

FIG. 1.

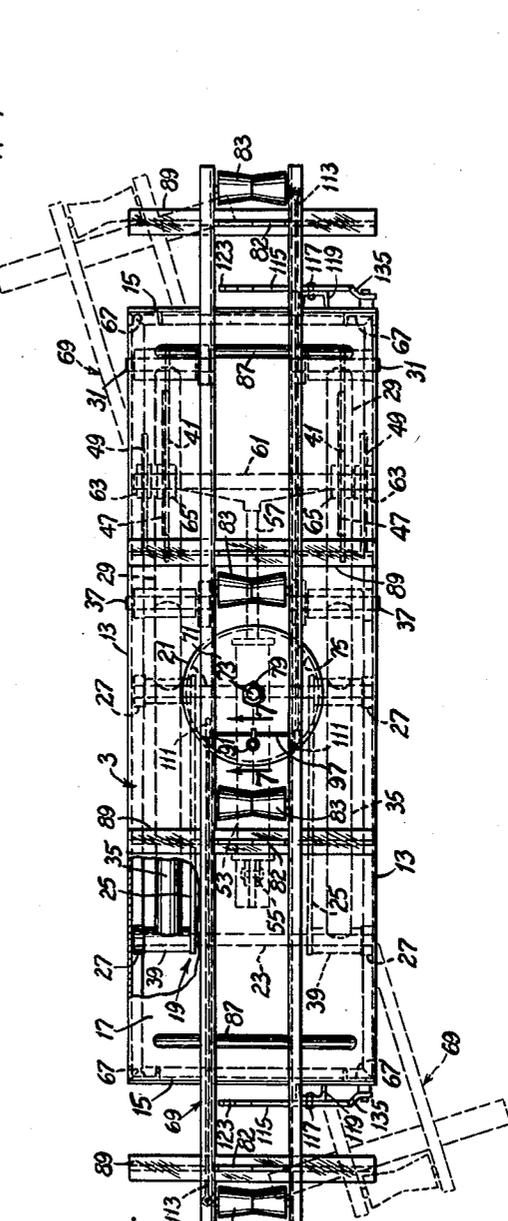


FIG. 3.

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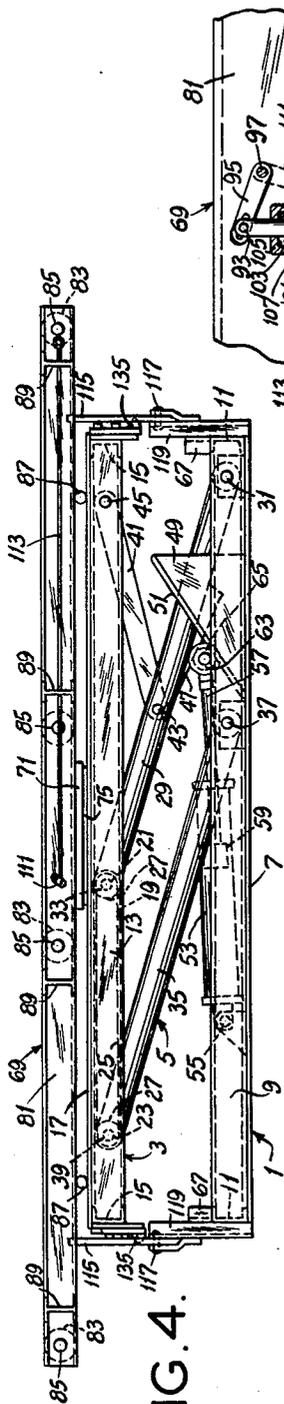


FIG. 4.

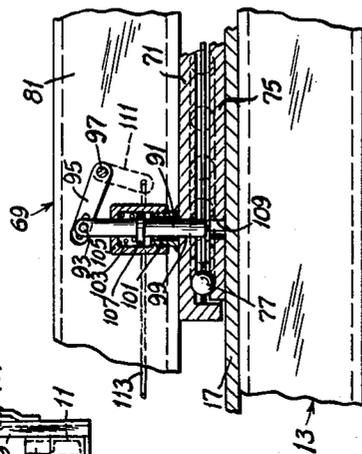


FIG. 7.

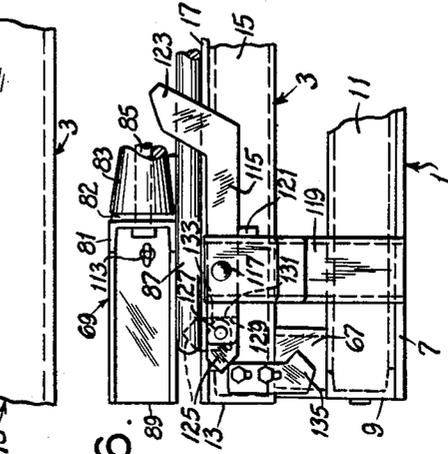


FIG. 6.

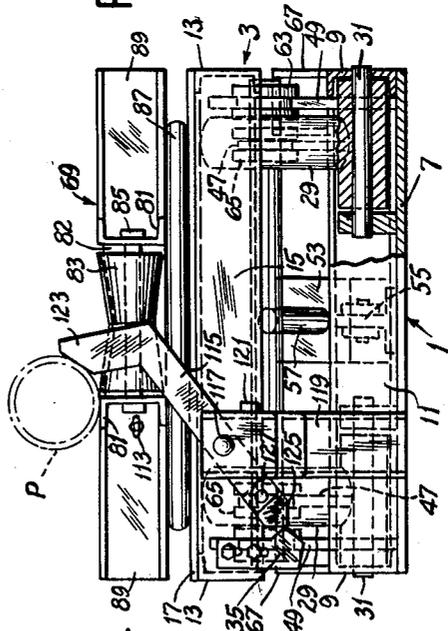


FIG. 5.

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2,922,533

LIFT

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7 Claims. (Cl. 214—1)

This invention relates to lifts, and more particularly to a hydraulic lift for pipe.

Among the several objects of the invention may be noted the provision of a hydraulic lift of simplified and economical construction for handling heavy pipe, such as steel pipe; the provision of a lift of this class which is useful, for example, for raising a pipe into position for being entered in a pipe threading machine and for lowering the pipe after it has been threaded; and the provision of a lift of this class which acts automatically to eject a pipe upon lowering. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a side elevation of a hydraulic pipe lift of this invention, showing a platform and a pipe cradle thereof in a raised position;

Fig. 2 is an end view of Fig. 1;

Fig. 3 is a plan view of Fig. 1, with parts broken away and shown in section, and illustrating in dotted lines a moved position of the pipe cradle;

Fig. 4 is a view similar to Fig. 1 showing the platform and the pipe cradle being lowered;

Fig. 5 is an end view of Fig. 4, with parts broken away and shown in section;

Fig. 6 is a fragment of Fig. 5 showing the platform and cradle in their lowermost position; and,

Fig. 7 is an enlarged vertical section taken on line 7—7 of Fig. 3.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, a hydraulic pipe lift of this invention is shown to comprise a base 1 and a platform 3 mounted on the base by means of a parallelogram linkage 5 for being raised and lowered while remaining substantially horizontal. The base 1 comprises a long narrow rectangular base plate 7, channels 9 extending along the sides of the base plate and channels 11 extending along the ends of the base plate. The platform 3 comprises side channels 13 and end channels 15 supporting a top plate 17. Channels 13 have their open sides directed inward.

The parallelogram linkage 5 comprises a horizontal top frame 19 supporting the platform and shiftable lengthwise relative to the platform. Frame 19 comprises a pair of transverse shafts 21 and 23 which are tied together by links 25. These shafts have rollers 27 at their ends which ride in the side channels 13 of the platform 3. Linkage 5 further comprises a first pair of links 29 having their lower ends pivoted as indicated at 31 to the base adjacent one end of the base (its right end as illustrated in Figs. 1 and 4) and their upper ends pivoted as indicated at 33 to the shaft 21, and a second and

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parallel pair of links 35 having their lower ends pivoted as indicated at 37 to the base and their upper ends pivoted as indicated at 39 to the shaft 23. A pair of links 41 is pin-connected at 43 to links 29 and pin-connected at 45 to the side channels 13 of the platform 3 for maintaining the platform against endwise movement relative to the base while allowing raising and lowering thereof.

As shown, each of the links 29 and 35 is constituted by a length of steel pipe and each of links 41 is a flat bar. Welded to each of the links 29 is a triangular plate 47. Welded to the base on the inside of the side channels 9 of the base and outside of the links 29 are triangular plates 49 arranged with the edges 51 thereof inclined upward in the direction toward the right end of the lift as viewed in Figs. 1 and 4. Plates 49 serve as ramps. A hydraulic cylinder 53 is pivoted at one end thereof as indicated at 55 on the base plate 7 and extends to the right from the pivot 55. A piston rod 57 extends from a piston 59 in the cylinder out of the forward (right) end of the cylinder. On the end of the piston rod is a crossbar 61 carrying rollers 63 riding on the inclined edges 51 of plates 49 and rollers 65 engaging the plates 47 on links 29. The arrangement is such that with the piston rod completely retracted, the platform 3 occupies the lowermost position in which it is illustrated in Fig. 6, engaging posts 67 adjacent the corners of the base 1. When the piston rod is extended, rollers 63 ride up the edges 51 of plates 49 and rollers 65 push on plates 47 to swing the links 29 clockwise as viewed in Fig. 4. This swings the linkage 5 upward and raises the platform 3 without moving the platform endwise in view of the shifting of frame 19 relative to the platform.

A pipe cradle 69 is mounted on the platform 3 for rotation on a generally vertical axis. As shown, cradle 69 comprises a circular center plate 71 rotary on a pin 73 extending up from a thrust plate 75 mounted on the top plate 17 of the platform. Ball bearings 77 are interposed between plates 71 and 75. A nut 79 is threaded on pin 73 to hold the plate 71 thereon. Secured on the plate 71 are two parallel horizontal channel bars 81. These are longer than the platform 3. Transverse braces for these channel bars are indicated at 82. Bars 81 carry grooved pipe-supporting rollers 83. These rollers are mounted on shafts 85 extending between the bars 81. Supports 87 for the cradle are provided adjacent the ends of the platform. The cradle is provided with lateral extensions 89.

Means is provided for latching the rotatable cradle 69 in a position aligned with the platform 3. As shown best in Fig. 7, this means comprises a vertical latch pin 91 having a connection at 93 with a radial arm 95 on a shaft 97 journaled in the cradle bars 81 above the plate 71. The pin 91 is slidable in a hole 99 in plate 71 and in a tubular guide 101 on plate 71. The pin 91 is biased downwardly by a spring 103 reacting from a cap 105 threaded on guide 101 against a collar 107 on the pin. The plate 75 has a hole at 109 on the longitudinal center line of the platform for receiving the pin to latch the cradle in a position aligned with the platform. Plate 75 may also have a hole diametrically opposite hole 109 for latching the cradle in a position 180° removed from the stated position aligned with the platform. For operating the latch pin 91, shaft 97 has cranks 111 at its ends outside the cradle bars 81, and long rods 113 extending from the cranks to the ends of the bars 81 for effecting rotation of shaft 97 from one end or the other of the cradle.

Means is provided for ejecting a pipe from the cradle upon lowering thereof, the cradle being aligned with the platform. As shown, this means comprises a pair of levers 115, one at each end of the base 1, each lever being pivotally mounted intermediate its ends as indicated at

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117 on a post 119 at the respective end of the base for swinging on a horizontal axis extending lengthwise of the base. Each lever normally occupies the lowered retracted horizontal position as illustrated in Fig. 6, determined by engagement of the lever with a stop 121 on the post, being gravity biased to this position. Each lever has an upwardly extending inclined arm 123 at its inner end, and a member 125 pivoted at its outer end as indicated at 127. Member 125 is formed with a flat end portion 129 engageable with a shoulder 131 on the lever to determine a limiting position of member 125 projecting straight out from the outer end of the lever, and is also formed with an arcuate edge portion at 133 so that it may swing up relative to the lever (see the dotted line position of member 125 illustrated in Fig. 6). At each end of the platform 3 there is provided a lug 135 for engaging the respective member 125.

Operation is as follows:

With the pipe cradle 69 in its lowermost position, and with each lever 115 in the lowered position illustrated in Fig. 6, a pipe P may be rolled onto the cradle over the extensions 89 on the right side of the lift, the pipe coming to rest in the grooved rollers 83. A suitable rollway (not shown) may be provided on this side of the lift for rolling pipe onto the lowered cradle. To raise the pipe, the piston rod 57 is extended, thereby swinging the parallelogram linkage 5 upward, and raising the platform 3 and the cradle 69 with the pipe thereon. Normally the pipe cradle will be latched by means of the latch pin 91 in position aligned with the platform 3 as illustrated in solid lines in Fig. 3. As the parallelogram linkage 5 swings upward, the frame 19 at the upper end of the linkage shifts its position relative to the platform 3, moving closer to the right end of the platform. The links 41 restrain the platform from moving endwise relative to the base so that the platform remains substantially directly above the base.

The lift may be positioned in tandem with a pipe threading machine, for example, being so located that, with the pipe cradle aligned with the platform, a pipe thereon may be raised to a position coaxial with the machine. Thereupon, the pipe may be moved endwise on rollers 83 into the machine for threading. After threading it is moved back out of the machine, and then the platform and cradle may be lowered to lower the pipe by retracting the piston rod 57. Upon retraction of the piston rod, the linkage 5 swings down (compare Figs. 1 and 4). The platform remains directly above the base without any substantial endwise shifting. As the platform approaches its lowermost position, lugs 135 engage the pivoted members 125 on levers 115, and act to swing these levers counterclockwise from the retracted position illustrated in Fig. 6 to the position illustrated in Fig. 5. The arms 123 of the levers 115 enter between the bars 81 of the cradle 69 and act to push the pipe off the cradle to the left as viewed in Fig. 5, the pipe rolling off over the left-hand extensions 89. A suitable rollway (not shown) may be provided at the left side of the lift for rolling pipe away from the lowered cradle. As the cradle 69 completes its descent, the lugs 135 ride off the pivoted members 125, and the levers 115 are released to swing back to their lowered retracted positions. Accordingly, arms 123 of the levers are moved down below the cradle and out of the way so that the next pipe may be rolled onto the cradle. When the platform is raised, lugs 135 move upward therewith and engage the pivoted members 125, but simply swing them upward and aside without moving the levers 115.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying draw-

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ings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A hydraulic pipe lift comprising a base, a platform, a linkage mounting the platform on the base for being raised and lowered while remaining substantially horizontal, means comprising a hydraulic cylinder and piston for operating the linkage to raise and lower the platform, a pipe cradle mounted on the platform for rotation on a generally vertical axis comprising a pair of bars and pipe-supporting rollers carried by and extending between the bars, means for latching the cradle in a position aligned with the platform, means carried by the base in position to enter between the bars of the cradle when the platform and aligned cradle are lowered for ejecting a pipe from the cradle comprising a pivoted lever swingable upward from a lowered retracted position wherein it is so located as to allow a pipe to be rolled onto the cradle when the platform and cradle are lowered, and means on the platform for engaging the lever to swing it upward as the platform is lowered, said lever having a pivoted one-way member engageable by said means on the platform as the platform is lowered for raising and then releasing the lever for return of the lever to retracted position, said member allowing for raising of the platform without actuating the lever.

2. A hydraulic pipe lift comprising a base, a platform, a parallelogram linkage mounting the platform on the base for being raised and lowered while remaining substantially horizontal, said linkage comprising a frame supporting the platform and shiftable lengthwise relative to the platform, a first pair of links having their lower ends pivoted on the base adjacent one end of the base and their upper ends pivoted to said frame, and a second pair of links parallel to the first pair having their lower ends pivoted on the base and their upper ends pivoted to said frame, additional links connecting one of said pairs of links and the platform, a hydraulic cylinder having one end pivoted on the base and extending toward said one end of the base, a piston rod extending out of the other end of the cylinder, ramp means comprising a pair of plates on the base, roller means on the piston rod engageable with said ramp means and with said first links for swinging the cylinder and the parallelogram linkage upward upon extension of the piston rod from the cylinder, each of said plates having an edge engageable by said roller means which edge is inclined upward in the direction toward said one end of the base, a pipe cradle mounted on the platform for rotation on a generally vertical axis, said cradle comprising a pair of bars and pipe-supporting rollers carried by the bars extending between the bars, means for latching the cradle in a position aligned with the platform, means carried by the base in position to enter between the bars of the cradle when the platform and aligned cradle are lowered for pushing a pipe laterally off the cradle, said pushing means comprising a pivoted lever swingable upward from a lowered retracted position, and means on the platform for engaging the lever to swing it upward as the platform is lowered.

3. A hydraulic pipe lift as set forth in claim 2 wherein the lever has a pivoted one-way member engageable by said means on the platform as the platform is lowered for raising and then releasing the lever, said member allowing for raising of the platform without actuating the lever.

4. A pipe lift comprising a base, a pipe cradle, a linkage mounting the cradle on the base for being raised and lowered while remaining substantially horizontal, means for operating the linkage to raise and lower the cradle, an ejector carried by the base for ejecting a pipe from the cradle when the cradle is lowered, said ejector being movable upward from a lowered retracted position wherein it is so located as to allow a pipe to be rolled onto the cradle when the cradle is lowered, means movable with the cradle for actuating said ejector to move it upward as

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the cradle is lowered, and means providing for one-way actuation of said ejector by said means movable with the cradle as the cradle is lowered for raising and then releasing said ejector, said one-way means allowing for raising of the cradle without actuating the ejector.

5. A pipe lift comprising a base, a pipe cradle, a linkage mounting the cradle on the base for being raised and lowered while remaining substantially horizontal, means for operating the linkage to raise and lower the cradle, an ejector carried by the base for ejecting a pipe from the cradle when the cradle is lowered, said ejector comprising a pivoted lever swingable upward from a lowered retracted position wherein it is so located as to allow a pipe to be rolled onto the cradle when the cradle is lowered, means movable with the cradle for engaging said lever to swing it upward as the cradle is lowered, said lever having a pivoted one-way member engageable by said means movable with the cradle as the cradle is lowered for raising and then releasing said lever for return of the lever to retracted position, said one-way member allowing for raising of the cradle without actuating the lever.

6. A hydraulic pipe lift comprising a base, a platform, a parallelogram linkage mounting the platform on the base for being raised and lowered while remaining substantially horizontal, said linkage comprising a frame supporting the platform and shiftable lengthwise relative to the platform, parallel links pivoted at their lower ends to the base and at their upper ends to the frame, means connecting said parallelogram linkage and said platform for maintaining the platform against endwise movement relative to the base while allowing raising and lowering thereof, means comprising a hydraulic cylinder and piston for swinging said parallelogram linkage to raise and lower the platform, said cylinder being pivotally mounted at one end on said base, said piston having a piston rod extending through the other end of the cylinder operable on said parallelogram linkage to effect swinging thereof, a pipe cradle mounted on the platform for rotation on a generally vertical axis, means for latching the cradle in a position aligned with the platform, and means operable in response to lowering of the platform and cradle for pushing a pipe laterally off the cradle when the latter is in said position aligned with the platform.

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7. A hydraulic pipe lift comprising a base, a platform, a parallelogram linkage mounting the platform on the base for being raised and lowered while remaining substantially horizontal, said linkage comprising a frame supporting the platform and shiftable lengthwise relative to the platform, a first pair of links having their lower ends pivoted on the base adjacent one end of the base and their upper ends pivoted to said frame, and a second pair of links parallel to the first pair having their lower ends pivoted on the base and their upper ends pivoted to said frame, additional links connecting one of said pairs of links and the platform, a hydraulic cylinder having one end pivoted on the base and extending toward said one end of the base, a piston rod extending out of the other end of the cylinder, ramp means on the base, roller means on the piston rod engageable with said ramp means and with said first links for swinging the cylinder and the parallelogram linkage upward upon extension of the piston rod from the cylinder, said ramp means comprising a pair of plates on the base, each plate having an edge engageable by said roller means which edge is inclined upward in the direction toward said one end of the base, a pipe cradle mounted on the platform for rotation on a generally vertical axis, said cradle comprising a pair of bars and pipe-supporting rollers carried by the bars extending between the bars, means for latching the cradle in a position aligned with the platform, and means carried by the base in position to enter between the bars of the cradle when the platform and aligned cradle are lowered by pushing a pipe laterally off the cradle.

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