

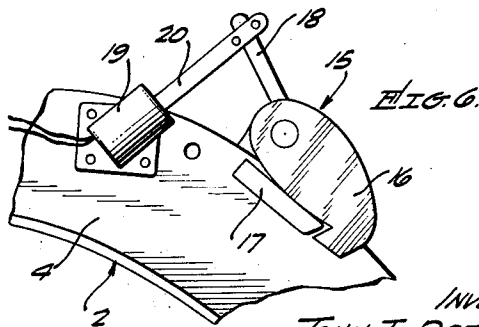
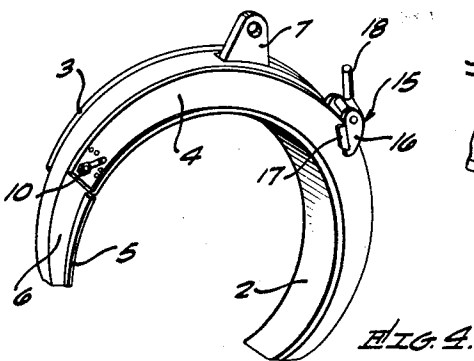
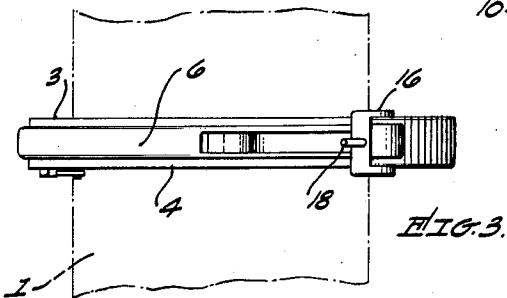
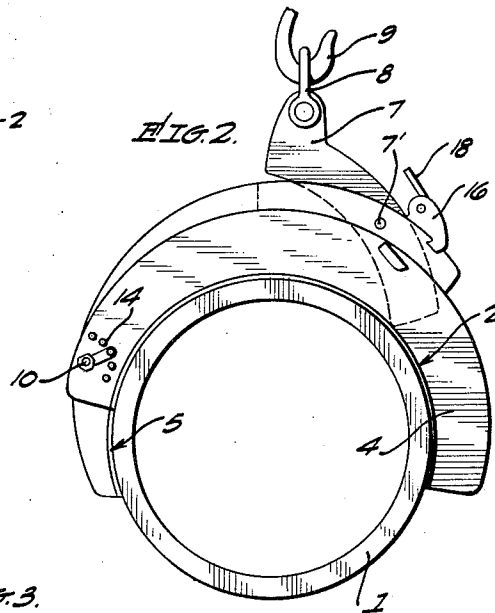
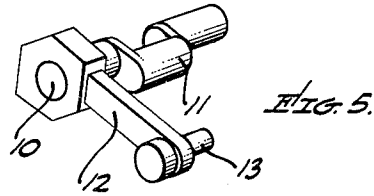
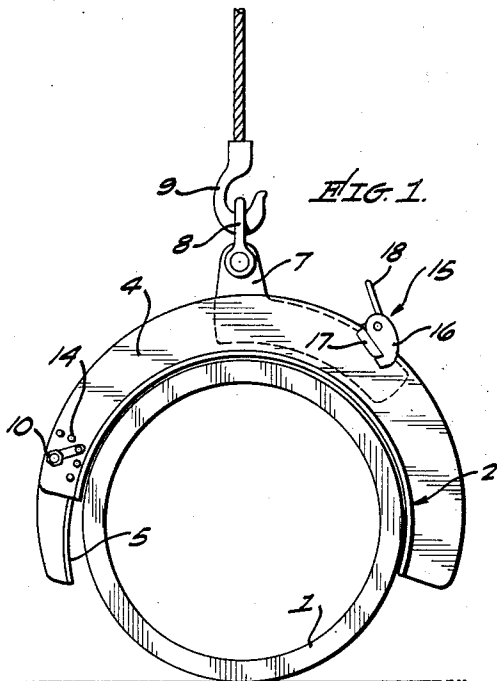
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AUTOMATIC PIPE HANDLING TONGS

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1

3,068,036

AUTOMATIC PIPE HANDLING TONGS

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3 Claims. (Cl. 294-104)

This invention relates to an automatic pipe handling tongs whereby lengths of pipe may be raised or lowered into a trench.

An object of my invention is to provide an automatic pipe handling tongs which will latch the parts in open or pipe disengaging position, and will release the parts to permit swinging movement thereof when it is desired to grip or lift the pipe.

Still another object of my invention is to provide a novel automatic pipe handling tongs of the character stated, in which the parts are so connected that when an upward lifting force is exerted on the tongs that the pipe engaging surfaces or shoes will grip the pipe.

Still another object of my invention is to provide a means of electrically tripping the latch so that the tongs may grip the pipe.

Still another object of my invention is to provide a novel automatic pipe handling tongs in which one pipe gripping shoe may be adjusted to permit the handling of various sized pipes.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

FIGURE 1 is a side elevation of my pipe handling tongs in open or pipe releasing position.

FIGURE 2 is a side elevation of the same showing the parts in pipe gripping position.

FIGURE 3 is a top plan view of my pipe handling tongs.

FIGURE 4 is a perspective view of the same.

FIGURE 5 is a perspective of the shoe adjusting cam.

FIGURE 6 is a side view of a modified form of an electrically actuated latch.

Referring more particularly to the drawing, my pipe handling tongs are adapted to engage a pipe 1 through an area somewhat greater than an arc of 180°. The principal gripping portion of the tongs consists of an arcuate shoe 2 which is equal to or somewhat less than an arc of 180° in length. This portion of the tongs can, therefore, be readily placed against the pipe and will partially encircle the same. A pair of flanges 3-4 project upwardly from the shoe 2 and are arranged substantially at right-angles to the surface of this shoe. The flanges 3-4 are a fixed part of the shoe 2 and are preferably welded or may be an integral part of the shoe, that is, it may be U-shaped in cross-section. The flanges 3 and 4 are also arcuate in shape in order to conform to the shape of the shoe 2. A segment or swinging shoe 5 also engages the outer surface of the pipe 1, and this segment or second shoe, in combination with the main shoe 2, partially encircles the pipe for a distance somewhat greater than an arc of 180°. The shoe or segment 5 is fixedly attached to, or may be an integral part of, an arcuate lifting arm 6. The arm 6 is curved to approximately the same arc as the shoe 2, so that in the lowered position of the arm, it will engage and rest upon the upper surface of the shoe 2 and between the flanges 3-4. A cam shoe 7 is pivotally attached to the arm 6; the outer end of the arm being bifurcated to accommodate the cam 7. One end of the cam 7 bears against the shoe 2 for the purpose of lifting or camming the one end of the arm 6 upwardly when a lifting force is exerted on the cam arm 7. A link 8 is pivotally attached to one end of the cam arm 7 and this link is engaged

2

by the hook 9 in order to lift the tongs and the pipe, as might be required. When the cam arm 7 is pulled upwardly by the hook 9 it will swing on the pivot 7', thus causing one end of the cam arm to engage the shoe 2 and thus lift the arm 6 on its pivot and thereby causing the segment 5 to swing inwardly and grip the pipe 1. The arm 6 is pivotally attached to the flanges 3-4 and between these flanges by means of a pivot pin 10. This pivot pin may include an offset journal 11 which is mounted in an appropriate hole in the arm 6. Rotation of the pin 10 will thus move the offset 11 to swing the segment 5 either inwardly or outwardly for the purpose of engaging different sized pipes. The pin 10 may be rotated by means of the finger 12 and the finger is held in adjusted position by a pin 13 which extends through the finger 12 and enters one of the holes 14 in the flange 4. Thus the pipe tongs may be adjusted to fit different pipes within the limit of adjustment of the offset 11.

In order to hold the shoe 2 and the segment 5 in open position, that is, where these parts do not engage the pipe 1, I provide a latch 15 which consists of two dogs 16 which are pivotally attached to the arm 6 at one end of this arm. Each dog engages a lug 17 on the flanges 3-4 to hold the arm 6 in position where the segment 5 is held in nonengaging position. A finger 18 on the dogs 16 permit these dogs to be operated either manually or mechanically, as might be required. If the dogs 16 are to be mechanically actuated, that is, if they are to be mechanically released from the lugs 17, I may provide a solenoid 19 which is mounted on either of the flanges 3 or 4. The core 20 of the solenoid 19 is attached to the finger 18, and when the solenoid is activated the dogs 16 will be swung on their pivot to release the arm 6 from engagement with the flanges 3-4.

When the pipe tongs are in use the dogs 16 first engage the lugs 17 to hold the segment 5 in extended position, as shown in FIG. 1. The tongs can then be swung into the required position relative to the pipe 1. When it is desired to grip the pipe 1 the latch 15 is released either manually or mechanically, and thereafter an upward force on the lifting hook 9 will swing the cam arm 7 upwardly to the position shown in FIG. 2; whereupon the arm 6 will swing upwardly and the segment 5 will swing inwardly to engage and grip the pipe 1. The pipe is then moved to its required position, and when a lifting force is eliminated on the arm 6 and cam 7 that arm will swing downwardly on its pivot 10, thus swinging the segment 5 outwardly to release the pipe. The latching dogs 16 are so pivoted that gravity will tend to swing these dogs into engagement with the lugs 17. Therefore, latching is accomplished automatically, but a force is required to release or unlatch the dogs 16. The lifting force on the arm 6 and cam 7 will act to press the segment 5 against the pipe 1 and thus securely grip the pipe.

Having described my invention, I claim:

1. A pipe handling tongs comprising an arcuate shoe, said shoe being approximately 180° in length, a pipe engaging segment positioned at one end of said arcuate shoe, said segment being materially less in length than said shoe and the arcuate shoe and pipe segment together having a length greater than 180°, an arcuate arm resting on said shoe in one position of the parts and being substantially concentric with the shoe, means fixedly mounting said segment on one end of the arm whereby the segment projects beyond the arm, and also beyond one end of the arcuate shoe, means pivotally mounting said arm on the shoe, said pivotal mounting being adjacent one end of the shoe and adjacent said pipe segment, a cam arm pivotally attached to the first named arm adjacent the end opposite the said pivotal mounting of the first named arm, one end of said cam arm engaging said

3

shoe, an ear extending from the cam arm to lift said cam arm and the first named arm relative to said shoe to swing said pipe segment against the pipe and clamp the pipe between said segment and said shoe, said means pivotally mounting the arm on the shoe, including a pivot pin rotatably mounted in the shoe, a cam on said pin journaled in the arm to adjust the pivot of said arm relative to the shoe.

2. A pipe handling tongs comprising an arcuate shoe, said shoe being approximately 180° in length, a pipe engaging segment positioned at one end of said arcuate shoe, said segment being materially less in length than said shoe and the arcuate shoe and pipe segment together having a length greater than 180°, an arcuate arm resting on said shoe in one position of the parts and being substantially concentric with the shoe, means fixedly mounting said segment on one end of the arm whereby the segment projects beyond the arm, and also beyond one end of the arcuate shoe, means pivotally mounting said arm on the shoe, said pivotal mounting being adjacent one end of the shoe and adjacent said pipe segment, a cam arm pivotally attached to the first named arm adjacent the end opposite the said pivotal mounting of the first named arm, one end of said cam arm engaging said shoe, an ear extending from the cam arm to lift said cam arm and the first named arm relative to said shoe to swing said pipe segment against the pipe and clamp the pipe between said segment and said shoe, said means pivotally mounting the arm on the shoe, including a pivot pin rotatably mounted in the shoe, a cam on said pin journaled in the arm to adjust the pivot of said arm relative to the shoe, and latch means on said first named arm connecting the arm and said shoe, said latch means being positioned adjacent the end of the first named arm opposite the pivot of the first named arm.

3. A pipe handling tongs comprising an arcuate shoe, said shoe being approximately 180° in length, a pipe en-

4

gaging segment positioned at one end of said arcuate shoe, said segment being materially less in length than said shoe and the arcuate shoe and pipe segment together having a length greater than 180°, an arcuate arm resting on said shoe in one position of the parts and being substantially concentric with the shoe, means fixedly mounting said segment on one end of the arm whereby the segment projects beyond the arm, and also beyond one end of the arcuate shoe, means pivotally mounting said arm on the shoe, said pivotal mounting being adjacent one end of the shoe and adjacent said pipe segment, a cam arm pivotally attached to the first named arm adjacent the end opposite the said pivotal mounting of the first named arm, one end of said cam arm engaging said shoe, an ear extending from the cam arm to lift said cam arm and the first named arm relative to said shoe to swing said pipe segment against the pipe and clamp the pipe between said segment and said shoe, a pair of flanges projecting from said arcuate shoe, said arm being positioned between the flanges and said pivotal mounting means of the arm extending through said flanges and the arm, said means pivotally mounting the arm, including a pivot pin rotatably mounted in said flanges, a cam on said pin journaled in the arm to adjust the pivot of said arm relative to the shoe.

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