June 10, 1924.

1,497,629

R. C. BAKER

BRIDGE BUILDER

Filed Feb. 20, 1922

Fig. 1.

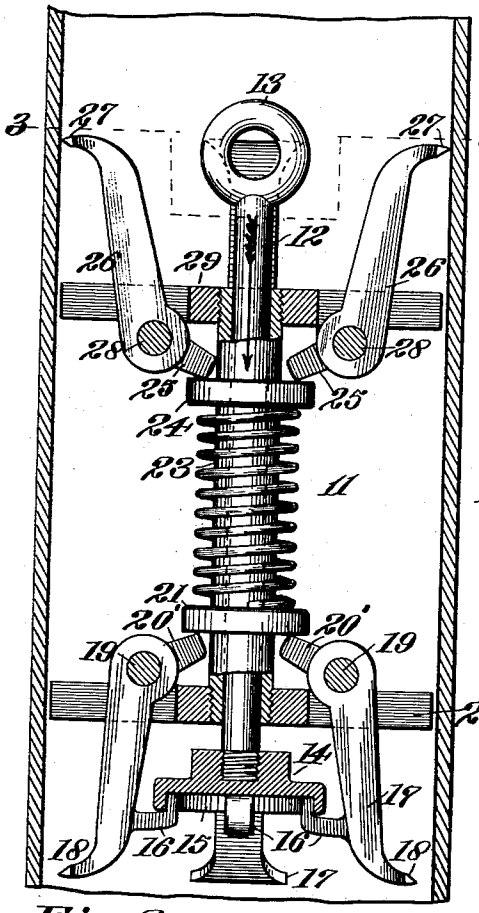


Fig. 2.

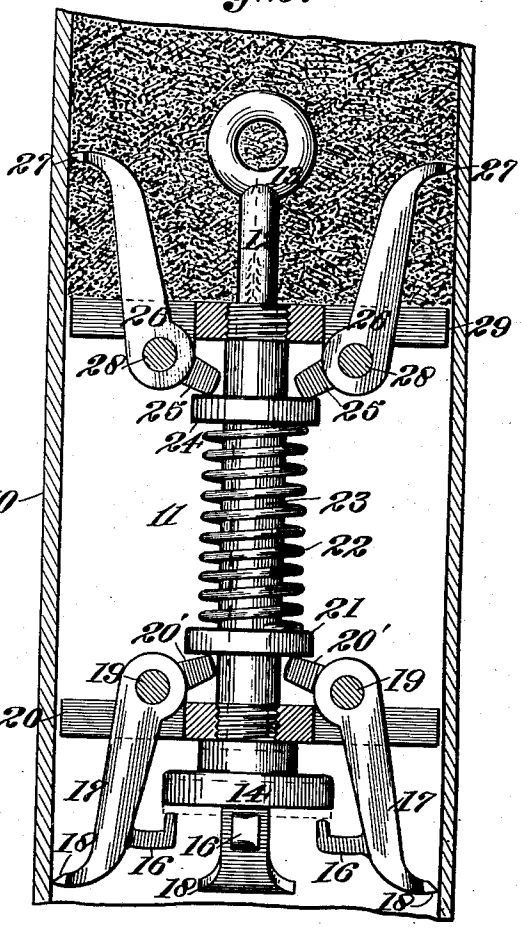


Fig. 3.

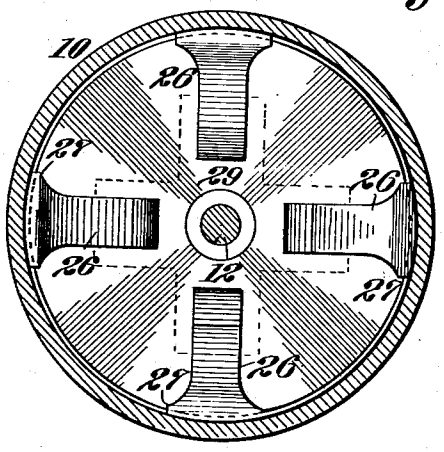
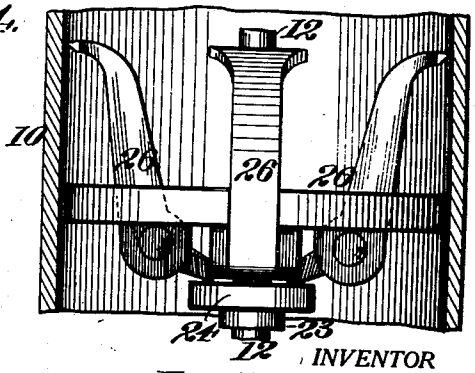


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BRIDGE BUILDER.

Application filed February 20, 1922. Serial No. 538,129.

To all whom it may concern:

Be it known that I, REUBEN C. BAKER, a citizen of the United States, residing at Coalinga, county of Fresno, and State of California, have invented new and useful Improvements in Bridge Builders, of which the following is a specification.

This invention relates to a bridge builder for a well shaft or casing.

It often becomes necessary in the course of drilling wells, and at times during the performance of the well, that it is desirable to obstruct the well at a certain depth. It has been the common practice to fill the well from the bottom up to the desired point with any material at hand, such as brick, old rope, tree boughs, rocks, etc., and thus close the well. It is the particular object of the present invention to provide a device which may be easily placed within a well shaft or casing and accurately located and fastened within the well shaft or casing at the desired point.

The present invention contemplates the use of sets of fastening jaws which are opposed to each other and may be lowered into the well upon spiders, after which they may be set to engage the well casing at any predetermined point and will thereafter support the spiders to carry a quantity of cementitious material and form a well bridge and plug.

The invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a view in vertical section and elevation showing the present invention as being lowered into a well and more clearly disclosing the normal positions of the upper and lower clamping dogs.

Fig. 2 is a view in section and elevation showing the bridge member as set and as supporting a casing plug.

Fig. 3 is a view in horizontal section through the casing as seen on the line 3—3 of Figure 1, illustrating the arrangement of the upper clamping dogs.

Fig. 4 is a fragmentary view in section and elevation showing the normal position of the upper clamping dogs and the spider they support.

Referring more particularly to the drawing, 10 indicates a well casing. This casing may be of any length and may be plugged at any point throughout its length by a bridging member 11, with which the present invention is particularly concerned. This bridge builder is formed with a central supporting rod 12 having an eye 13 at its upper end to which a cable or other suspending member may be secured. The lower end of the rod is externally threaded and engages a lock-cap 14. This cap has a lower cup portion 15 into which locking fingers 16 of lower locking dogs 17 normally seat. These fingers extend radially from the locking dogs and hold these dogs in a disengaged position, under normal conditions. The lower locking dogs are formed with outturned sharpened jaws 18 adapted to engage the inner faces of the well casing and to act to support the bridge structure. The locking dogs are mounted upon pivots 19 carried by a lower spider 20. This spider is substantially circular in shape as more clearly shown in Fig. 3 and is formed with four radial slots through which the dogs may swing. The upper ends of the dogs are formed with upwardly extending and inturned lugs 20′ which rest beneath and are partially engaged by a pressure collar 21. The pressure collar 21 is normally and constantly forced down by means of an expansion spring 22. This spring circumscribes a spacing sleeve 23 through which the rod 12 is free to slide. The lower end of this sleeve is externally threaded and passes through a bore in the center of the spider 20. The collar 21 is free to slide upon the spacing sleeve 23 and agrees in construction and operation with an upper collar 24 resting upon the upper end of the spring 22 and disposed around the sleeve. The upper collar 24 is adapted to bear upwardly against lugs 25 of upper locking dogs 26. These dogs extend upwardly and are intended to swing outwardly to cause their gripping faces 27 to forcibly engage and lock against the sides of the casing in opposition to the locking action of the faces 18. The upper dogs are carried upon pivot pins 28 which are supported from an upper spider 29. This spider is formed with a central threaded bore into which the upper end of the spacing sleeve 23 is adapted to seat. It will thus be seen that the spacing sleeve 23 and the upper and lower spiders 28 and 20 form a spool-like structure upon which the two sets of dogs are mounted and from which they may pivot.

In operation of the present invention, the bridge builder may be lowered into a well casing and as it is lowered, will forcibly engage the sides of the well casing by the V-shaped jaws 27 of the upper locking jaws 26. As the bridge builder gradually moves down into the casing, it may be set at any position desired and when in position the rod 12 may be drawn upwardly. This upward action will cause the jaws 27 to be forced into the sides of the casing and prevent upward movement of the bridge builder, as a whole, at the same time the shaft 12 will be lifted and will elevate the cup member 14. This will draw the cup from an engaging position with the locking lugs 16 and will permit the lower jaws 17 to spring outwardly as forced by the action of the expansion spring 22, this will cause the V-shaped faces 18 of the lower jaws to be forced into the sides of the casing and hold the bridge member against any lowering action. It will thus be seen that the bridge builder will then be locked against upward or downward movement, at which time the suspending member may be released and concrete or other cementitious material poured into the casing. The two spiders 20 and 28 will, of course, obstruct the downward flow of this material and will assist in forming a satisfactory bridge or obstruction for the casing.

It will thus be seen that the device here disclosed, while simple and economical in its construction, provides means by which it may be easily lowered into a well and positioned at any desired point or depth and thereafter set.

While I have shown the preferred form of my invention as now known to me, I wish it understood that various changes may be made in the construction and combination of parts by those skilled in the art without departing from the spirit of my invention as disclosed in the appended claims.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A gas well obstructing bridge mechanism including a central stem, a sleeve through which the stem is slidable, said sleeve having spiders fixed at its opposite ends, radially swinging arms fulcrumed to the spiders, and forming upper and lower sets of arms, said arms having their outer ends adapted to engage the sides of the well casing, cam lugs on the inner ends of each set of arms, an upper and a lower collar slidably mounted on the sleeve, a spring surrounding the sleeve between the collars and exerting a pressure thereon, said spring and upper collar normally projecting the upper set of arms into engagement with the well casing, means for securing the lower set of arms against engaging the well casing when the device is lowered into the casing, and means for releasing said means when the desired point is reached.

2. A well casing bridge including a sleeve having spiders secured to opposite ends, radial arms pivoted to the spiders, and having their outer ends adapted to engage and lock with the casing, lugs on the inner ends of the arms, and collars on the sleeve engaging the lugs, a spring between the collars, acting to force the collars apart and diverge the arms, a shaft extending through the sleeve, a flanged locking cap fixed to the lower end of the shaft, locking lugs on the lower set of expansible locking arms, said lugs engaging the flange of the cap, to retain the arms out of locking contact with the casing, and means for moving the cap out of engagement with the locking lugs to release the same.

3. In a bridge builder for a well shaft or casing, comprising in combination a pair of plates disposed one above the other and supporting means therebetween, a plurality of spider arms extending from each of said plates and pivotally secured thereto, means by which the spider arms of the upper plate may be swung outwardly and locked with relation to the well shaft or casing against upward movement, means for securing the lower spider arms against engagement with the well casing when the device is being lowered into the well, means for releasing said arms when a predetermined point in the well is reached, and other means for forcing said lower spider arms outwardly into locking engagement with the casing.

4. A device of the character described, a pair of interspaced plates, a tube connecting the same, a plurality of spider arms pivotally mounted on the uppermost of said plates, a plurality of spider arms pivotally mounted on the lowermost of said plates, means for retaining the lowermost spider arms in a position where they will be held out of engagement with relation to the well casing when the device is being lowered into the well, a common means for projecting both the upper and lower set of spider arms outwardly into engagement with the well casing, said means maintaining the upper set of spider arms in constant engagement with the well casing when the device is being lowered, and means for releasing the lowermost set of spider arms when a predetermined point is reached so that the common actuating means may project the lower set of spider arms into engagement with the well casing.

REUBEN C. BAKER.