

J. D. ISAACS & J. B. SPEED.  
HELICALLY RIFFLED FLUID PIPE LINE.  
APPLICATION FILED JUNE 23, 1905.

Fig. 1

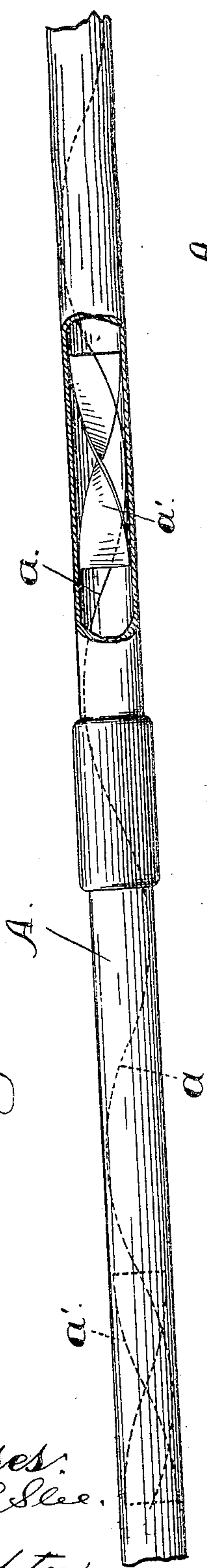


Fig. 3.

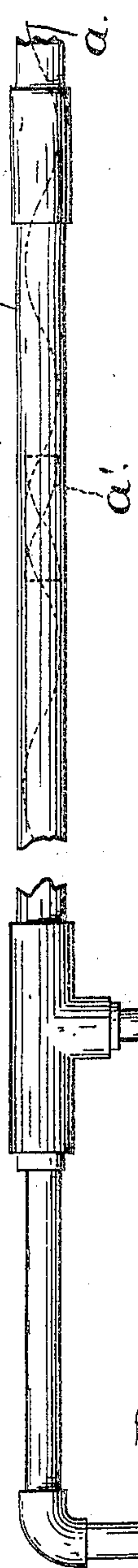
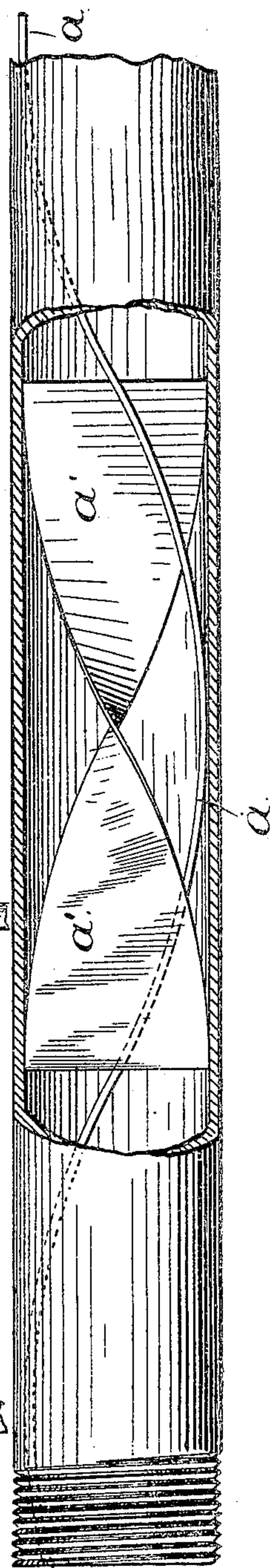
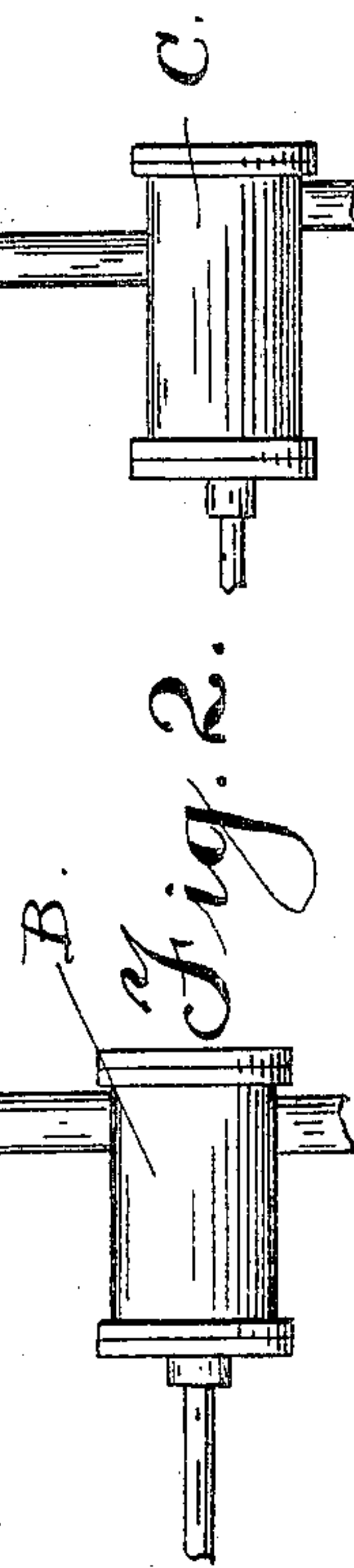


Fig. 2.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN DOVE ISAACS, OF OAKLAND, AND JAMES BUCKNER SPEED, OF  
BERKELEY, CALIFORNIA, ASSIGNORS TO RIFLED PIPE COMPANY,  
OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

## HELICALLY-RIFFLED FLUID PIPE-LINE.

No. 808,752.

Specification of Letters Patent.

Patented Jan. 2, 1906.

Application filed June 23, 1905. Serial No. 266,573.

*To all whom it may concern:*

Be it known that we, JOHN DOVE ISAACS, residing at Oakland, and JAMES BUCKNER SPEED, residing at Berkeley, Alameda county, State of California, citizens of the United States, have invented certain new and useful Improvements in Helically-Riffled Fluid Pipe-Lines; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to a pipe-line adapted to be used in connection with that art or method of piping a fluid which consists in advancing the fluid, together with a second fluid of greater specific gravity, through the pipe with a helical motion about the axis of the fluid content, whereby the fluid of greater specific gravity is caused to form an envelop about the fluid of lesser specific gravity, thereby reducing the friction against the pipe-walls. This art or method is fully disclosed in Letters Patent of the United States No. 759,374, granted to us May 10, 1904, to which patent reference is hereby made. In this method the necessary helical motion of the fluid content of the pipe is in practice produced by means of a helically-directed riffle or obstruction of some suitable character upon and throughout the interior of the pipe-line. Our present invention relates especially to a pipe-line of this character and for the purpose stated; and its object is to insure the resumption of the relative concentricity of the two fluids after that relation has been temporarily destroyed by a cessation of the pumping, which interruption naturally results in the settling of the heavier fluid to the bottom of the pipe and the rise of the lighter fluid to the top of the pipe. The necessity for this reestablishment of the proper relation of the two fluids is particularly apparent when the pipe-line is laid on a grade, for in such case the pumping pressure might unassisted be insufficient to overcome the gravity-pressure, and thereby fail to impart the necessary helical motion to the fluid content. If said motion be dependent on the riffled pipe alone, for it is obvious that the pumping pressure must be greater than that due to velocity.

Our invention consists in a helically-riffled pipe-line for carrying out the method stated, said pipe-line having within it at suitable intervals helically-twisted diaphragms, whose function is to bodily turn over the stratified fluids after they have become separated by reason of a cessation of pumping.

Referring to the accompanying drawings, Figure 1 is a side elevation of the pipe-line broken at one point to show the twisted diaphragm. Fig. 2 is an enlarged elevation, partly broken, of a pipe-section of the pipe-line, showing the diaphragm. Fig. 3 is an elevation showing the apparatus, including the pipe-line, for carrying out the method stated.

A is the pipe-line, having on its interior wall any suitable helically-directed riffle or obstruction *a*.

B is the pump for supplying the lighter fluid, and C is the pump for supplying the heavier fluid to the pipe-line.

At suitable intervals in the line are fitted the helically-twisted diaphragms *a'*, consisting in practice of sheets of thin metal. These are sufficient to insure the turning over bodily of the two fluids and to effect a return to the necessary helical motion when after a cessation of pumping they have become separated.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A pipe-line the interior wall of which is provided with a helically-directed obstruction, said line having within it at intervals helically-twisted diaphragms.

2. In an apparatus for the method stated and in combination with means for supplying the lighter and heavier fluids to the pipe-line, a pipe-line the interior wall of which is provided with a helically-directed obstruction, said line having within it at intervals helically-twisted diaphragms.

In witness whereof we have hereunto set our hands.

JOHN DOVE ISAACS.

JAMES BUCKNER SPEED.

Witnesses:

J. COMPTON,

D. B. RICHARDS.