Feb. 5, 1952 S. L. HANDFORTH 2,584,801

PIPE EXTRACTOR

Filed Sept. 19, 1949

FIG. 5.

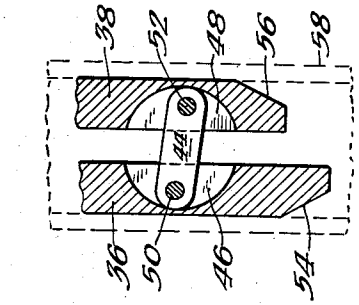


FIG. 3.

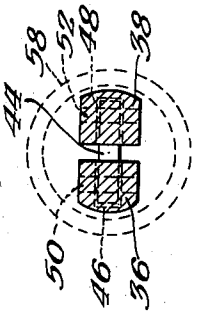


FIG. 4.

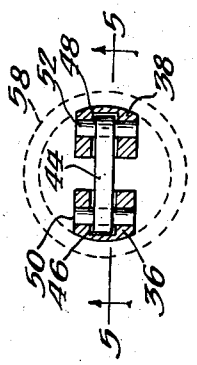


FIG. 2.

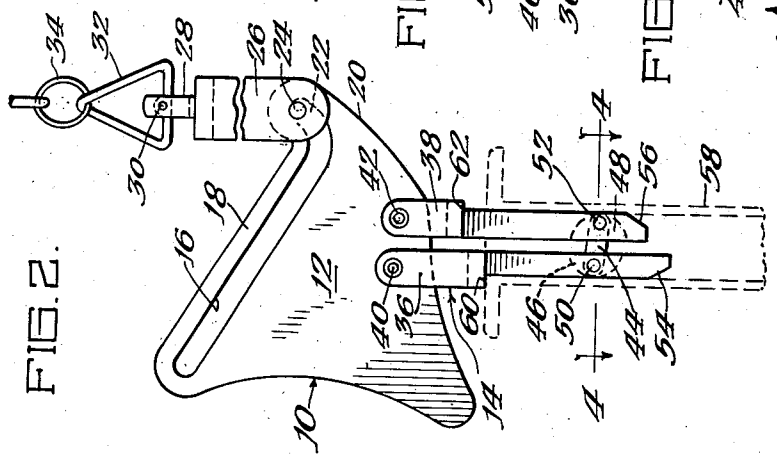


FIG. 1.

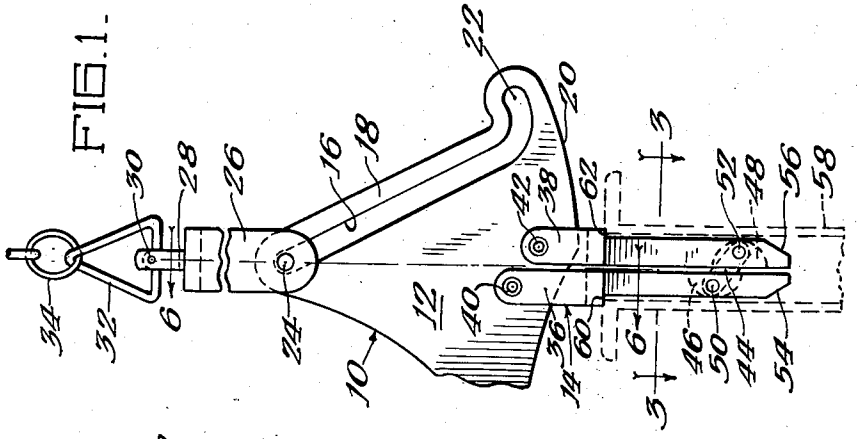
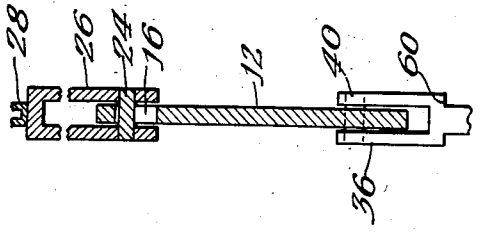


FIG. 6.



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PIPE EXTRACTOR

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9 Claims. (Cl. 294—97)

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This invention relates to extractors for pipes and similar tubular articles, and more particularly to a clamp for extraction of vertical pipes from locations which are inaccessible.

It is the purpose of this invention to provide a novel device which may be suspended at the end of a single supporting cable and lowered into the end of a pipe, and, when in position, manipulated from a remote point by means of the cable to grip and remove the pipe.

The invention provides a durable tool which is inexpensive to manufacture and simple to operate.

Other advantages of the present invention will become apparent from the following description taken with the accompanying drawings which represent one embodiment and in which:

Figure 1 is a front view in elevation of a pipe extractor in the contracted position illustrating the manner of insertion in the top portion of a pipe;

Figure 2 is a front view in elevation of the pipe extractor of Figure 1 in the expanded position;

Figure 3 is a horizontal sectional view taken on line 3—3 of Figure 1.

Figure 4 is a horizontal sectional view taken on line 4—4 of Figure 2;

Figure 5 is a fragmentary vertical sectional view taken on line 5—5 of Figure 4; and

Figure 6 is a vertical sectional view taken on line 6—6 of Figure 1.

Referring to Figure 1, an extractor generally indicated at 10 is illustrated in a contracted position. This extractor comprises generally a clamp actuating member 12 and a clamp assembly 14. The actuating member 12 is a triangular plate which contains an elongated slot 16 along one side 18 extending to a base 20. At the angle between the side 18 and the base 20 the slot 16 has an upward bend 22. The actuating member 12 is suspended at its apex from a pin 24 which traverses a yoke 26 (see Figure 6). The yoke is secured to a bifurcated member 28, which is pivoted by a pin 30 to a triangular ring 32 that is attached to a single supporting chain 34. In turn, the chain is suspended from an overhead crane not shown in the drawings. As shown in Figure 6, the pin 24 passes through the top extremity of the elongated slot 16.

The clamp assembly 14 comprises a pair of clamp elements 36 and 38 pivotally attached to the actuating member 12 by pins 40 and 42, respectively, near the base 20. In the contracted position of the clamp assembly 14, the pin 42 is situated on a lower level than the pin 40. Near the lower ends the clamp elements 36 and 38 are coupled together by means of a link 44 (see Figure 5). The ends of the link 44 are inserted within semi-disk-shaped recesses 46 and 48 in the inner surfaces of the elements 36 and 38, respectively, and are pivoted on pins 50 and 52. The lower extremities of the elements are

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tapered at 54 and 56 to facilitate insertion into the open end of a pipe 58. Near the upper ends of the elements 36 and 38 are shoulders 60 and 62, respectively, which limit the extent of insertion. As indicated in Figures 3 and 4, the outer edges of said elements are curved in order to increase the contact surface with the wall of the pipe.

Operation of the extractor is simple. To insert the extractor into a pipe, the clamp elements 36 and 38 hang in a contracted position. This position exists when the extractor is borne at the upper end of the slot 16, for then the horizontal distance between the pivotal pins 40 and 42 is relatively small. In this position the clamp elements 36 and 38 are lowered into the pipe 58 until the shoulders 60 and 62 come to rest upon the end of the pipe. The extractor then remains stationary and further lowering of the chain 34 by the overhead crane permits the pin 24 to slide downwardly along the slot 16 until it reaches the upward bend 22 which serves as a detent to prevent the pin from moving back up the slot. When the pin 24 is manipulated into the bend 22, the chain 34 is raised by the overhead crane and the clamp actuating member 12 is rotated counterclockwise about the pin 40, causing the pin 42 to rotate similarly about said pin. In effect this forms a lever of the second class. Since the pins 50 and 52 at the lower ends of the clamp elements 36 anad 38 are equidistant from the respective pins 40 and 42, the pin 42 rotates with respect to pin 40 in a similar manner. By means of parallel motion linkage of the link 44 and the actuating member 12 between the parallel clamping elements 36 and 38, the clamp assembly expands until the outer surfaces of the clamp elements 36 and 38 contact the inner wall of the pipe 58. At this point the rotation of the clamp actuating member 12 stops and the extractor 10 is in the expanded position, as shown in Figure 2. In the expanded position the horizontal distance between the pivots 40 and 42 is greater than in the contracted position, but the vertical distance is less. Further raising of the chain 34 no longer rotates the clamp actuating member 12, but serves to lift the extractor 10 and the pipe 58 with it. The extractor may be used also to install a pipe as well as remove one.

To withdraw the extractor from a pipe the above procedure is reversed. Thus, when a pipe is lowered to a resting place, the chain 34 is further lowered to permit the clamp actuating member 12 to rotate clockwise about the pivot pin 40 until the shoulder 62 comes to rest upon the top of the pipe 58. At this juncture the clamp actuating member 12 stops moving, the clamp assembly 14 having contracted by means of parallel motion linkage. The pin 24 is then manipulated out of the bend 22 and the chain 34 is raised, causing said pin to slide upwardly along the slot 16 until it reaches the top extremity thereof. By continuing to lift the chain

34 the extractor 10 is withdrawn from the top of the pipe.

Although the drawings and above description indicate one embodiment of this invention, it is readily apparent that other embodiments are available. Accordingly, the invention should be limited only insofar as set forth in the following claims.

What is claimed is:

1. A pipe extractor comprising, in combination, an actuating member, means mounting the actuating member for rotation between two positions, and a clamp assembly comprising clamp elements pivotally attached to the actuating member and extending in one direction therefrom, said assembly being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

2. A pipe extractor comprising, in combination, an actuating member, means mounting the actuating member for rotation between two positions, a clamp assembly comprising clamp elements pivotally attached to the actuating member extending in one direction therefrom, and a link fastening the clamp elements together at a position spaced from the first-mentioned attachment, the clamp assembly being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

3. A pipe extractor comprising, in combination, an actuating member, means mounting the actuating member for rotation between two positions, a clamp assembly comprising clamp elements pivotally attached to the actuating member extending in one direction therefrom, and a link fastening the clamp elements together adjacent to their free extremities, the clamp assembly being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

4. A pipe extractor comprising, in combination, an actuating member, means mounting the actuating member for rotation between two positions, a clamp assembly comprising elongated clamp elements substantially parallel to each other having one end pivotally attached at spaced points near one side of the actuating member, and a link fastening the clamp elements together adjacent to their free extremities, the clamp assembly being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

5. A pipe extractor comprising, in combination, an actuating member, means mounting the actuating member for rotation between two positions comprising a yoke adapted to be suspended on hoisting means, a clamp assembly comprising elongated clamp elements substantially parallel to each other having one end pivotally attached at spaced points near one side of the actuating member, and a link fastening the clamp elements together adjacent to their free extremities, the clamp assembly being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

6. A pipe extractor comprising, in combination, an actuating member having a guideway therein, means mounting the actuating member for rotation between two positions comprising a yoke adapted to be suspended on hoisting means and having key means engaging said guideway, a clamp assembly comprising elongated clamp elements substantially parallel to each other having one end pivotally attached at spaced points near one side of the actuating member, and a link fastening the clamp elements together adjacent to their free extremities, the clamp assembly being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

7. A pipe extractor comprising, in combination, an actuating member having a guideway therein, means mounting the actuating member for rotation between two positions comprising a yoke adapted to be suspended on hoisting means and having key means engaging said guideway, a clamp assembly adapted to grasp the end of a pipe by rotation of the actuating member between the two positions and comprising elongated clamp elements substantially parallel to each other having one end pivotally attached at spaced points near one side of the actuating member, one of which points is nearer the pipe when the assembly is contracted and which point moves away from the pipe with respect to the other point as the clamp assembly changes from a contracted to an expanded position, and a link fastening the clamp elements together at a position spaced from the first-mentioned attachment, said link being substantially parallel to a line connecting said spaced points.

8. A pipe extractor comprising, in combination, an actuating member having a guideway therein, means mounting the actuating member for rotation between two positions comprising a yoke adapted to be suspended on hoisting means and having key means engaging said guideway, a clamp assembly adapted to grasp the end of a pipe by rotation of the actuating member between the two positions and comprising elongated clamp elements substantially parallel to each other having one end pivotally attached at spaced points near one side of the actuating member, one of which points is nearer the pipe when the assembly is contracted and which point moves away from the pipe with respect to the other point as the clamp assembly changes from a contracted to an expanded position, said latter position being the clamping position of the assembly, and a link fastening the clamp elements together adjacent to their free extremities in a position which is substantially parallel to a line connecting said spaced points.

9. A pipe extractor comprising, in combination, an actuating member having a guideway, means mounting the actuating member for rotation between two positions including a key disposed in the guideway and adapted to ride in the guideway and being disposed adjacent to one end of the guideway when the actuating member is disposed in one position and adjacent to the other end when the actuating member is disposed in the other position, and a clamp assembly comprising clamp elements pivotally attached to the actuating member and being adapted to grasp the end of a pipe by the rotation of the actuating member between the two positions.

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