of the seat which was the back in one position and having as his back rest the portion of the seat which was used as the seat in the other position; such a construction is shown in the patent of Holopainen No. 2,784,768. Both of these constructions suffer from the shortcomings that the ideal seat position for operating the front portion of the apparatus is spaced a considerable distance from the position in which the rear portions of the equipment are operated. Attempts have been made to compensate for this by providing for sliding between the upper and lower parts of the seat, but the amount of sliding adjustment that is possible is not great enough to take care of the distance between these two ideal positions. Furthermore, the use of adjusting tracks is frustrating to the operator and a source of constant maintenance difficulty in the seat because of the presence of dust and dirt in the atmosphere. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to proivide material handling apparatus having a seat which may be easily moved from one optimum position of operation to another such position.

Another object of this invention is the provision of material handling apparatus having a two-position seat, which is simple in construction and which is capable of a long life of useful service with a minimum of maintenance.

A further object of the present invention is the provision of material handling apparatus having a seat which can be moved and turned at the same time by apparatus which cannot be disabled by the presence of dust and dirt.

It is another object of the instant invention to provide material handling apparatus in which the operator's

seat is mounted in a narrow aisle in which the seat is rotatable and movable longitudinally along the aisle, the apparatus being arranged so that the seat does its major turning at the ends of the longitudinal passage along the aisle, so that the operator does not strike his knees against the sides of the aisle.

A still further object of the invention is the provision of material handling apparatus having a seat which can be sold and mounted on existing apparatus and accessory.

It is a further object of the invention to provide material handling apparatus having a two-positioned seat which can be mounted on a flat deck without interrupting the decks surface with protusions and attachments.

It is another object of the instant invention to provide material handling apparatus having a two-positioned seat in which the seat can be moved easily by the operator from one position to the other without his leaving the seat.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

SUMMARY OF THE INVENTION

In general, the invention has to do with a material handling apparatus having a vehicle body with a horizontal deck extending longitudinally of the body, and having a pair of spaced parallel fenders extending longitudinally of the body, one fender being located on each side of the deck. The seat is mounted above the deck between the fenders and a support arm is pivoted at one end to a fender for swinging movement in an angle of approximately 90° in a horizontal plane below the level of the seat. The other end of the arm is pivotally attached to the bottom of the seat at the center front thereof. Means is provided to cause the seat to rotate through an angle of 180° when the arm swings through its angle of 90°.

More specifically, the means also serves to cause the seat to move a substantial distance longitudinally, as it pivots through its angle of 180° from a forwardly-direct position where the operator has access to the driving controls of the vehicle to a rearwardly-directed position at which the operator has access to the handling controls of the vehicle.

Furthermore, the means consists of a control arm pivotally connected at one end to the same fender to which the support arm is pivoted, but at a point spaced forwardly a substantial distance from the connection of the support, the other end of the control arm being pivotally connected to the bottom of the seat as the center of one side.

The support arm is located a substantial distance above the deck and is the sole support for the seat with the weight of the operator.

BRIEF DESCRIPTION OF THE DRAWINGS

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawings, in which:

FIG. 1 is a perspective view of material handling apparatus embodying the principles of the present invention,

FIG. 2 is an enlarged perspective view of the apparatus taken from the front end,

FIG. 3 is an enlarged perspective view of the apparatus taken from a rear quarter.

FIG. 4 is an enlarged perspective view of the apparatus taken from above, and

FIGS. 5, 6, and 7 are somewhat schematic plan views of the apparatus showing the seat in three different positions.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, wherein are best shown the general features of the invention, the material handling apparatus, indicated generally by the reference numeral 10, is shown as consisting of a vehicle body 11 in the form of a tractor to the front end of which is connected a front end loader 12 and to the rear end of which is attached a back-hoe 13. The operator 14 is shown in place on a seat 18.

Referring now to FIGS. 2, 3, and 4, it can be seen that the apparatus is provided with a flat horizontal deck 15, which extends longitudinally of the vehicle body and has fenders 16 and 17. The fenders 16 and 17 are spaced and in parallel and they extend longitudinally of the vehicle body on either side of the deck 15 to define an aisle between them. A seat 18 is mounted above the deck 15 between the fenders 16 and 17. The seat is carried on a swingable support arm 19 and movable from a forwardly-directed position (as shown in FIG. 2) where the operator has access to the driving controls 22 of the vehicle to a rearwardly-directed position (as shown in FIG. 4) where the operator has access to the operating controls 23.

The forwardly-directed position is shown in FIGS. 3 and 7, while the rearwardly-directed position is shown in FIGS. 4 and 5. In the forwardly-directed position the operator also has access to the controls for the front end loader 12 and in the rearwardly-directed position, the operator by using the operating controls 23 controls the back-hoe 13.

As is evident in FIGS. 2, 3, and 4, the supporting arm 19 is pivoted at one end to the fender 16 for swinging movement through an angle of approximately $\pi°$ in a generally horizontal plane below the level of the bottom of the seat 118. The other end of the arm is pivotally attached to the bottom of the seat at the center front thereof. Means including a control arm 21 causes the seat to rotate through an angle of 180° when the arm swings through its angle of 90°.

The control arm 21 also serves to cause the seat to move a substantial distance longitudinally as it pivots through its angle of 180° from the forwardly-directed position (where the operator has access to the driving controls 22 of the vehicle) to the rearwardly-directed position (where the operator has access to the handling controls 23 of the vehicle). A detent mechanism 24 is provided in association with the support arm 19 to lock it selectively at either end of its swinging movement. The detent mechanism is provided with an apertured horizontal quadrant plate 25 which is fastened to the fender 16 and underlies the portion of the arm which is connected to the fender. A vertically-movable detent pin 26 is mounted in the arm and is located to be accessible to the operator for movement in and out of the apertures in the plate 25. Its lower end is tapered for ease of entry into the quadrant plate apertures.

The control arm 21 is pivotally connected at one end to the same fender 16 to which the support arm 19 is pivoted, but at a point spaced forwardly a substantial distance from the connection of the support arm. The support arm 19 is connected at the fender 16 for movement about the vertical pivotal access defined by a pivot pin 27, while the control arm is connected to the fender 16 for pivoting about a vertical axis defined by a pivot pin 28. As is most evident in FIG. 2, the support arm 19 and the control arm 21 are located in different vertically-spaced planes so that they do not interfere with one another during swinging. As has been previously stated, the point of attachment of the support arm 19 to the seat 18 (indicated by a bushing 29 integral with the end of the arm) is located at the center of the seat adjacent the forward edge. As is evident in FIGS. 5, 6, and 7, this bushing or point of attachment of the support arm to the seat always remains at one side of the control arm 21 during the movement of the seat from one position to the other. The control arm 21 is provided with a threaded coupling 31 for adjustment of its length. The fenders 16 and 17 are provided with forwardly-directed headlights 32 and rearwardly-directed lights 33.

As is evident in the drawings, the support arm 19 is located a substantial distance above the deck 15 and is the sole support for the seat 18 and for at least a major portion of the weight of the operator 14. As is best evident in FIGS. 2 and 3, the seat 18 consists of an upper portion 35 and a lower portion 34, the arms 19 and 21 being connected to the lower portion 34 and the operator occupying the upper portion 35. There is a slidable connection between the two portions for adjustment longitudinally of the vehicle body and detent means is provided to lock the two portions in a selected position of relative adjustment. A vertical pintle 36 extends downwardly from the lower portion 34 of the seat and resides in the bushing 29, which is integral with the end of the support arm 19. As is best evident in FIG. 3, the main portion of the support arm 19 extends at an obtuse angle to the axis of the pintle 35 and at an acute angle to the horizontal surface of the deck 15.

The operation of the invention will now be readily understood in view of the above description. Referring to FIG. 1, the operator 14 is shown in the seat 18, facing forwardly of the vehicle body 11 for operating the front-end loader 12. He also has available to him in that position, a driving control 22 for the vehicle, thus permitting him to move the vehicle backwards and forwards, as is particularly necessary when operating a front-end loader. When the operator faces rearwardly to operate the back-hoe 13, the forward and rearward movement of the vehicle does not ace quite as frequently. Nevertheless, in using a back-hoe it is quite often necessary to advance the vehicle forwardly in small increments to make the back-hoe operative with different parts of the ground being worked on. This situation takes place when the back-hoe is being used to form an elongated ditch. In this situation the operator must face rearwardly one moment to operate the back-hoe and then a few minutes later face forwardly to run the vehicle forward a few feet. An effective operation of the present invention permits the seat 18 to be moved from the forwardly-directed position to the rearwardly-directed position without difficulty. FIGS. 2 and 3 show the forwardly-directed position of the seat 18, where the operator has access to the driving controls 22 of the vehicle. It also shows the way in which the fenders 16 and 17 lie on opposite sides of the deck

15, so that an aisle is formed. This aisle provides suitable operating area for the swinging of the seat. FIG. 4 shows the rearwardly-directed position of the seat 18 where the operator has access to the operating controls 23 of the vehicle, particularly for those operating the back-hoe 13. FIGS. 5, 6, and 7 shown, particularly well, the manner in which the seat is manipulated. In FIG. 7 the seat 18 is shown in the forwardly-directed position with the detent pin 26 engaging a foreward pin on the quadrant plate 25. When the operator wishes to change the position of the seat, he pulls up on the detent pin 26, so that it is free of its aperture, and he pushes backwardly on the seat. As the seat begins to swing rearwardly about the axis of swing of the support arm 19, this swinging motion also causes the seat to rotate about a vertical axis passing generally through its center of gravity due to the operator's action of the control arm 21. It operates in such a way that, when the swinging action on the arm 19 has gone even a few degrees, the seat has already rotated 90° (as shown in FIG. 6), so that the operator now faces the side of the vehicle and the vertical surface of the fender 17. In this position the seat rotates at least 45° before it again begins to rotate about its center of gravity another 90° to occupy the position shown in FIG. 5. It can be seen, then, that a large part of the rotation of the seat takes place during the first part of the swing and during the last part of the swing, so that as the operator's knees moved past the fender 17, he is moving generally parallel to the fender so that he does not bang his knees against the fender. Because of the longitudinal sliding adjustment available between the upper and lower parts of the seat, he can adjust the center of gravity of his body and of the seat relative to the support arm 19. Minor adjustments in angularity of the seat can be brought about by use of the threaded coupling 31 in the control arm 21. When the seat reaches the rearwardly-directed position shown in FIG. 5, the detent 26, which is springed-biased into a lower position, drops into the rearward aperture in the quadrant plate 25.

It can be seen that, by use of the construction of the present invention, it is possible to provide a seating arrangement in which the forwardly-directed position is displaced longitudinally a considerable distance from the rearwardly-directed position. Since the operator can do this without physical discomfort to hinself, he is more likely, when operating the back-hoe 13, to move frequently into the forwardly-directed position to adjust the vehicle plate relative to the trench. This is a safety feature, because he will then not try to overreach with the back-hoe. He is encouraged to make the change of position when it is necessary, because of the uncluttered nature of the deck 15, due to the fact that the sole support for the seat is the support arm 19 and it rises at a considerable angle to the horizontal. The deck, therefore, is clear for him to "walk" the seat around from one position to the other. Furthermore, there is little danger of his striking his knees against the fender or being otherwise physically cramped because of the unusual geometric motion of the seat. Furthermore, there are no sliding joints involved in the motion, which sliding joints could cause maintenance problems because of dust and dirt in the atmosphere. In a commercial embodiment of the invention, the seat 18 with its related arms 19 and 21 are formed as an integral unit with the fenders 16 and 17 and the deck 15 and the unit is sold for attachment to a conventional tractor.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by letters Patent is:

I claim:

1. Material handling apparatus, comprising:
   a. a vehicle body having a substantial horizontal deck longitudinally of the body,
   b. a pair of spaced, parallel fenders extending longitudinally of the body, one fender being located on each side of the deck,
   c. a seat mounted above the deck between the fenders,
   d. a support arm pivoted at one end to a fender for swinging movement through an angle of approximately 90° in a horizontal plane below the level of the bottom of the seat, the other end of the arm being pivotally attached to the bottom of the seat at the center front thereof, and
   e. means to cause the seat to rotate through an angle of 180° when the arm swings through its angle of 90°, the means also serving to cause the seat to move a substantial distance longitudinally as it pivots through its angle of 180° from a forwardly-directed position were the operator has access to the driving controls of the vehicle to a rearwardly-directed position where the operator has access to handling controls of the vehicle, the means consisting of a control arm pivotally connected at one end to the same fender to which the support arm is pivoted, but at a point spaced forwardly a substantial distance from the connection of the support arm, the other end of the control arm being pivotally connected to the bottom of the seat at the center of one side.

2. Material handling apparatus as recited in claim 1, wherein
   the support arm and the control arm swing in vertically-spaced planes, so that they do not interfere with one another during swinging.

3. Material handling apparatus as recited in claim 1, wherein
   the point of attachment of the support arm to the seat always remains at one side of the control arm during the movement of the seat from one position to the other.

4. Material handling apparatus as recited in claim 1, wherein,
   the control arm is provided with a threaded coupling to permit its length to be adjusted.

5. Material handling apparatus as recited in claim 1, wherein
   the seat consists of upper and lower portions, the operator occupying the upper portion and the arms being connected to the lower portion, there being a slidable connection between the portions for adjustment longitudinally of the vehicle body, and means to lock the portions in a selected position of relative adjustment.

6. Material handling apparatus as recited in claim 1, wherein

detent means is provided in association with the arm to lock the arm selectively at either end of its swinging movement.

7. Material handling apparatus as recited in claim **6**, wherein

the detent means consists of a horizontal apertured quadrant plate fastened to the fender and underlying the portion of the arm which is connected to the fender and of a vertically movable detent mounted in the arm and located to be accessible to the operator for movement in and out of the aperture in the plate.

8. Material handling apparatus as recited in claim **1**, wherein

the seat is padded and provided with a vertical back rest, wherein the seat has a generally rectangular horizontal portion with a front edge, a rear edge from which the back rest extends, and two side edges, wherein the point of attachment of the support arm to the seat is adjacent the center of the front edge, and wherein the point of attachment of the control arm to the seat is adjacent the center of a side edge.

9. Material handling apparatus as recited in claim **1**, wherein

the fenders are provided with headlights, some directed forwardly and some directed rearwardly.

10. Material handling apparatus as recited in claim **1**, wherein

the support arm is located a substantial distance above the deck and is the sole support for the seat and the weight of the operator.

11. Material handling apparatus as recited in claim **1**, wherein

a vertical pintle extends downwardly from the seat and the said other end of the support arm is provided with an integral bushing fitting around the pintle, wherein the main part of the support arm extends at an obtuse angle to the axis of the pintle and an acute angle to the deck.

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