SAFETY CAGE FOR WORKMEN
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My invention relates to new and useful improvements in safety cages for workmen, particularly for use in oil field derricks, and has for its objects: to provide a safe working place for a workman held at a hazardous height, which will not only insure his safety but will also facilitate his work; to provide the same in an adjustable manner which will adapt the cage to use in different kinds of work; to provide an attachment thereto for different kinds of work; and to provide a cage in portable form with quick connecting means wherewith it may be mounted for use.

The cage so provided is particularly adapted for use in a derrick for pulling and running strings of rods and of tubing and the like in oil wells, in which operation a workman is located high in the well derrick to handle the upper ends of the rods or tubing as they are unscrewed or screwed from the remainder of the string. Prior to my invention, the practice in such cases was to lay a plank platform or "tubing board" across the girts of the derrick at the desired height, and to locate a man on this board with a safety belt about him attached to the derrick. The man so located stood on the board and handled the tubing or rods from that precarious position; and particularly in cold weather his exposed position subjected him to dangers because of his inability, occasioned by the cold to which he was exposed, to properly control his movements; nor could he throw the weight of his body against his belt to assist him in obtaining leverage to handle the tubing or rods.

With the above and other objects in view, which will appear as the description proceeds, my invention consists in the novel features hereinafter set forth in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

Referring to the drawings in which like numerals designate similar parts throughout the several views:

Fig. 1 is a view in perspective of my swiveled cage and adjustable detachable mounting therefor. It indicates by the dotted lines how the cage may be turned on its bracket to various positions.

Fig. 2 is a top plan view of the same.

Fig. 3 is a view in perspective of one of my mounting clamps for mounting device on the girts of a steel derrick of conventional construction, showing the same in unclamped position.

Fig. 4 is a view of the same in side elevation, or strictly a view of the lower clamp as it is preferably a longer clamp than the upper clamp, altho except for length the two clamps are similar.

Fig. 5 is a top plan view of my cage attached to the girt of a derrick and in position for use in running rods in a well, and also showing attached to said derrick a rod rack with winch thereon wherewith a man in the cage may take the rods from the elevator and transfer them to the rod rack or transfer them from the rod rack to elevator. It also shows by dotted lines the position and location of the cage when not in use in the derrick, in which location it does not interfere with well serving operations.

Fig. 6 is a view of my cage and mounting therefor in side elevation with an attachment thereon for handling well tubing from the cage, and which is used in running tubing in or out of an oil or gas well.

Fig. 7 is a top plan view of the same showing the cage attached to a girt of a derrick and indicating the manner in which tubing is handled from said cage by showing a joint of tubing resting on my device and stands of tubing positioned with reference to the derrick structure and to my cage and handling attachment.

Fig. 8 is a somewhat schematic view of a well derrick with my cage located therein as shown in Fig. 7, but swung to the opposite side of the bracket in order that the workman therein may cooperate with the workman on the derrick floor in standing tubing in the opposite side of the derrick, or in removing it therefrom.

Describing my invention and particularly with reference to its use in a well derrick for handling pump rods and well pipe, 1 indicates a derrick corner post, 2 the girts of the derrick and 3 its stays. 4 represents the well head located at or near to the center of the derrick floor. 5 represents generally a conventional rod hanger attached to a girt of a derrick and having a winch 6 fastened to the hanger in the usual manner. The winch line and rod elevator are not shown. 7 represents a few joints of well pipe or tubing or the like stacked in the derrick, or in the so-called "corner" of the derrick and positioned as if tubing was either run in or pulled out of well 4. 8 represents such a joint of tubing not stacked but either in the process of being stacked or of being taken from the stack with the use of my tubing attachment and cage. The tubing elevators and hook and line are not shown. 9 represents generally the workman's cage, which will hereafter be referred to as a cage, wherein the man handling the rods or tubing in the derrick may stand and against which he may
brace himself. 10 represents the floor of the cage, preferably of heavy wire or lattice work as indicated to provide ventilation in hot weather, 11 the sides of the cage and 12 the rim thereof.

The cage is pivotally held on a bracket 13 by means of a pivot connection 14. The drawings show said connections in the form of a pipe 15 which forms a pivot pin rigidly attached to the cage and secured to the bracket by clamps 16 held by bolts 17 which may be tightened to positively locate said cage in any desired position with reference to bracket 13, and may be loosened to permit the cage to be swung on the bracket at any desired angle thereto. It is obvious that the swing connection may be made in any other suitable manner. The drawings also show the bracket 13 as constructed of two plates 18 and 19 between which clamps 16 are located and to which another pair of clamps 20 are attached having bolts 21 wherewith to clamp said bracket 13 to a pipe standard 22 and upon which said bracket 13 is free to pivot when said clamps are unloosened, in which situation its weight is supported by a clamp collar 23 clamped to said standard by bolts 24 and adjustable longitudinally thereon by loosening said bolt and moving said collar to any desired location on said standard. It is likewise obvious that any suitable form of bracket may be used and any other suitable form of standard employed.

The standard 22 is itself secured to the derrick at any desired height by means of a pair of clamps adapted to be fastened to any selected pair of derrick girts. These clamps, designated generally by the numeral 25, are shown in form adapted to grip a standard size structural steel angle iron of which practically all girts of steel derricks used in the oil fields are made, and to be attached to and support the pipe standard 22.

One of said clamps, preferably the upper one, may be rigidly and permanently attached to said pipe standard 22 by bolts passed therethrough as clearly indicated in Fig. 1. The other of said clamps is preferably clamped to said pipe standard 22 by bolts passed thru plates 18 and 19 and about said pipe as is also indicated in said Fig. 1 in manner so that it may be moved along said standard and clamped at any desired position thereon by tightening said bolts and thus provide an adjustment of said clamps and standard to a pair of girts at any distance apart to which it may be desired to secure said cage. Obviously any other suitable attaching means may be used. The structure of the clamp 25 is shown in detail in Figs. 3 and 4 and consists of a body portion of two parallel plates shown as angle irons 26 positioned back to back with the movable jaw 27 of the clamp also formed of an angle iron or of structure similar thereto, when the clamp is to be used on girts made of structural steel angle iron, and having two set screws 28 therein, and with said movable jaw 27 affixed to an arm 29 pivotally secured between said plates 26 by means of a pivot pin 30 held between said plates. When the clamp is to be used on girts made of pipe the same clamp construction is used but the set screws must be positioned to fully grip the pipe. An abutting plate 31, which also serves as a tie member for plates 26, is secured across said plates a distance from the ends of said plates and from the are prescribed by the movement of the movable jaw 27 on its pivot pin 30. The ends 32 of said plates 26 extend beyond said abutting plate 31 to form the stationary gripping jaw of said clamp, to the effect that said clamp when open to be attached to the girt may be rested on said girt on ends 32 of said plates and the abutting plate 31 placed in abutment with the vertical flat surface of the girt 2 as indicated in Fig. 3, if the girt is of an angle iron, and if of a pipe then with the abutting plate 31 and ends 32 of plates 26 may be swung over the ends of plate 26 until jaw 27 comes into a position under the other flange of the angle iron, or the under side of the pipe girt as the case may be, with the girt thus located between plates 31 and ends 32 of plates 26. Set screws 28 may be caused to grip said girt, clamping the same in the clamp 25 and with the jaw 27 and the abutting plate 31 further serving to prevent the clamp from being detached from the girt with a movement transverse of said girt. As is seen in Fig. 1, the body position of plate 25 of the lower clamp 25 is longer than that of the upper clamp 25. The distance of this extra length is calculated so that on a standard steel derrick, which narrows at the top as shown in Fig. 8 with a definite angle of pitch, the standard 22 will set in position as nearly vertical as possible.

A link or clevis 33 is secured to bracket 13 in a position so that the weight of the entire structure of cage, bracket, standard and clamps as shown in Fig. 1 may be balanced therein in order that said structure may be bodily lifted by a derrick line attached to said eye 33 and maintain the standard 22 in substantially its upright position, thereby making easier its attachment to the girts of the derrick. As a matter of fact the preferred balance of the structure on eye 33 is such that said top of clamp 25 at its jaws will be several inches beyond the plumb line of the jaws of the lower clamp 25 in which position it is easier to attach the top clamp, which is rigidly affixed to standard 22, to its girt from which it may then be hung while the lower clamp 25 is adjusted along standard 22 and then attached to its girt. It will be noted that the cage 9 is held in spaced relationship to its pivot pin or pipe 15 and bracket 13 with the lugs 34 connecting it to said pipe and sufficiently long to permit the cage to be swung to either side of and placed with said bracket. Thus it may be swung straight out from the bracket as shown in Fig. 5 for use in running rods in a well, or may be swung parallel to either side of the bracket as shown in Fig. 7 for use in running tubing in a well, or may be swung into the corner of the derrick as indicated in Fig. 5 by dotted lines, the bracket also being swung on the standard 22 in this instance. The dotted lines in Fig. 2 also show positions which cage and bracket may thus be caused to assume.

The apparatus so far described is adapted for use in handling pump rods. When it is desired to handle pipe or tubing from the cage, a hook and pull attachment is secured to the apparatus whereby the upper part of the joint or joints of tubing may be caused to rest in the well when he receives it from the stack to attach the elevator to the joint of tubing to run it into the well, and whereby said upper part of said tubing may be slid to or near to its rest position which is as indicated by the position of pipe 7 shown in Fig. 8, or may be slid from
the stack to the rest hook for it to rest therein until the elevator can be attached to the joint and the joint raised thereby. The attachment will be referred to generally as a tubing rest and slide and is shown in Figs. 6, 7 and 8 of the drawings as a plate or bar 35 secured to the top of bracket 13 along one side thereof by bolts 36 and having a curved projecting portion 37 ending in a hook 38 located in proximity to said cage, the invention in this feature residing in providing a rest and slide for said tubing and usable from the cage, and which may be attached to the cage itself or to the derrick entirely independent of the cage and its mounting, the preferred form as is shown in the drawings. The bar 35 is reversible so that it may be attached to the opposite side of the bracket when desired.

In use for pulling or running rods in an oil well when a rod hanger is used in a derrick for suspending the joints of rods thereon, the cage, together with its bracket and standard with grip clamps thereon, is brought on the derrick floor and the cage, bracket and standard clamped in desired position. A derrick line is then attached to its hoisting eye, and the cage lifted to desired height and the standard then clamped to two of the derrick girts. The workman using the cage then enters the cage, having previously hooked on his safety belt, and adjusts the cage on its bracket if such adjustment is needed. The rods are handled by him in the usual manner, after which the cage may be removed from the derrick by unclamping the grip clamp, or if the cage is to remain in the derrick it may be swung in the corner of the derrick upon loosening the clamps between standard and bracket and bracket and cage. The workman is free to throw his weight against the sides of the cage and his position thereby secure. In winter, he may protect himself by placing sacks or other suitable material on the floor of the cage and placing a frame on the cage and hanging thereon a protecting wall and roof of canvas.

When the cage is used in handling tubing in the derrick, the tubing rest and slide is bolted to the bracket, on whichever side thereof the tubing is to be handled, and the tubing is handled from the cage in the same manner as when the workman is standing on the tubing board, except that he has a safe rest for the tubing while he is engaged in removing the elevator therefrom or while engaged in attaching the elevator thereto, and has a convenient rail on which he may slide the tubing from its rest to its stacking position or from the stack to the rest.

With this description of my cage in use in a well derrick for pulling rods, tubing and the like, it is evident that my invention may also assume the form of a non-adjustable cage as well as the adjustable one heretofore disclosed, but the cage adjustable horizontally and vertically as shown, is to be preferred because of its greater convenience. It is also evident that a non-portable cage and one permanently attached to the well derrick would serve the same purpose once it is installed, but would have the disadvantage over a portable cage in that it would require a cage on each well derrick which would involve a very considerable expense. It is furthermore evident that the cage in portable form could be made to be suspended from a derrick line and braced against horizontal movement by struts attached to the cage and anchored to the derrick, either to its post or to its girts, and that this form of construction would provide a cage adjustable both vertically and horizontally, particularly if two struts were pivotally secured to the cage by clamps which could be clamped to hold the cage against gyration, such as with the clamp arrangement shown in the drawings, and the struts attached to the derrick girt or girts with slidable adjusting clamps which could be clamped on said girt or girts at any desired location thereon, thus permitting the cage to be located in any desired position in the derrick.

Having thus fully disclosed my invention, what I claim and desire to secure by Letters Patent is:

1. A safety cage for a workman, including a cage proper, a bracket, a hinge connection between said cage and bracket, a hinge mounting for said bracket, and with the axis of said hinge connection and said hinge mounting substantially parallel to each other, means for securely holding said bracket on said mounting at any desired place thereon which it may be free to pivot, and means for securely holding said cage at any desired angle with relation to said bracket.

2. In a safety cage for a workman in an oil field derrick, the combination of an upright standard, a derrick gripping clamp thereon, a second derrick gripping clamp slidably mounted thereon, a bracket both pivotally and slidably mounted on said standard, a bearing on said standard for said bracket, clamps on said bracket engageable with said standard, a safety cage proper pivotally mounted on said bracket and supported thereby, and means for locking said cage at any desired angle with relation to said bracket.

3. A grip mounting for use in an oil field derrick including a body portion proper having means for attaching the same to an object to be held on said derrick, and a clamp on said body portion having a stationary jaw thereon and a pivoted jaw thereon with a set screw in said last named jaw, and an abutting plate on said body portion in proximity to said stationary jaw and against which a member of the derrick aforesaid may be caused to bear when said clamp is set.

4. A tubing handling device, including a workman's cage pivotally secured to a supporting bracket, a supporting bracket as aforesaid, a mounting for said bracket, and a tubing rest and slide attached to said bracket and having a rail portion thereon which the tubing to be handled may be slid and also having an offset portion thereon against which said tubing may be rested.

5. In a safety cage for a workman in an oil field derrick, an upright standard, means for securing the same to an oil field derrick, a bracket pivotally secured at one end to said standard, and a workman's cage mounted on the other end of said bracket.

6. In a safety cage for a workman in an oil field derrick as claimed in claim 5; and means on said standard for raising and lowering said cage bodily in vertical movement thereof.

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