Dec. 14, 1943. B. BANNISTER 2,336,524

COMBINATION STRAIGHTENER AND TESTER FOR PIPES

Filed Nov. 1, 1940

FIG. 1.

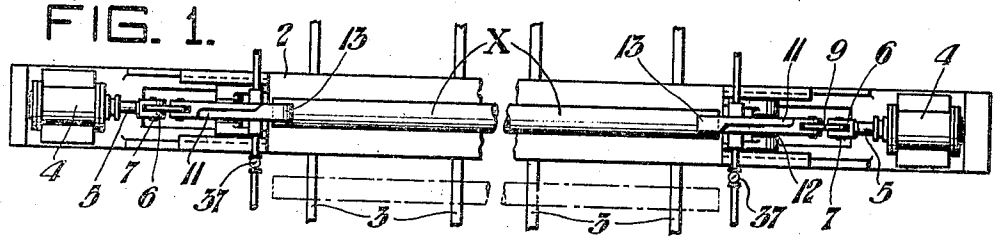


FIG. 2.

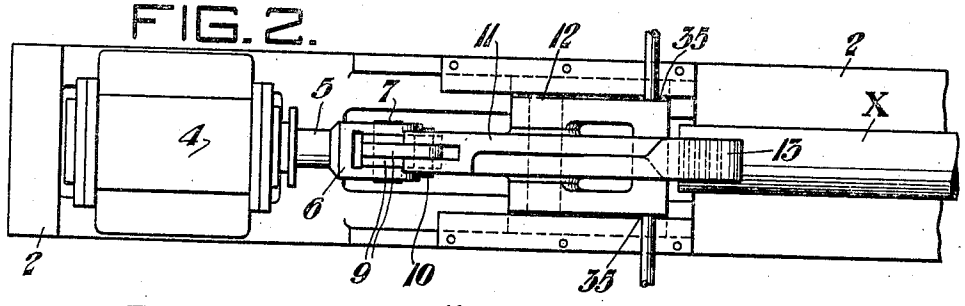


FIG. 3.

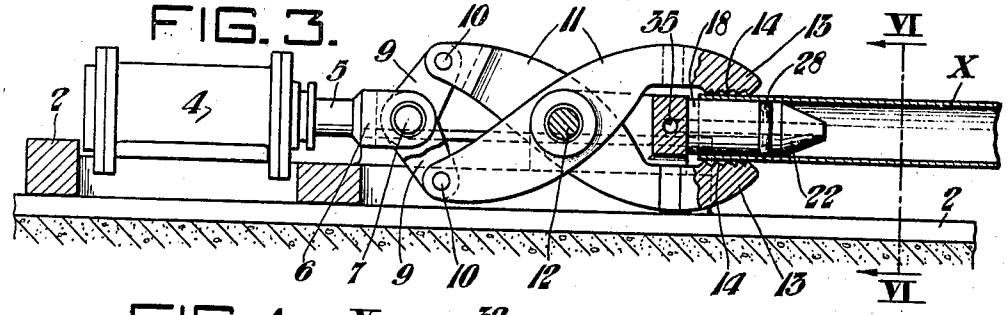


FIG. 4.

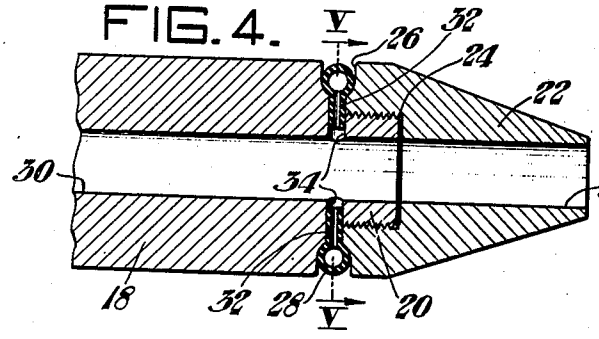


FIG. 5.

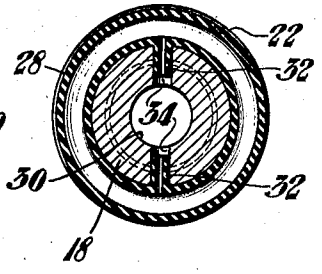
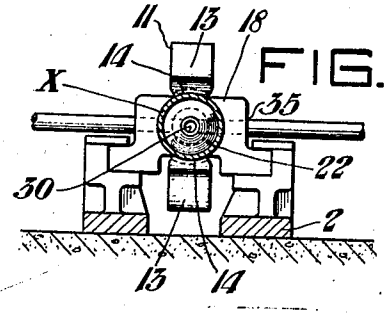


FIG. 6.



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COMBINATION STRAIGHTENER AND TESTER FOR PIPES

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Application November 1, 1940, Serial No. 363,932

2 Claims. (Cl. 153—2)

This invention relates to the manufacture of pipes and tubes and more particularly to the axial straightening and hydraulic pressure testing thereof.

In the conventional manufacture of pipes and tubes they are straightened as they leave the cooling table, subsequent to which the ends are cropped and beveled or threaded as desired. The usual equipment for performing the straightening operation comprises a series of rolls set in opposed planes, or cross rolls with special profiles. Following the straightening operation, the pipe or tube is transferred to a test pump where it is filled with water and subjected to high pressure in order to determine whether or not there is leakage. The foregoing operations require a crew of workmen at the straightening machine and another crew at the test pump. Usually two test pumps spaced at substantial distances are required to handle the product of one pipe mill.

From the foregoing, it will be seen that considerable conveying and handling equipment is required to straighten and test the pipe.

When a pipe or tube is subjected to tension, there is an initial tendency for it to align itself with the direction of pull, provided, of course, the tension is capable of stretching the material beyond its elastic limit. It is, accordingly, among the objects of the present invention to take advantage of this tendency while at the same time, or at least while in the same apparatus, subjecting the interior of the workpiece to the application of a suitable test fluid. It will, of course, be understood that when pipes and tubes may be straightened and tested in the same machine there will result a reduction in cost of labor and handling over that required of conventional practice.

Another object is to accomplish the foregoing ends by the provision of simple and relatively inexpensive instrumentalities.

The foregoing and other objects will be more apparent after referring to the drawing, in which:

Figure 1 is a fragmentary plan of an apparatus embodying the teachings of the present invention;

Figure 2 is an enlarged fragmentary plan of the left-hand portion of Figure 1 referred to hereinbefore;

Figure 3 is a side elevation of the showing of Figure 2, certain of the parts thereof being shown in section;

Figure 4 is an enlarged fragmentary elevation of the means for sealing the ends of the pipe to be straightened and tested;

Figure 5 is a view on the line V—V of Figure 4; and

Figure 6 is a sectional view on the line VI—VI of Figure 3.

Referring more particularly to the drawing, the numeral 2 generally designates a bed or base upon which there is received pipes or tubes to be tested, the latter, referred to hereinafter at X, being conveyed over a suitable skidway or other conveying device 3 preferably disposed at the discharge end of a cooling table (not shown).

Disposed at either end of the bed or base 2 is a hydraulic cylinder 4 each containing a suitable piston (not shown) and having the piston rod 5 thereof extending inwardly and, therefore, in opposed relationship one with respect to the other. Carried on the inner and therefore the most adjacent ends of each of the piston rods 5 is a clevis 6 to which there is pivotally connected as at 7 the converging inner ends of a pair of toggle links 9, the latter carrying on their outer ends pivot pins 10 which are connected to the rearward ends of a pair of pliers, the latter being pivotally interconnected intermediate their ends as shown at 12. The gripping ends of the pliers 11, designated at 13, are transversely concaved and provided with serrated edges 14. Disposed between the gripping ends 13 of each of the pairs of pliers 11 is a cylindrical plug 18 which carries on its outer end an exteriorly screw threaded cylindrical portion 20 of reduced diameter. Connected to this cylindrical portion 20 is a coniform nozzle portion 22 having at the base thereof an interiorly threaded cylindrical recess 24. Referring more particularly to Figure 4 of the drawings, it will be perceived that while the rearward portion of the base of the nozzle 22 abuts the correspondingly adjacent surface of the plug 18, there is provided between the said nozzle and the said plug an annular recess 26 which accommodates an annular expansible tube 28 of suitable high strength resilient material. The plug 18 and nozzle 22 are centrally bored as shown at 30 and the expansible annular tube 28 communicates therewith at diametrically opposite points, by way of being provided with tubes 32 which extend at least partially through radial passageways 34 which are conjointly formed from the forward and rearward portions of the plug 18 and nozzle 22, respectively. As shown most clearly in Figure 3, the central bore 30 through the plug 18 and nozzle 22 communicates adjacent the rear of the said plug with a right angularly extending aperture 35 which communicates with a suitable source of fluid under pressure (not shown). Ac-

cording to the foregoing construction and arrangement, it will be seen that when fluid under pressure is applied to either one or both of the right angular apertures 35 in the plugs 18, it will move through the central bore 36 in the plug 18 and the coniform nozzle 22, and completely fill the interior of the pipe or tube X to be tested. When the test fluid completely fills the pipe X some of the fluid will flow through the radial passageways 34, tubes 32, and annular expansible tubes 28, and cause the latter to expand outwardly. Accordingly, the ends of the test piece are disposed over the nozzles 22 and plugs 18 and within the gripping ends 13 of the pliers 11. As clearly shown in Figure 3, the plug 18 serves as an internal support for the test piece, thus preventing the jaws 13 from causing it to collapse. As soon as fluid tight connections are maintained at either end of the test piece X and the interior of the latter supplied with test fluid under the required pressure, fluid is admitted to the adjacent ends of the cylinders 4, the pistons of which (not shown) are made to draw the piston rods 5 in opposite directions. The drawing apart of the piston rods 5 is continued sufficiently to stretch the test piece X beyond its elastic limit, whereby it is straightened.

For supplying fluid under pressure through the apertures 35 at the rearward ends of the plugs 18, a one-way valve 37 is provided in the low pressure line; and this is automatically closed by the overbalancing pressure of the higher pressure line when it is turned on.

In order to accommodate test pieces X which vary as to length, one or both of the cylinders 4 is made adjustable in any suitable manner (not shown) on the base or bed 2.

While I have shown and described a specific embodiment of the present invention, it will be seen that I do not wish to be limited exactly thereto since various modifications may be made without departing from the scope of the invention, as seen by the following claims.

I claim:

1. Apparatus for straightening and pressure-testing a metallic tubular article, comprising combined gripping and sealing means for each of the ends of the metallic tubular article, at least one of said means including a movable drawhead, gripping means carried by said movable drawhead for engaging the exterior of one end of said article, a sealing plug carried by said gripping means and adapted to seal the adjacent end of said article, said plug serving as an internal support for said article while it is being gripped, means operating through said sealing plug to admit test fluid to the interior of said article, and means for moving said drawhead relative to the other combined gripping and sealing means sufficiently to stretch said article beyond its elastic limit.

2. Apparatus for straightening and pressure-testing a metallic tubular article, comprising combined gripping and sealing means for each of the ends of said article, each of said means including means for gripping the exterior of one end of said article, a plug adapted to seal the adjacent end of said article and to serve as an internal support for said article while it is being gripped, means operating through one of said plugs to admit test fluid to the interior of said article and means for moving said combined means relative to each other sufficiently to stretch said article beyond its elastic limit.

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