Sept. 18, 1928. 1,684,476

F. J. CULLEN ET AL

ROTARY ACETYLENE TORCH

Filed Dec. 27, 1926 2 Sheets-Sheet 1

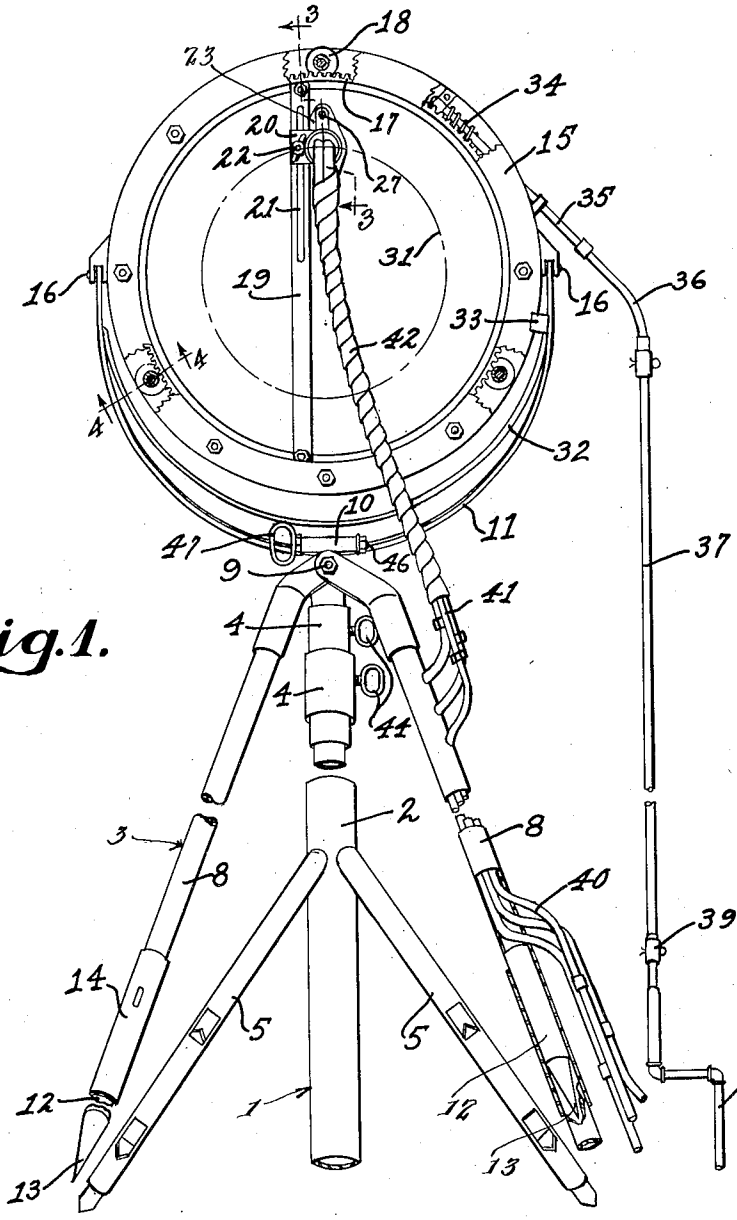


Fig. 1.

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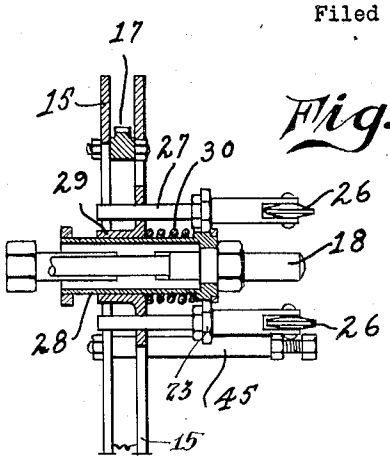


Fig. 3.

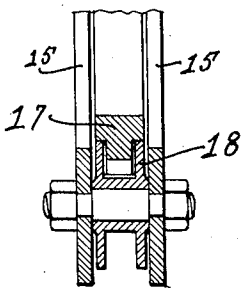


Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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ROTARY ACETYLENE TORCH.

Application filed December 27, 1926. Serial No. 157,223.

When fires occur in oil storage tanks, they may be extinguished by supplying a quantity of foaming solutions which are projected onto the surface of the burning oil. This foam operates as a blanket and excludes the air in such a way as to extinguish the fire. The efficiency, however, of this method of extinguishing a fire, depends somewhat upon the manner of delivering the foam onto the liquid, and it has been found ineffective to deliver it into the tank at a considerable distance above the oil level. Of course the oil level in these storage tanks varies considerably.

The general object of this invention is to provide an apparatus which can be used to cut or burn an opening in the wall of a tank near the level of the burning oil, so as to provide for supplying the foam to the interior of the tank just above the level of the burning oil.

The invention contemplates the use of a burning torch to burn or cut an opening in the tank wall, and one of the objects of the invention is to provide simple means for supporting and guiding this torch to move around on the wall of the tank in such a way as to cut an opening through it; also to provide simple means for maintaining a gas connection to the burner or torch during this operation.

A further object of the invention is to provide a device of this kind which is of simple construction and which can be quickly set up at the side of the tank and adjusted so as to cut the opening slightly above the oil level.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient rotary acetylene torch.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawings:

Figure 1 is a front elevation of the apparatus, certain parts being broken away.

Figure 2 is a side elevation of the apparatus, certain parts being broken away, and indicating how it is set up against the wall of the tank.

Figure 3 is a vertical section taken about on the line 3—3 of Fig. 1; this view is upon an enlarged scale.

Figure 4 is a cross section taken about on the line 4—4 of Fig. 1, upon an enlarged scale.

In practicing the invention, we provide a supporting frame 1 which preferably comprises a forward leg 2 and a back leg 3. The forward leg preferably comprises a body composed of telescoping sections 4, 4 of tubular form. At its lower end the forward leg comprises two laterally extending feet 5, the lower portions of which are in the form of a bow 6. These bows are adapted to rest upon the ground so as to give the front leg stability and they may be provided with cleats 7 to engage the earth.

The back leg is formed of two separate sections or legs 8, which may be connected at their upper ends by a pivot pin 9 and a bracket 10 which is attached to the uppermost section 4 of the front leg, the said bracket being formed as part of an upwardly extending yoke 11.

These back leg sections 8 are of tubular form and their lower ends are provided with extensible feet or extensions 12 which terminate in points 13 at their lower ends to engage the ground.

If desired, the sections 8 of the back leg may be provided with extension joints 14, enabling these legs to be made of any length desired.

The supporting frame supports a torch, which is carried in a rotatable frame, and means is provided for rotating this frame so that the torch moves around in a circle on the face of the tank wall. In order to accomplish this, we provide a guide frame 15 (see Fig. 1), which is of circular form and pivotally attached at diametrically opposite points to the upper ends of the arms of the yoke 11, as indicated at the points 16. This guide frame is of annular form and guides the rotary frame, which consists of a ring gear 17 mounted to rotate on its axis between guide rollers 18 set in the guide frame 15. This ring gear 17 carries the torch 18*. For this purpose, it is provided with a cross bar 19, the torch being carried on a bracket 20 which may be adjustably secured to the cross bar 19 by means of a slot 21 and wing nut 22.

The torch is mounted on a carriage 23 which operates to hold the end of the torch near the side wall of the tank, indicated by the line 24 in Fig. 2 and slightly above the oil level 24ª. The carriage 23 consists of a cross head or plate having tubular legs 25 with rollers 26 at their ends to roll upon the tank wall. The legs 25 are guided on fixed stems 27 which are mounted in the bracket 20.

The torch has a swivel connection with the carriage for which purpose the torch is attached to a sleeve 28, which rotates in a bearing 29 formed in the bracket, the lower end of said sleeve being rotatably mounted in the cross head 23.

Means is provided for yieldingly holding the torch adjacent to the wall of the tank. For this purpose, a coil spring 30 is provided, disposed around the sleeve 28 and thrusting against the inner side of the bracket 20. This spring exerts its force in such a way as to hold the rollers 26 of the carriage against the wall of the tank. The axes of the rollers 26 are located on a substantially radial line from the center of the ring gear so that they will track properly as the ring gear rotates. With this arrangement, it will be evident that when the rotary frame is rotating, the torch will describe a circle of any desired diameter, such as indicated by the dotted line 31 in Fig. 1.

In order to limit the swinging movement of the guide frame 15 at the pivot points 16, we provide an inner yoke 32, the ends of which are provided with laterally projecting guard lips 33. These lips will be engaged by the edge of the guide frame 15 and limit its swinging movement.

Any suitable means is provided for rotating the rotary frame from the ground. For this purpose, we have illustrated a worm 34 which meshes with the teeth of the ring gear, the shaft 35 of this worm being connected by a jointed rod or flexible connection 36 with a shaft 37 which extends down toward the ground, at which point a crank 38 is provided for rotating the shaft. This shaft may be provided with joints 39, enabling it to be constructed of as many sections as desired to give it the proper length to enable it to reach the ground.

The torch is supplied with gas to give the flame sufficient temperature to melt the wall of the tank where the flame comes in contact with it. For this purpose, we prefer to use an oxy-acetylene burner. In order to supply gases to the torch, we provide a plurality of copper tubes 40 (see Fig. 1), which may be fitted into place so that they pass up the interior of one of the back legs 8. Near the upper end of the back leg, flexible tubes 41 are provided which connect with the copper tubes 40. These tubes 41 are all encased in a wrapping or sheath 42 of asbestos.. In Fig. 1, portions of this asbestos are indicated as removed, so as to expose the tubing, thereby enabling the drawing to be more intelligible. The upper ends of the tubes 41 are attached to pipe connections 43 which extend into the swivel sleeve 28 and are attached to it. In the present instance, we have provided three of these tubes 40 which enables two kinds of oxygen to be provided, for example, welding oxygen and cutting oxygen.

The sections 4 of the front leg are provided with set screws 44 which enable them to be secured in any extended position desired.

The guide frame 15 is provided with a plurality of adjustable legs 45, the ends of which rest against the wall of the tank.

At the connection between the bracket 10 and the back legs 8, a clamping bolt 46 is provided which may be tightened up by means of a handle 47.

In using the apparatus it is set up against the side of the tank as indicated. The cleats 7 engage the ground in any inclined position the frame must assume. It is found in practice that the temperature on the ground close to the tank is not so high as to prevent the men from standing there while operating the apparatus. After the frame is set up the crank 38 is rotated. In a few moments the torch cuts the opening in the tank wall, after which a nozzle is introduced for supplying the foaming solution to the surface of the burning liquid. The gas hoses are of course provided with suitable valves, not illustrated.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and we do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What we claim is:

1. In a device for cutting an opening in a tank or the like, the combination of a supporting frame having means enabling the same to be set up near the wall of the tank, a guide frame carried by the supporting frame, a torch carried by the guide frame, and means for rotating the torch so as to move the same in a circle adjacent the face of the tank.

2. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame having means enabling the same to be set up adjacent the wall of the tank, a rotary frame carried by the supporting frame, a torch carried on the rotary frame, mechanism associated with the rotary frame engaging its outer edge for rotating the same, and means for actuating the said mechanism from the ground to rotate the rotary frame.

3. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame having means enabling the same to be set up on the ground adjacent the wall of the tank, a guide frame carried

by the supporting frame, a rotary-frame carried by the guide frame, a torch, means for supporting the torch on the rotary frame so that when the rotary frame is rotated the torch will move in a circle to burn an opening in the tank wall, means for maintaining a connection to the torch to supply the same with oxygen and acetylene while the same is rotating, and means for rotating the rotary-frame.

4. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame having means enabling the same to be set up on the ground near the wall of the tank, a rotary-frame including a gear, a guide-frame supported on the supporting frame and carrying the gear, a torch, means for supporting the same on the gear, means for maintaining a connection to the torch while the gear is rotating to supply oxygen and acetylene to the same, and means for rotating the gear.

5. In a device for cutting a hole in the wall of a tank or the like, the combination of a supporting frame constructed to be set upon the ground adjacent the wall of the tank, a guide frame supported on the supporting frame, a rotary frame supported in the guide frame, a carriage supported on the rotary frame and having means for engaging the tank wall as the rotary frame rotates, an oxy-acetylene torch supported on the carriage, means for rotating the rotary frame, and means for maintaining a gas connection to the burner while the rotary frame is rotating.

6. In a device for cutting a hole in the wall of a tank or the like, the combination of a supporting frame constructed to be set up on the ground adjacent the wall of the tank, a guide-frame supported on the supporting frame, a rotary frame carried by the guide-frame, an oxy-acetylene torch, means for supplying oxygen and acetylene to the torch including a swivel connection at the burner, and means for rotating the rotary frame to move the torch in a circle on the wall of the tank.

7. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame constructed to be set up on the ground near the wall of the tank, a guide-frame supported on the supporting frame, a rotary-frame mounted to rotate in the guide frame comprising a ring-gear with a transverse bar, an oxy-acetylene torch connected with the said bar so as to move in a circle adjacent the tank wall when the ring-gear is rotated, means for rotating the ring-gear, and means for maintaining a gas connection to the burner including a swivel connection at the torch.

8. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame constructed to be set up on the ground near the tank wall, a guide-frame pivotally supported on the supporting frame, a rotary frame carried in the guide frame including a ring-gear, a carriage supported on the ring-gear, an oxy-acetylene burner supported on the carriage, means for rotating the ring to move the burner in a circle on the tank wall, and means for resiliently maintaining the carriage in contact with the wall as the rotary frame rotates.

9. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame constructed to be set up on the ground near the tank wall, a carriage, a rotary frame supporting the carriage, means for yieldingly holding the carriage against the tank wall, means for rotating the rotary frame, a torch supported on the carriage, and means for maintaining a gas connection to the torch while the rotary frame is rotating.

10. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame having a pair of feet in the form of bows adapted to rest upon the ground, a back leg attached to the frame for bracing the same, a rotary frame supported on the supporting frame, a torch carried by the rotary frame, a pipe connection passing up the back leg and having flexible connections connecting the same to the torch for supplying the same with gas.

11. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame constructed to be set up on the ground near the tank, a rotary frame supported on the supporting frame, a torch carried thereby so as to move in a circle near the wall of the tank when the rotary frame rotates, means associated with the rotary frame for rotating it, a flexible shaft connected with the last named means, and a crank connected with the flexible shaft for rotating the same from the ground.

12. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame comprising a main leg with laterally projecting bow-shaped feet at the lower end of the same to rest upon the ground, a back leg connected with the main leg, a guide frame supported on the supporting frame, a rotary frame supported on the guide frame, a torch carried on the rotary frame, pipe connections extending up the back leg and having a flexible connection connecting the same with the torch and including a swivel connection at the torch, and means for rotating the rotary frame from the ground.

13. In a device for cutting an opening in a tank or the like, the combination of a supporting frame having means enabling the same to be set up near the wall of the tank, a guide frame carried by the supporting frame, a rotary frame guided at its edge on the supporting frame, a torch carried by the rotary frame, means for rotating the rotary frame

so as to move the torch in a circle adjacent the face of the tank, and a swivel connection for supporting the torch on the rotary frame and having means for carrying the end of a hose.

14. In a device for cutting an opening in the wall of a tank or the like, the combination of a supporting frame having means enabling the same to be set up on the ground near the wall of the tank, a guide frame supported on the supporting frame, a rotary frame mounted to rotate on the guide frame including a ring with a transverse bar, a torch having a swivel connection with said bar, and having means for securing the same in adjusted positions on the bar to regulate the diameter of the hole cut by the torch, means for rotating the rotary frame, and means for maintaining a hose connection to the torch.

15. In a device for cutting an opening in the wall of a tank, the combination of a supporting frame having means enabling the same to rest upon the ground and lean against the side wall of the tank, a guide frame having a joint connecting the same with the supporting frame enabling the guide frame to lie in a substantially vertical plane substantially against the side of the tank, a rotary frame mounted to rotate on the guide frame, a torch carried thereby, means for rotating the rotary frame, and means for maintaining a hose connection to the torch.

Signed at El Segundo this 17 day of December, 1926.

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