

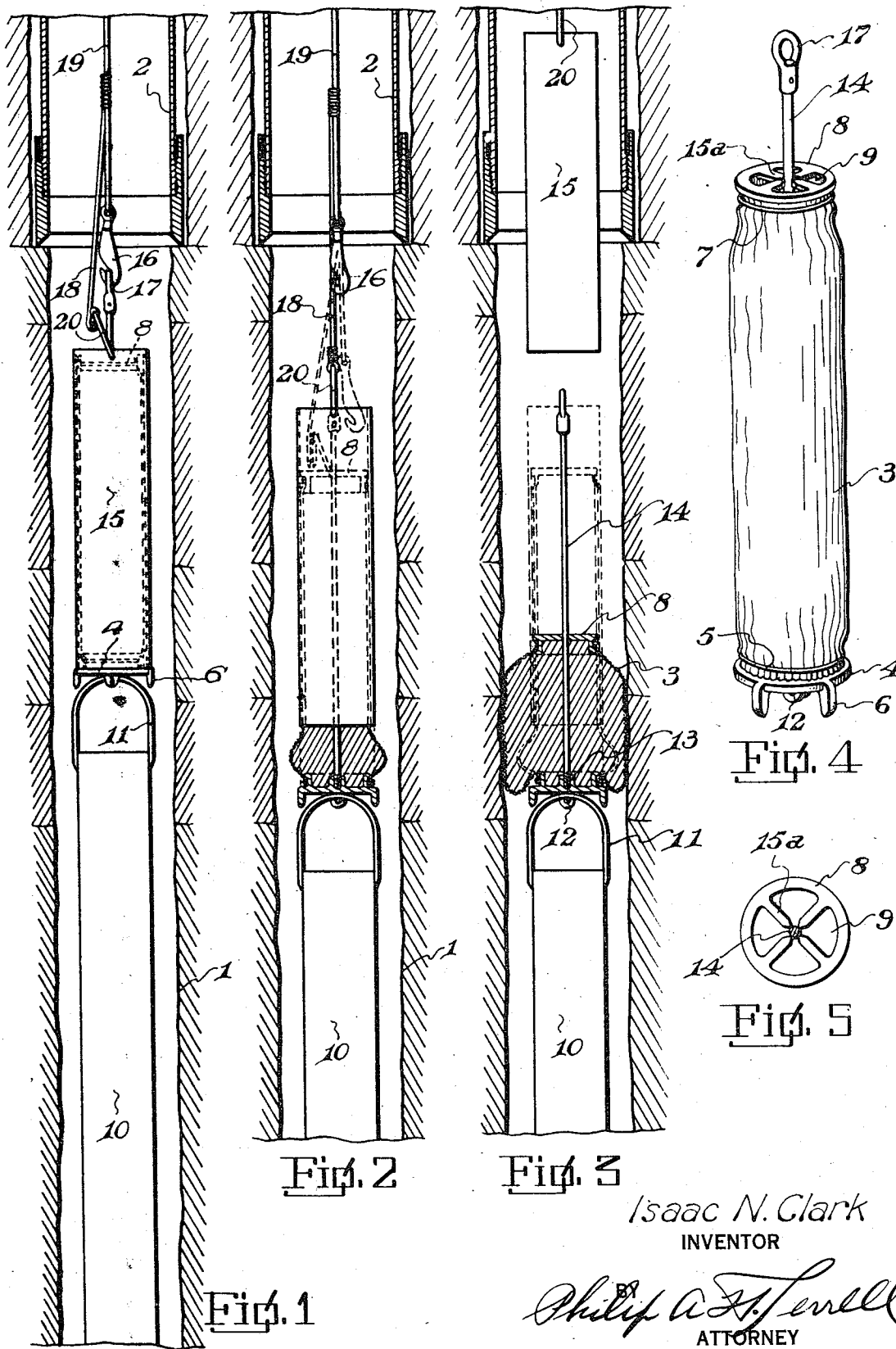
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BLASTING BRIDGE FOR OIL WELLS

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BLASTING BRIDGE FOR OIL WELLS

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9 Claims. (Cl. 166—13)

The invention relates to bridges for bridging above a shot in an oil well, and has for its object to provide a pliable restricted material container within a cylindrical member and adapted to be lowered into the well in a position above a torpedo to a formation to be blasted and means for removing the restricting cylinder from the pliable receptacle for allowing the pliable receptacle to expand into engagement with the wall of the well under the influence of mud, sand or fluid within the pliable receptacle, for restricting the force of the blast to the place desired and against loss of force upwardly through the well.

15 A further object is to provide latching means for holding the pliable bag within the cylinder during the lowering operation and for raising the cylinder from the bag and allowing the bag to expand when the torpedo is properly positioned for the blasting operation.

20 A further object is to provide the pliable expansible bag with a plate at its lower end on which the torpedo bail is suspended and the plate, with an upwardly extending rod, slidably mounted in an upper plate on the bag and adapted to be attached to the shooter's line for holding the bag within the cylinder.

25 A further object is to provide the shooter's line with a branch line connected to the bail of the bag receiving cylinder so that when the shooter's line is unhooked from the rod and pulled upwardly the cylinder will be pulled from the bag and the bag will expand into binding engagement with the wall of the well for the blasting operation.

30 A further object is to form the bag from a pleated thin material which will easily expand.

35 With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing:

40 Figure 1 is a vertical transverse sectional view through a conventional form of oil well, showing the device with the suspended torpedo being lowered therein.

45 Figure 2 is a view similar to Figure 1, but showing the shooter's line unhooked, and the cylinder partially removed from the expansible bag for bridging the hole.

50 Figure 3 is a view similar to Figure 1, but show-

ing the cylinder entirely removed from the bag and the expansible bag in close binding engagement with the wall of the well.

Figure 4 is a perspective view of the expansible bag.

5 Figure 5 is a plan view of the upper bag plate showing the filling openings therein and the guiding means for the plate on the rod.

10 Referring to the drawing, the numeral 1 designates the wall of the well formation to be blasted and 2 a conventional form of well casing extending into the hole.

15 Heretofore various kinds of bridge members have been provided for confining the force of the blast to the formation to be blasted and preventing the upward loss of this force. In the present device the bridge member comprises a pliable expansible bag 3, which may be filled with mud, sand or water if desired and is preferably formed from fabric, pleated as shown to allow the expansible action thereof when the bag is allowed to expand under the gravity flow of the material therein, clearly shown in Figures 2 and 3. The lower end of the expansible bag 3 is provided with a plate 4, to which is secured the lower end of the bag by means of a band 5. Plate 4 is preferably provided with downwardly extending lugs 6, extending beyond the periphery of the plate for preventing the plate catching on uneven wall surfaces. Secured to the upper end of the bag 3 by means of a band 7 is a plate 8 having a plurality of filing openings 9 therein through which mud, sand or water may be passed for filling the bag before lowering the same into the well. This filling operation is preferably done when the bag is within the cylinder on the derrick platform.

20 The torpedo 10 is suspended below the bridge by means of a bail 11 detachably connected at 12 to the under side of the plate 4 as clearly shown in Figures 1, 2 and 3. Rigidly connected at 13 to the upper side of the lower plate 4 is an upwardly extending rod 14, which extends through the bag 3 and through the rigid cylinder 15, and the rod 14 at its upper end is slidably mounted between the fingers 15^a of the plate 8.

25 The fingers 15^a are sharpened or reduced where they engage the rod 14, thereby reducing the contacting surfaces so that the rod will not stick incident to grains of sand, mud or the like, there being no closed bearing in which the particles can collect.

30 After the parts are assembled on the platform of the derrick the shooter's hook 16 is hooked

in the eye 17 of the rod 14 and the short branch line 18 from the shooter's line 19 is connected to the bail 20 of the removable cylinder 15, and the whole assembly is then lowered into the well as shown in Figure 1. When the torpedo 10 reaches the formation 1 to be blasted, the shooter's line 19 and its hook are lowered to the dotted line position shown in Figure 2 for releasing the hook from the eye 17 and then an upward pull is imparted on the cylinder 15 through the medium of the branch line 18 which pulls the cylinder from the bag and allows the restricted bag to expand outwardly by the fluid material therein, clearly shown in Figures 2 and 3. The cylinder is raised from the well, and then a further bridging operation on top of the expanded bag is applied. This further bridging operation may be in the form of sand poured into the well or water for building up a column above the bag for resisting the upward force of the blast and confining the full force of the blast to the formation 1. It is possible where the hole has no fluid at the time of running the torpedoes, the bag may be made of a rubberized material and water used in the bag instead of sand or mud, however if there is fluid in the hole, the material placed in the bag must be a heavier one such as sand or drilling mud.

From the above it will be seen that a bridging device is provided for bridging above shots in an oil well, which is simple in construction and one wherein a fluid or flowing material is used in an expanding bag for plugging the hole above the shot.

The invention having been set forth what is claimed as new and useful is:

1. A well bridge comprising an expansible, longitudinally collapsible closed pre-filled chambered member having a gravity actuated fluid material therein for expanding the chambered member into engagement with a well wall.

2. A well bridge comprising an expansible, longitudinally collapsible pliable member having a closed pre-filled chamber therein, a gravity actuated fluid material within the chambered member and adapted to expand the chambered member into engagement with a well wall upon longitudinal collapsing of the pliable member, means for lowering the chambered pliable member into a well to a predetermined position and means for maintaining the chambered pliable member in contracted condition during the lowering operation, said last named means also forming means for allowing the chambered pliable member to expand into engagement with the wall of the well.

3. A well bridge comprising an expansible, longitudinally collapsible closed pliable chambered member having a gravity actuated fluid material therein for expanding the chambered pliable member within a well upon longitudinal collapsing of the pliable member, said chambered pliable member being slidably disposed within a cylindrical member of smaller diameter than the well and means whereby the cylindrical member may be removed from the chambered pliable

member when they reach a predetermined position for allowing the gravity actuated fluid material to expand the chambered pliable member into engagement with the wall of a well.

4. A device as set forth in claim 3 including discs carried by the upper and lower ends of the expansible chambered pliable member, a rod carried by the lower disc and extending axially through the chambered pliable member and the other disc, detachable lowering means connected to the rod, a connection between the lowering means and the cylindrical member, said connecting means forming means whereby the cylindrical member may be raised from the chambered pliable member when the lowering means is detached from the rod.

5. A torpedo bridge for oil wells comprising an expansible fluid operated chambered member, a cylindrical restricting member around the expansible member, a lowering cable connected to the expansible member and maintaining said expansible member within the restricting member until the restricting member is raised, said lowering cable being detachably connected to the restricting member and the lowering cable, said connection forming means whereby when the lowering cable is detached from the expansible member, the restricting member may be raised for allowing the expansible member to expand into engagement with the wall of a well.

6. A device as set forth in claim 5 wherein the expansible member is provided with a lower disc, means for attaching a torpedo to said lower disc, an upper apertured disc carried by the expansible member and a rod connected to the lower disc and extending upwardly through the expansible member and upper disc and connected to the lowering line.

7. A device as set forth in claim 5 wherein the lower end of the expansible member is provided with a torpedo supporting disc forming a bottom for the expansible member, downwardly extending guide lugs carried by said disc, an apertured filling disc carried by the upper end of the expansible member, a rod carried by the lower disc, said rod extending upwardly through the expansible member and restricting member and detachably connected to the lowering line, said upper disc having a plurality of arms, said arms terminating in edge bearing engagement with said rod.

8. A well bridge comprising an expansible longitudinally collapsible member adapted to receive therein a gravity actuated expanding material, a restricting sleeve within which the expansible member is housed as it is lowered into a well and means for removing said restricting sleeve from the expansible member when the sleeve and expansible member reach a predetermined position in a well.

9. A device as set forth in claim 8 including means whereby a torpedo may be supported from the lower end of the expansible member below the restricting sleeve.

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