Aug. 7, 1928. 1,679,499

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METHOD OF AND APPARATUS FOR MAKING STOVEPIPE CASINGS

Filed Sept. 26, 1925 2 Sheets-Sheet 1

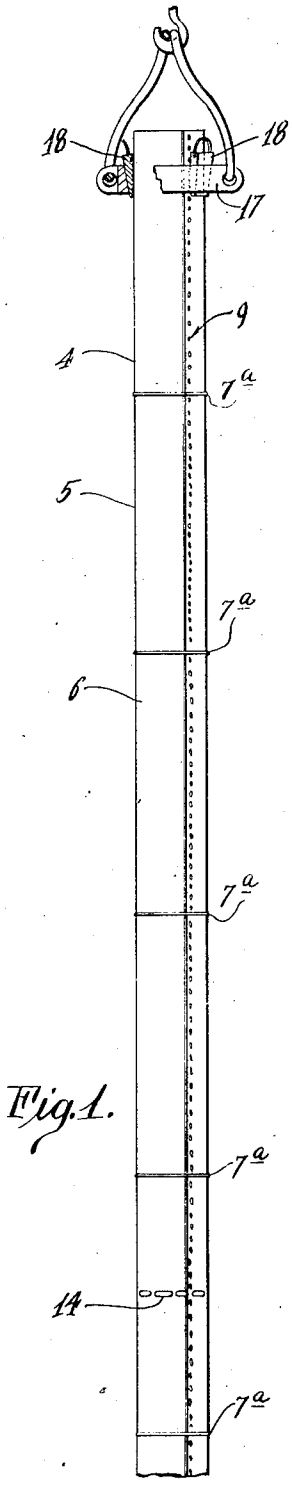


Fig. 1.

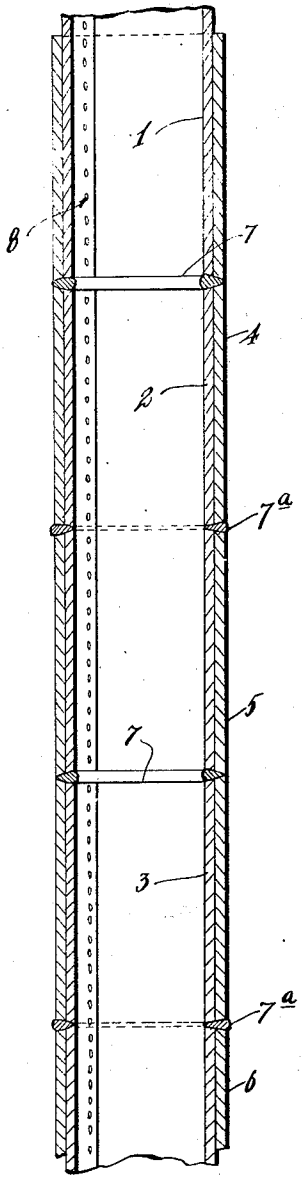


Fig. 2.

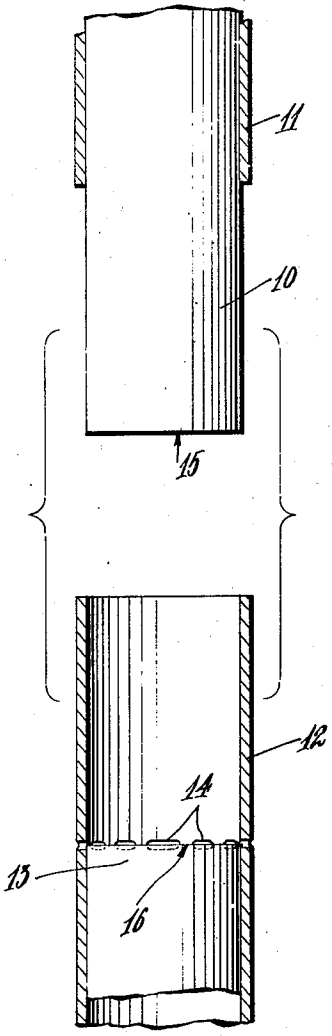


Fig. 3.

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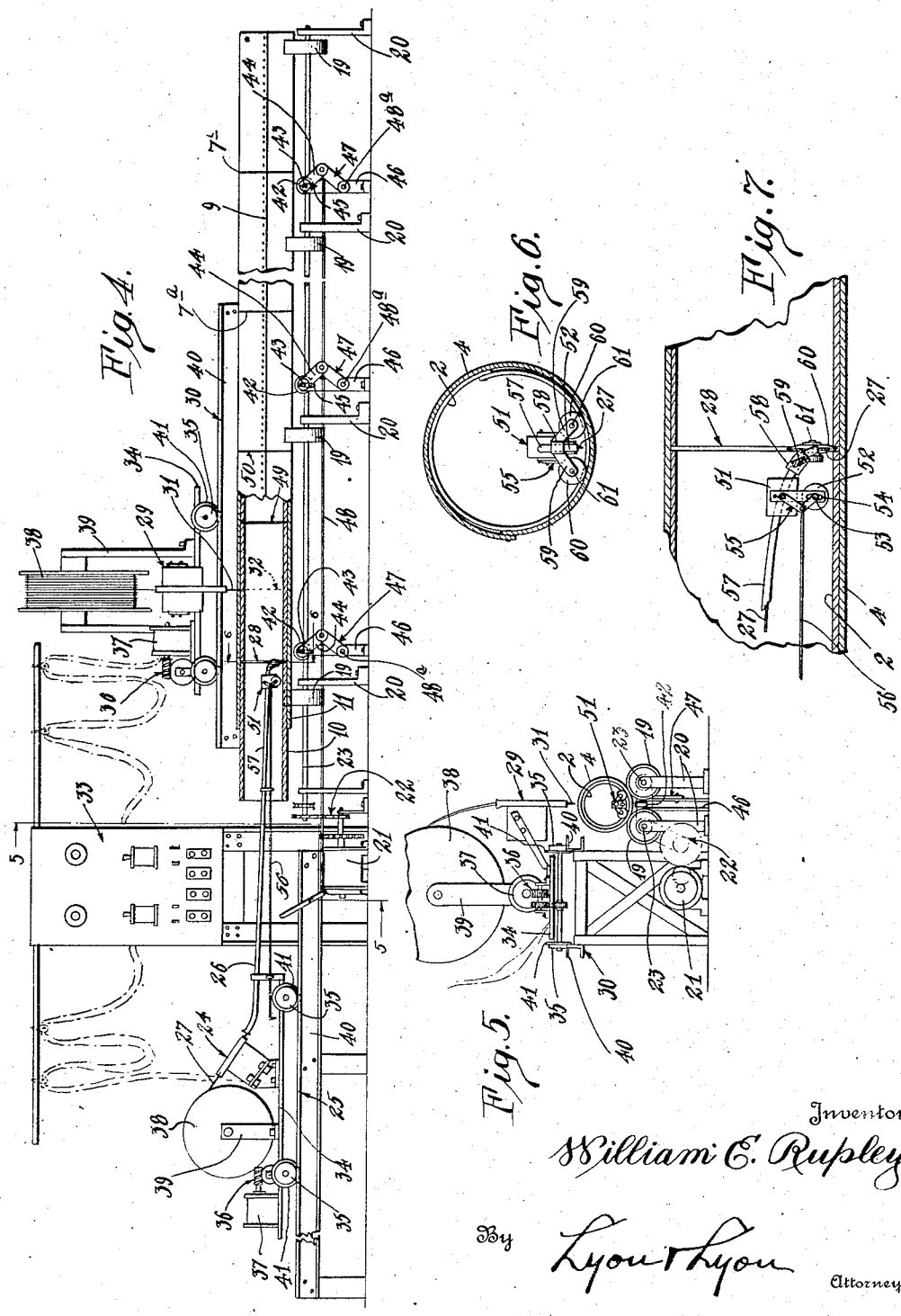


Fig. 4.

Fig. 6.

Fig. 7.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR MAKING STOVEPIPE CASINGS.

Application filed September 26, 1925. Serial No. 58,951.

This invention relates to stove pipe casing, and the method and apparatus for forming the same, and refers more particularly to a stove pipe casing composed of a plurality of concentric tubular sections which are rigidly welded one to the other at their connecting joints and to the method and apparatus for forming the same.

Stove pipe casing is employed in the sinking of wells for the recovery of either water or oil. Such stove pipe casing is driven or lowered into the hole formed for the well. When in the proper position the stove pipe casing is set and remains as a permanent part of the well. In order to prevent the collapse of such a stove pipe casing the same must be of great strength and as the same is a permanent part of the well, must be of great durability.

Many types of stove pipe casing are now in use which are for the most part of expensive construction or are of insecure manner of connection of the sections one to another so that the same "part" during the driving of the casing.

It is, therefore, an object of this invention to provide a stove pipe casing of any durable construction and of great strength so that the same will withstand the driving of the same and will be extremely adaptable for use as a permanent part of a well.

Another object of this invention is to provide a stove pipe casing having a practically uniform exterior contour throughout its length so that the same will not "hang up" during the driving of the same.

Another object of this invention is to provide a method of forming the stove pipe casing, which method is comparatively inexpensive and will produce a stove pipe casing of great durability and strength in an inexpensive manner.

Another object of this invention is to provide apparatus for use in carrying out the method, having the advantages above set forth.

Other objects and advantages of this invention will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is a side elevation of a stove pipe casing embodying this invention.

Fig. 2 is a sectional side elevation thereof.

Fig. 3 is a side elevation of a fragment of stove pipe casing embodying this invention, illustating the manner of assembling the sections thereof.

Fig. 4 is a side elevation of apparatus employed for the carrying out of this invention.

Fig. 5 is an end elevation thereof taken substantially on the line 5—5, of Fig. 4.

Fig. 6 is an end elevation taken substantially on the line 6—6, Fig. 4.

Fig. 7 is a fragmental side elevation of the portion of the apparatus illustrated in Fig. 6.

In the preferred embodiment of this invention illustrated in the accompanying drawings, 1, 2 and 3 illustrate a series of tubular sections of sheet steel which tubular sections 1, 2 and 3 are disposed within a plurality of outer tubular sections 4, 5 and 6. The tubular sections 1, 2 and 3, and 4, 5 and 6, are from three to six feet in length depending upon that desired by the manufacturer constructing the stove pipe casing. The ends of the tubular sections 1, 2 and 3 are abutted and the ends of the sections 4, 5 and 6 are abutted between the abutted ends of the inner sections 1, 2 and 3 so that the joints formed in the casing are staggered.

The joints between the inner sections are electric or acetylene welded preferably with a butt-weld so that a welded joint is made that secures the ends of the sections together and secures the ends of the sections to the outer section overlying the same. Such a welding connection is illustrated at 7 wherein the abutting ends of the tubular sections 1 and 2 are welded together and the two sections 1 and 2 are welded to the outer section 4.

A similar weld is formed between the abutted ends of the outer sections and the inner casing, for example the adjacent ends of the sections 4 and 5 are welded together and to the inner casing as illustrated at 7^a.

The tubular sections 1, 2 and 3 are of slightly less exterior diameter than the tubular sections 4, 5 and 6 so that the same will fit within the interior of the sections 4, 5 and 6. The tubular sections composing this stove pipe casing are formed of sheet steel and are lap-riveted as illustrated at 8 and 9.

Each section or stand of stove pipe casing is formed of a plurality of concentric

tubular sections and may be of any desired length and these stands are in practice built up to about twenty-eight or thirty feet. The end of either tubular section 10 projects from the end of the outer and tubular section 11 approximately one-half its length as illustrated in Fig. 3. On a second section or stand of casing the end outer tubular member 12 projects approximately one-half its length beyond the end of the end inner tubular member 13. A plurality of perforations 14 are formed around the circumference of the outer tubular member 12 immediately above the end of the tubular section 13. In assembling two stands or sections of stove pipe casing when the same are in position to be lowered in a well, the end of the tubular section 10 is fitted into the end of the tubular section 12 with the end 15 thereof in abutment with the end 16 of the tubular section 13. A welder then spotwelds through the perforations 14 welding the tubular section 10 to the tubular section 13 and to the tubular section 12 much in the same manner as is illustrated at 7 except that in case of the welding through the perforations the weld connecting the three tubular sections is not continuous as illustrated at 7. The welder then welds the sections 11 and 12 together at their ends and to the inner section 10 to form exactly the same manner of welded connection as is illustrated at 7a. By this means the stands or sections of stove pipe casing are secured together in approximately the same manner and have approximately the same strength as the connections formed between such sections as 1, 2 and 4.

An elevator 17, employing slips 18 is illustrated in Fig. 1 as gripping the outer surface of such a stove pipe casing. The entire length of the stove pipe casing may be "picked" in the manner illustrated in the patent granted to Morgan L. Sweeney, on September 11, 1917, No. 1 240,098. This casing is formed in the manner as will hereinafter be described:

According to the method embodying this invention as illustrated in Figure 4, the stove pipe casing with its sections such as 1, 2 and 3, and 4, 5 and 6 etc., properly assembled with their connecting ends staggered, is supported in a horizontal position on a plurality of rollers 19 which rollers 19 are supported in hangers 20. The rollers are rotated by means of an electric motor 21 which is connected through reducing gearing 22 to a drive shaft 23, on which shaft 23 the rollers 19 are supported and secured.

The welding apparatus 24 is mounted upon a runway 25 and carries an extension arm 26 which supports the welding strand 27 forming one electrode for the welding of an interior joint 28 in a manner that will hereinafter be described. A second welding apparatus 29 is supported on a second runway 30 and supports a welding strand forming an electrode 31 in position to form the outer connection 32. The electrodes 27 and 31 being properly positioned the circuit is completed at the board 33 in the manner well understood in the art, and the motor 21 started so that as the joints 28 and 32 are being formed the stove pipe casing is being revolved upon the rollers 19 to form a complete and continuous circular weld at these points. The depth of penetration of such a weld 7 is regulated by the density of the current permitted to flow through the welding strands 27 and 31, it being desirable in most cases to have such a current density that the weld formed will almost, but not quite, penetrate through the opposite pipe. For example, say that sections similar to 1 and 2 will be welded together at their ends to the pipe 4. In such case it would be preferable that the weld 7 be formed to approximately, but not quite, pass through the outer pipe 4. This can easily be determined by means of the rheostat (not shown but ordinarily provided in such electrical welding apparatus) and this regulation of the current is well understood in the art and it may be easily determined when the weld is penetrating to the sufficient depth by observing, on the interior of the pipe in the case of an exterior weld, or on the exterior thereof in case of an interior weld, whether or not the pipe is of a red heat at the welding joint for the connection. The welding apparatus 24, 29 are of the ordinary type and comprise a platform 34 supported on wheels 35 which are driven through gearing 36 from motors 37 which are connected to any suitable source of electric current supply. The welding strands 27 and 31 are carried on spools 38 mounted in brackets 39 supported on the platform 34.

In order to guide the weld apparatus 24, 29 it is preferable that the runways 25, 30 be formed of channel irons 40 and that the wheels 35 form the flanges 41 which guide the apparatus along the channel irons 40.

In order to enable the operator of this apparatus to position the tubular sections of which a stand casing is to be formed, a plurality of idler rollers 42 are mounted on pins 43 which pins 43 are supported in links 44 and are guided in slots 45 formed in the standards 46. The links 44 are one of the links of the toggle links 47 which are secured to an actuating rod 48 and are pivotally secured to the standards at 48a. The actuating rod 48 connects with the piston of an air cylinder or like actuating mechanism (not shown) so that the rollers 42 may be elevated to raise the stove pipe casing from engagement with the rollers 19. The stove pipe casing in this manner is rolled to or from position on the rollers 42. When one set of joints 28, 32 are

formed the welding apparatus 24, 29 are moved by completing the electric circuit to the motors 37 to a second position to form connections 49, 50 and are so progressively moved until the stand or section of stove pipe casing is completely welded.

In order to properly position the electrode 27 the same is mounted upon a carriage 51 which is supported on a wheel 52 which is pivotally supported at a pin 53 in a slot 54, which pin 53 is likewise secured to one link of the toggle link 55. The actuating rod 56 is secured to the toggle link 55 and projects outward to a point of manipulation. The welding strand 27 is extended through a tubing 57 which is secured to the standard 51. Secured to the forward end of this tubing 57 is a second standard 58 which comprises a pair of arms 59 which support discs 60 at pins 61. In positioning the inner electrode 27 the same is run into the interior of the pipe on the wheel 52 until in position so that the discs 60 will fall into the space between the ends of the tubular sections forming the stove pipe casing. The arm 56 is then actuated to raise the wheel 52 on its pin 53 in the slot 54 so that the ends of the electrode 27 will be positioned in proper relation to the ends of the tubular sections so that the same will form the desired weld. The welding strands 27, 31 in each case is fed outward to provide the weld in any desired or preferred manner as is well understood in the art.

The method of forming stove pipe casing and the operation of the apparatus embodying this invention is, therefore:

A plurality of sections of casing are placed upon a rotatable support. Inner and exterior electrodes 27 and 31 are positioned to form circular welds for welding the abutting ends of the tubular sections to each other and to the adjacent tubular sections. The apparatus is grounded so that the casing forms the second electrode for carrying out the electric welding. Requisite current is supplied to the electrodes, the casing is then rotated on the rollers 19 during the welding operation until a complete circular weld is formed. The two welding electrodes formed by the strands 27, 31 are then moved to a second position and being properly positioned the operation is repeated. When the stand or section of stove pipe casing is welded the casing is lifted from the rollers 19 by means of the rollers 42 and the same removed from the rotatable platform and taken to any desired point of use.

Having fully described a preferred embodiment of this invention, it is to be understood that I do not wish to be limited to the exact details herein set forth which may, obviously, be varied in detail without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. The method of forming stove pipe casing which comprises welding the abutted ends of a plurality of tubular sections together and to a substantially concentric abutted casing within said sections.

2. The method of forming stove pipe casing which comprises positioning a plurality of tubular sections in abutted relation within a plurality of outer tubular sections in abutted relations and welding the inner sections together and to the outer section and the outer sections together and to the inner sections.

3. The method of forming stove pipe casing which comprises positioning a plurality of tubular sections in abutted relation within a plurality of tubular sections of greater diameter and like in abutted relation and, welding the inner abutted tubular sections together and to an outer section and welding the outer tubular sections together and to an inner section while revolving the said sections.

4. The method of forming stove pipe casing which comprises positioning a plurality of tubular sections in abutted relation within a plurality of tubular sections of approximately the same internal diameter as the external diameter of the first said sections, electric welding the said sections together and to the opposite substantially concentric sections with a current of predetermined density.

5. An apparatus for forming stove pipe casing comprising a carriage, a pair of welding apparatus, one of which welding apparatus is adapted to be supported within a casing, and one of which apparatus is adapted to be supported on the exterior of the casing, means for supplying and regulating electric current to said welding apparatus and means for revolving the casing on the carriage.

6. The method of forming stove pipe casing comprising, positioning tubular metal sections in abutted relation within tubular metal sections of larger diameter in abutted relation, positioning the abutted joints of outer tubular sections in staggered relation to the abutting joints of inner tubular sections, revolving such positioned tubular sections and electrically welding said abutting sections together and with adjacent concentric sections.

7. An apparatus for forming stove pipe casing comprising, a carriage adapted to support and rotate tubular sections, a welding apparatus adapted to extend into said tubular sections, a separate welding apparatus positioned on the exterior of the tubu-

lar sections and means for supplying and regulating electric current to said welding apparatus.

8. An apparatus for forming stove pipe casing comprising, a grounded carriage adapted to support and rotate tubular metal sections, extensible means for positioning a welding electrode within said sections, adjustable means for positioning a separate welding electrode upon the exterior of said sections and means for supplying and regulating electric current to said welding electrodes.

9. An apparatus for forming stove pipe casing comprising, a grounded carriage adapted to support and rotate tubular metal sections, a welding electrode capable of being laterally and vertically positioned within said sections, a welding electrode capable of being laterally and vertically positioned upon the exterior of said sections and means for supplying electric current to form arcs between the electrodes and said sections at different points thereof.

Signed at Los Angeles, California, this 11th day of September, 1925.

WILLIAM E. RUPLEY.