(No Model.)

2 Sheets—Sheet 1.

J. N. WEAVER.

Crown-Sheet Attachment.

No. 227,336. Patented May 4, 1880.

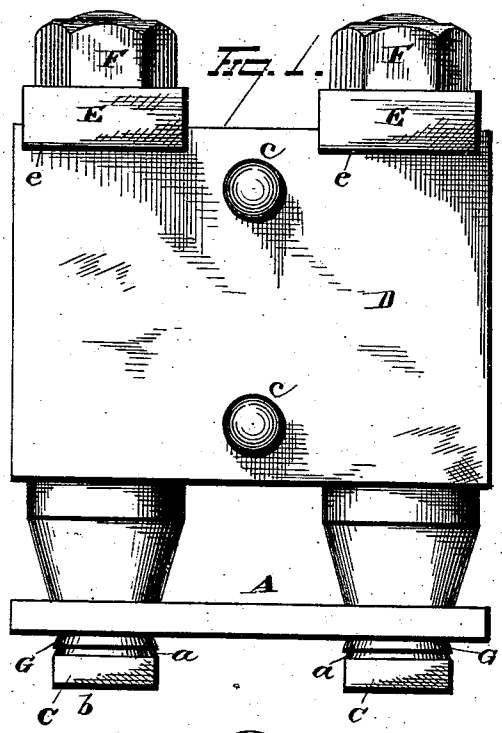


Fig. 1.

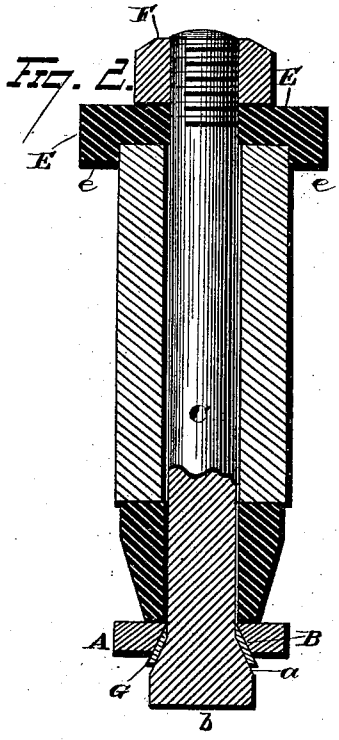


Fig. 2.

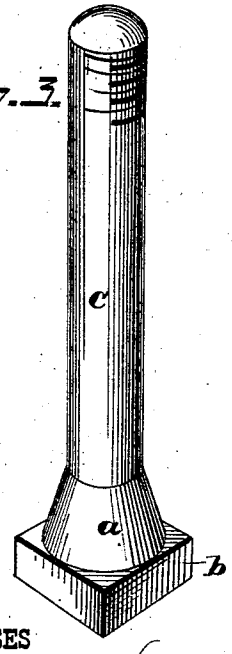


Fig. 3.

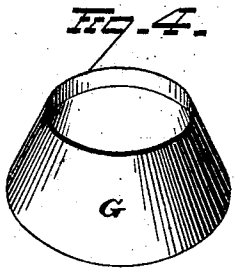


Fig. 4.

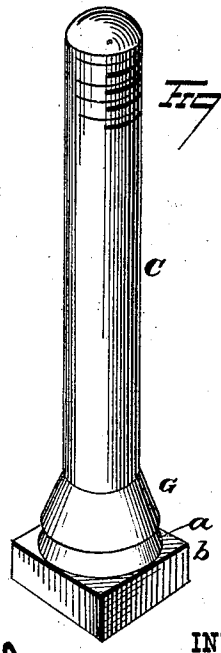


Fig. 5.

WITNESSES

E. E. Nottingham

A. M. Bright.

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James N. Weaver,

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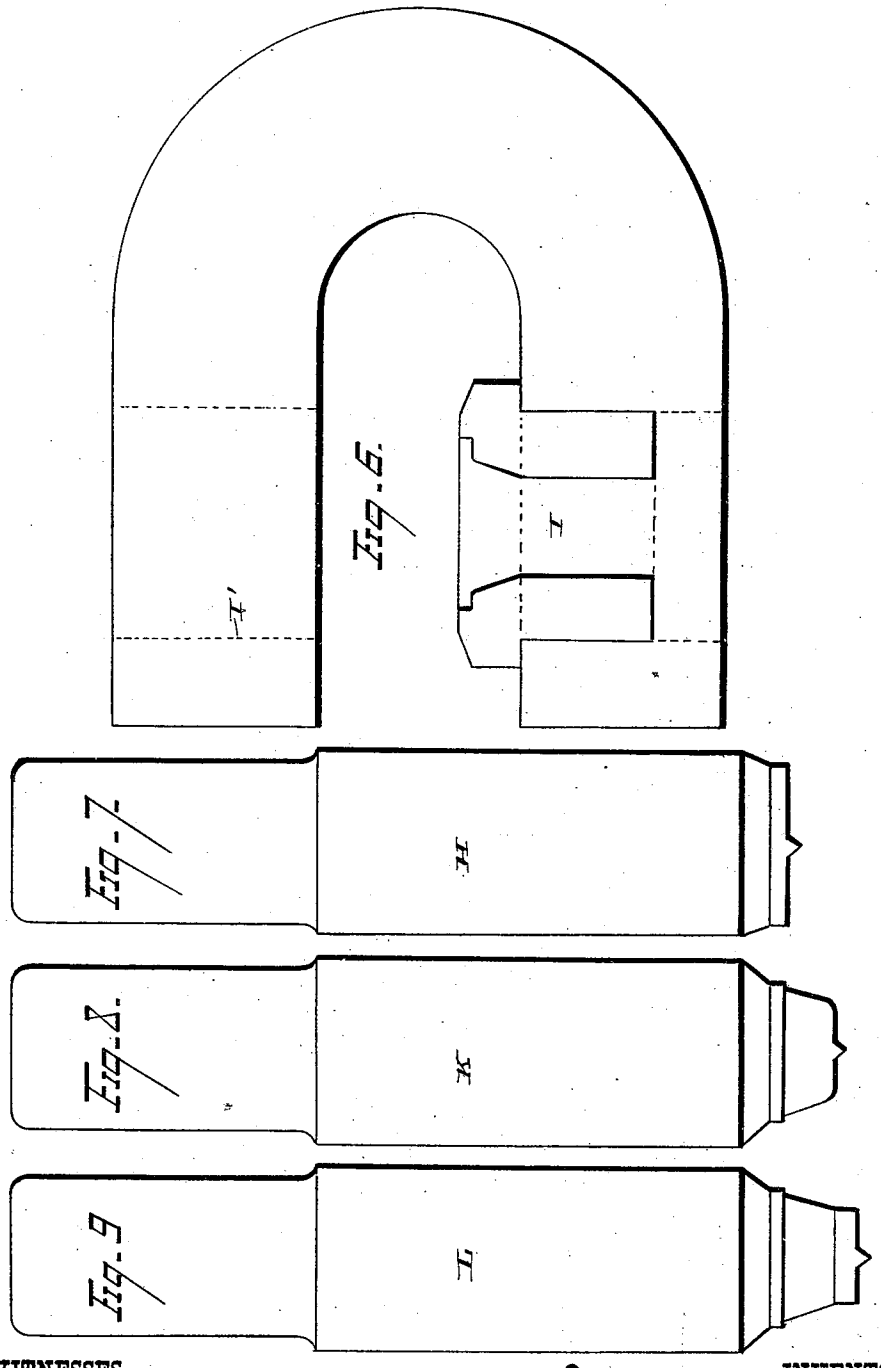
N. PETERS. PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Crown-Sheet Attachment.

No. 227,336. Patented May 4, 1880.



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UNITED STATES PATENT OFFICE.

JAMES N. WEAVER, OF WAVERLY, NEW YORK.

CROWN-SHEET ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 227,336, dated May 4, 1880.

Application filed March 13, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES N. WEAVER, of Waverly, in the county of Tioga and State of New York, have invented certain new and useful Improvements in Crown-Sheet Attachments for Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in crown-sheet attachments for steam-boilers.

Heretofore the crown-bars have been secured to crown-sheets in the following manner: The crown-bolts are formed with a beveled portion under the bolt-head by turning the bevel on a lathe and reaming out the holes in the crown-sheet, forming a beveled bolt-hole corresponding to the beveled portion on the bolts, and the bolts are then inserted in place and drawn iron to iron by means of the nuts on top of the crown-bars.

This construction is objectionable for the following reasons: First, by reason of the undue cost of preparing the crown-sheet and crown-bolts, as costly machinery, labor, and considerable time are required in the turning and reaming processes hereinbefore described; second, the crown-sheets are often slightly warped or sprung, owing to a slight unevenness of the cast-iron ferrules interposed between the crown-sheet and crown-bars, and hence a steam-tight joint, although formed when the bolts are first tightened, will become impaired after a comparatively short time, as the water will enter the upper side of the joint and operate to corrode and destroy the narrow seat forming the joint.

The object of my invention is to obviate the defects and objectionable features hereinbefore set forth, and to form a perfectly-tight joint between the crown-bolts and crown-sheet without turning the bevel on the crown-bolts, and construct the devices at small initial cost, and insure the most perfect and satisfactory results; and to this end my invention consists, essentially, in the combination, with the crown-sheet and crown-bolts, the latter formed with a bevel under the bolt-heads, of tapering copper ferrules interposed between the bolt-holes in the crown-sheet and beveled portions of the crown-bolts.

My invention further consists in a tapered copper ferrule formed with open ends and adapted to be applied to the beveled portions of crown-sheet bolts.

My invention further consists in certain other details in construction and combination of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse section taken through a portion of a crown-sheet, showing a section of the crown-bars and crown-bolts in side elevation. Fig. 2 is a transverse section taken through a portion of the crown-sheet, ferrule, and crown-sheet bolts. Fig. 3 is a view, in perspective, of one of the crown-sheet bolts. Fig. 4 is a similar view of one of the tapered copper ferrules. Fig. 5 is a similar view, illustrating the copper ferrule applied to the bolt. Figs. 6, 7, 8, and 9 are views, in side elevations, of the punches and dies for making my improved crown-bolt ferrules.

A represents the crown-sheet of a boiler. B are the bolt-holes, made slightly tapering from the under to the upper side of the crown-sheet. C are the crown-bolts, each being provided with a beveled portion, *a*, under the bolt-head *b*. Crown-bolts C are forged in a steel die to form the bevel portion *a*.

As a very slight irregularity in the shape of the bevel portion of the crown-bolts as ordinarily used would be fatally defective to their efficiency, it is absolutely necessary to turn the bevel portion *a* in a lathe, as hereinbefore explained, in order to insure a perfectly true and even surface to the beveled portion *a* of the bolt; but in my invention it is not requisite that the bevel portion shall be formed with such nicety and precision, and hence I am enabled to dispense with the lathe-turning and form the bolt in a steel die. This part of the operation results in a material saving in expense, as the employment of costly labor and machinery and much valuable time is thereby avoided.

D represents the crown-bars, which latter are arranged in pairs in the usual manner, and

secured together by bolts or rivets *c*. Around the crown-bolts C, between the crown-sheet and crown-bars, are interposed the cast-iron ferrules. Flanged bolt-plates E are placed upon the upper edges of the crown-bars, the flanges *e* of the plates overlapping the edges of the two adjacent crown-bars, and thereby preventing the latter from spreading. The threaded ends of the crown-bolts extend upwardly through holes in the plates E, and are secured by the nuts F.

Around the beveled portion *a* of the crown-bolt is placed a copper ferrule, G, which is tapered to fit the beveled portion *a* of the bolt and the beveled bolt-hole in the crown-sheet.

When the nuts F are drawn up tight the copper ferrules accommodate themselves to any inequalities or irregularities in the surfaces of either the bolt or the bolt-holes, and form a perfectly steam-tight joint, and protect the iron from corrosion.

When it becomes necessary to remove the crown-bars to cleanse them of scale—an operation which is often required, especially when impure water is used in the boiler—it is only necessary to fresh up or recut the threads of the crown-bolts, slip one of the ferrules on each bolt, and tighten the nuts, thereby drawing the copper ferrule in tight and intimate contact with the bolt and bolt-hole in the crown-sheet, and thus insure a perfect joint though the bolt-hole in the crown-sheet may be rough and irregular, as the copper is sufficiently ductile to adapt itself to any such irregularities of surface.

The copper ferrules are made by first cutting a round disk of copper out of No. 20 sheet-copper by the employment of the punch H, in connection with the die I, the latter being provided with a guide, I′, to guide and center the punch. The disk of copper is then operated upon by the punch K, which draws the disk into cup shape, which latter is then subjected to the action of punch L, which punches the bottom out of the ferrule and finishes it.

From the foregoing it will be observed that the copper ferrule, in connection with the joint in the crown-sheet, enables me to reduce the initial cost of manufacture of the parts very materially and to form a tight and durable joint.

I make no claim to the dies and punches for manufacturing the copper ferrules, but describe the method and means employed in their manufacture, so that upon the expiration of this patent the public may have full knowledge of the method and means necessary to be employed to enjoy the invention hereinafter claimed.

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

1. The combination, with a crown-sheet provided with beveled bolt-holes and crown-bolts, each having a beveled portion under the bolt-head, of tapering copper ferrule interposed between the bolt and crown-sheet, to form a steam-tight joint, substantially as set forth.

2. The combination, with a crown-sheet provided with beveled bolt-holes and crown-bolts, each having a beveled portion formed under the bolt-head by forging, of tapering copper ferrules surrounding the beveled portion of the crown-bolts and forming a steam-tight joint with the crown-sheet, substantially as set forth.

3. A tapered copper ferrule adapted to be applied to the beveled portion of a crown-sheet bolt, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 8th day of March, 1880.

JAMES N. WEAVER. [L. S.]

Witnesses:

E. J. CAMPBELL,

JAMES R. STONE.