No. 619,821. Patented Feb. 21, 1899.

T. J. BRAY.

TUBING OR CASING JOINT FOR ARTESIAN AND OIL WELLS.

(Application filed Nov. 30, 1898.)

(No Model.)

Fig. 1.

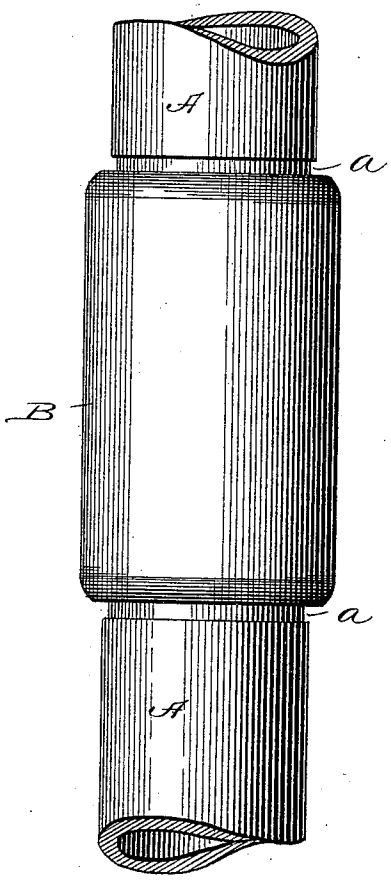
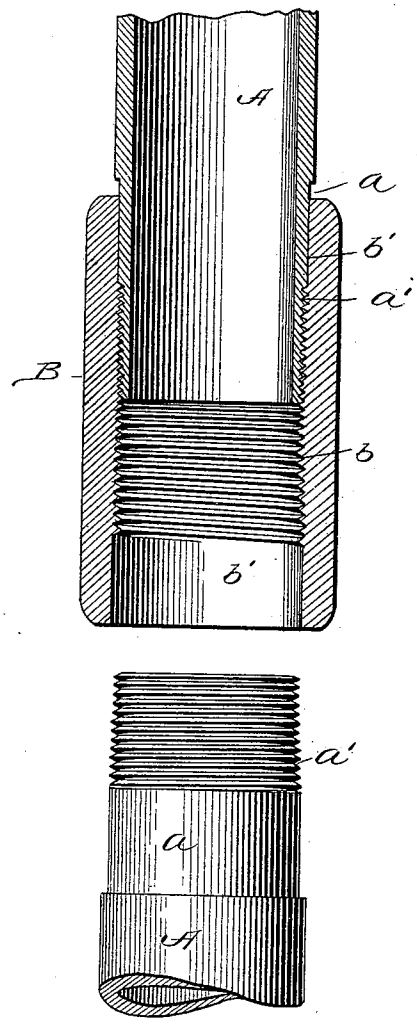



Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## TUBING OR CASING JOINT FOR ARTESIAN AND OIL WELLS.

SPECIFICATION forming part of Letters Patent No. 619,821, dated February 21, 1899.

Application filed November 30, 1898. Serial No. 697,839. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. BRAY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Tubing or Casing Joints for Artesian and Oil Wells; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a view in elevation of portions of tubing and a coupling comprising a joint for tubing, &c., which embodies my invention; and Fig. 2 is a longitudinal central section of the tubes and coupling shown in Fig. 1, one piece of the tubing being detached the better to show the sleeve-section of the coupling and the bearing on the tubing or casing. Like symbols refer to like parts wherever they occur.

My invention relates generally to the construction of joints for tubing, and more especially to that class of tubing or casing used in Artesian and oil wells, which are usually of great depth, and where the string of tubing is suspended and rigidly secured above, so as to be subjected to vibration and shocks, and has for its object the production of a very rigid joint, or one wherein any slack and movement between the tubing and coupling are eliminated and prevented.

In the case of Artesian and oil wells of great depth—say fifteen hundred (1,500) feet or more—wherein are required at least seventy-five (75) separate tubes of about twenty (20) feet each, the weight of which will approximate three (3) tons, said string of tubing suspended in the well, the several joints from below upward carry a gradually-increasing load, to which must be added the weight of the contained fluid, and the string of tubing is consequently subject to shocks and vibrations incident to the operation of the sucker-rods and valves in pumping, all of which tends to a cross-strain at the joints, which frequently results in rupture of the tubing taking place at the termination of the thread near the outer end of the coupling of a joint.

The breaking of the tubing or casing above noted interrupts the operation of the well and gives rise to much expense and loss of time, and the recovery of the tubing and repair thereof is often attended with much difficulty and delay. To guard against such accidents and interruptions, many attempts have been made to devise a joint of such a rigid character as would support the threaded end of the tubing against movement or the cross-bending strain incident to the vibration of the tubing.

For the purposes of the present case it is only necessary to call attention here to one or more such attempts. The construction most commonly adopted, though its inefficiency is fully recognized, is the provision at the outer ends of the coupling of sleeve-sections adapted to extend over the unthreaded sections of the tubing adjacent to the threaded end of the tubing.

Though in the manufacture of tubing or casing and couplings there are well recognized and established standards not only for the diameters of the tubing and coupling, but also for the length and taper of the thread, yet for reasons well understood by those skilled in the art it is practically impossible to obtain absolutely round tubing or casing of exact gage, and as a consequence the tubing will bind in the sleeve of the coupling on one side or another, forcing the parts out of the axial line, preventing the seating of the threads of the screw, and resulting in a leaky joint, as well as permitting of a slack in the joint, (between tubing and coupling,) rendering the joint incapable of withstanding for any length of time the cross-bending strains incident to pumping, &c. The inefficiency of such a construction for the purpose intended is now so well recognized that the sleeve-section at the end of the coupling is simply used as a means of centering the pipe and starting the thread straight when applying the coupling and in the case of most manufacturers of tubing and couplings has degenerated into a mere countersink or bevel at the outer end of the coupling. Another construction devised for the purpose consists of the provision of a flare or bell mouth for the coupling and a swell or enlargement of the tubing above the thread; but the same has proved equally inefficient for the reasons

above noted—viz., the binding of the tube in the bell of the coupling before the threads are fully seated or the seating of the threads before the swell of the tube engages the bell of the coupling. In order to overcome said objections in joints for casing or tubing as now constructed, I give to the tubing or casing a somewhat greater outer diameter than the internal diameter of the coupling and provide a coupling having sleeve-sections at its ends, the sleeve-sections being turned to a given gage and the tubing above the thread being also turned to a corresponding gage, whereby the threads on the tubing may be turned fully home within the coupling and a tight joint secured, as well as an exact and extended bearing of the tube within the sleeve above the thread, thus obtaining a rigid joint and relieving the thread from cross-bending strain, and such a construction embodies the main feature of my invention.

As is well understood, there are certain established standards for couplings, and for the sake of economy and convenience I prefer to conform to the established standards so far as the coupling-sleeve and the pitch and taper of the thread are concerned, though special dimensions therefor may be adopted without departing from the spirit of my invention. The departure from the standard dimensions is preferably confined to the external diameters of the tubing or casing, which, as before noted, will always exceed the internal diameters of the coupling, except at the bearing.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A A indicate portions of tubing or casing, and B the coupling comprising the joint.

The coupling B is formed in the usual manner with the internal thread *b* of any given taper and pitch (preferably standard) and next its ends with the sleeves or bearing-sections *b' b'*. In order to get an extended bearing, the coupling B is preferably about five (5) inches long, with threads *b* three (3) inches long and of standard pitch and taper, and with the sleeves or bearing-sections *b' b'*, each about one (1) inch long by two and thirty-seven hundredths (2.37) inches internal diameter, turned to gage and capable of forming a tight joint with the standard tubing or of being replaced by the standard coupling in case of necessity.

The tubing or casing A A, I form of greater external diameter than the internal diameter of the coupling at *b'*, (or in excess of the standard,) and where said internal diameter of the sleeve of the coupling is standard, as is preferred, an increase of the diameter of said tubing A A of one thirty-second ($\frac{1}{32}$) of an inch will suffice, though a greater increase may be made, if desired.

The tubing A A being of a greater diameter than the internal diameter of the coupling at *b'*, as specified, is turned down to the gage of the sleeve *b'*, as at *a* adjacent to the thread *a'*, for a space at least equal in length to the length of sleeve-section *b'* and preferably somewhat longer—as, for instance, if the length of the sleeve-section *b'* is one (1) inch the length of the bearing will preferably be one and one-quarter ($1\frac{1}{4}$) inches. As a result of this construction the thread of the tubing will always screw home in the coupling, so as to produce a tight joint, and the gage of the sleeve *b'* and the bearing *a* on the pipe being absolute and corresponding, an exact and extended bearing will be obtained between the tube and coupling outside and beyond the thread, so that the tube at its weakest point (the thread) is relieved of all cross-bending or breaking strain incident to shocks and vibrations of the string of tubing.

Among the minor advantages incident to the construction devised by me is the ability when standard gages are followed for the coupling of being able to substitute the usual coupling or section of tubing for any tubing or coupling of the string in case of necessity and the ability to quickly repair or to add to the string a short length of pipe, either the ordinary pipe or the enlarged pipe, as the latter can be readily turned down to standard gage to form the bearing *a* above the thread by a simple attachment to the hand-dies commonly found in the field.

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

1. A casing or tubing joint comprising a coupling having at its end a sleeve-section, and a pipe or tube whose external diameter exceeds the internal diameter of the sleeve of the coupling, said tube or pipe having adjacent to its threaded end a turned bearing of gage corresponding to the gage of the sleeve-section of the coupling; substantially as and for the purposes specified.

2. A casing or tubing joint comprising a coupling having at its end a sleeve whose inner face is turned to a given gage, and a casing or tube of greater external diameter than the internal diameter of the sleeve-section of the coupling said tube or pipe having adjacent to its threaded end a turned bearing of gage corresponding with the gage of the sleeve-section of the coupling, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 28th day of November, 1898.

THOMAS J. BRAY.

Witnesses:
E. H. GOODWIN,
HENRY WEISKETTLE.