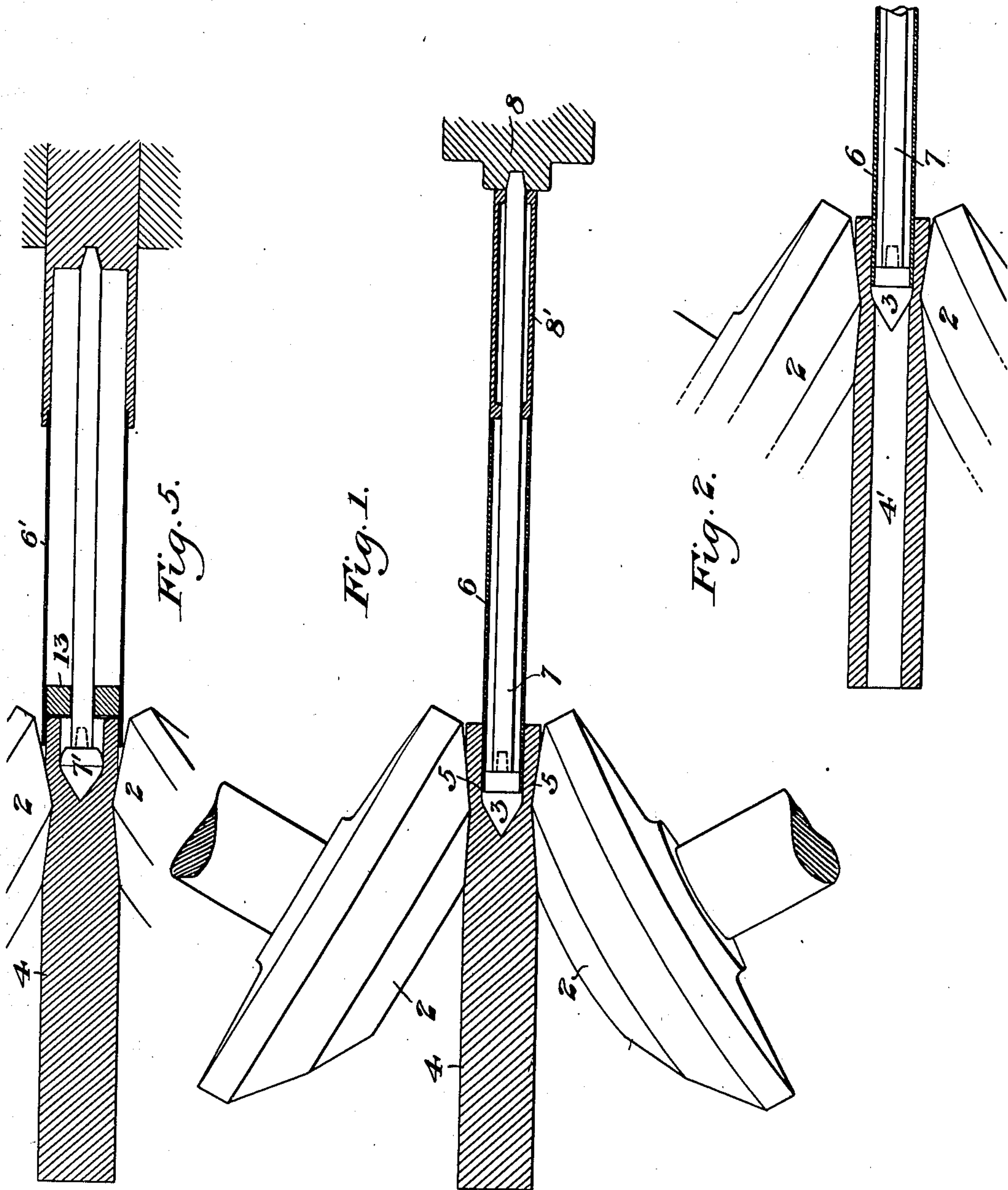


No. 860,232.

PATENTED JULY 16, 1907.

J. W. OFFUTT.
MANUFACTURE OF COMPOUND PIPES AND TUBES.
APPLICATION FILED JUNE 30, 1904.

2 SHEETS—SHEET 1.



WITNESSES

M. M. Griffin
T. A. Connor

INVENTOR

John W. Offutt
by *Barrett & Byrnes*
his Attorneys

No. 860,232.

PATENTED JULY 16, 1907.

J. W. OFFUTT.
MANUFACTURE OF COMPOUND PIPES AND TUBES.
APPLICATION FILED JUNE 30, 1904.

2 SHEETS—SHEET 2.

Fig. 4.

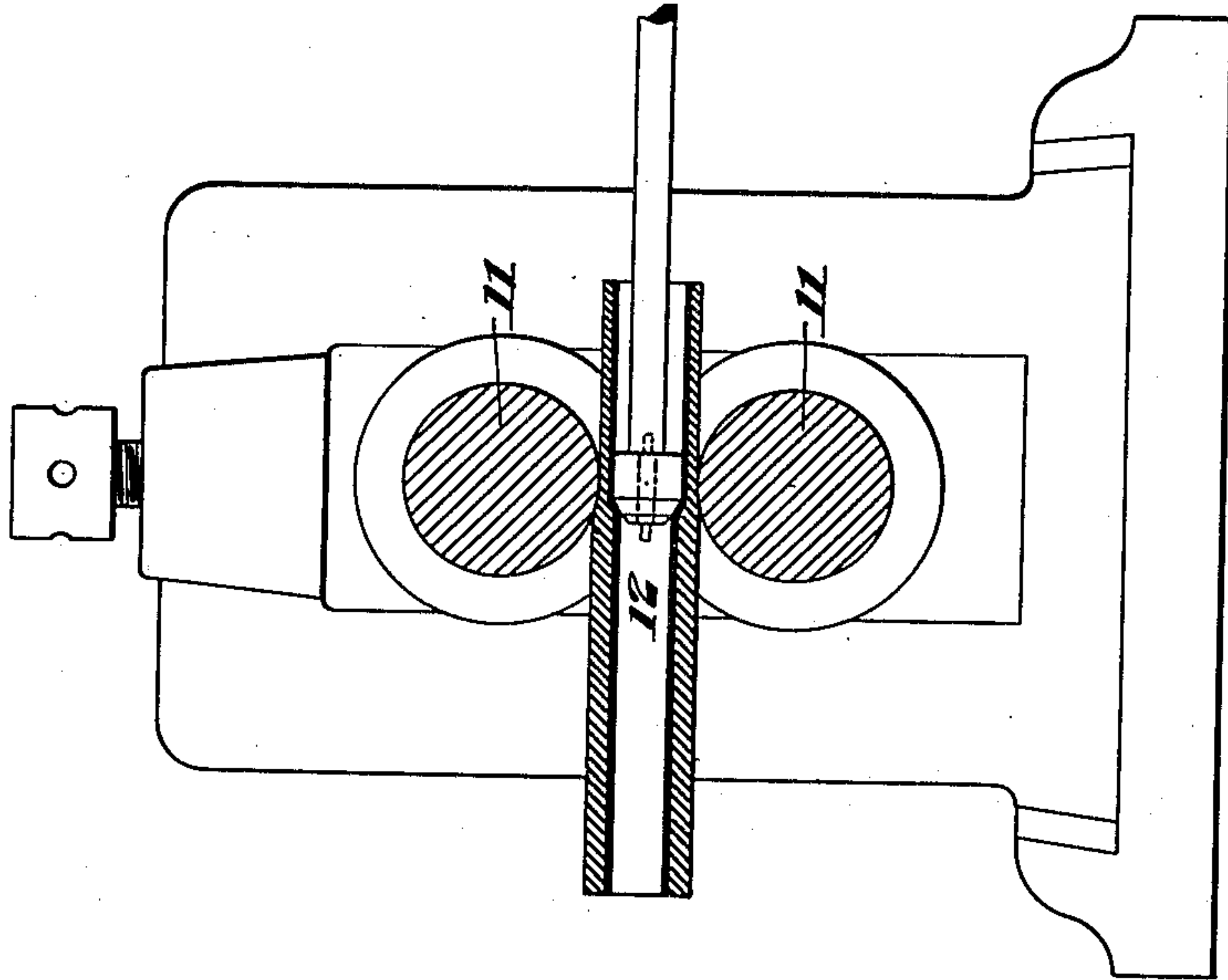
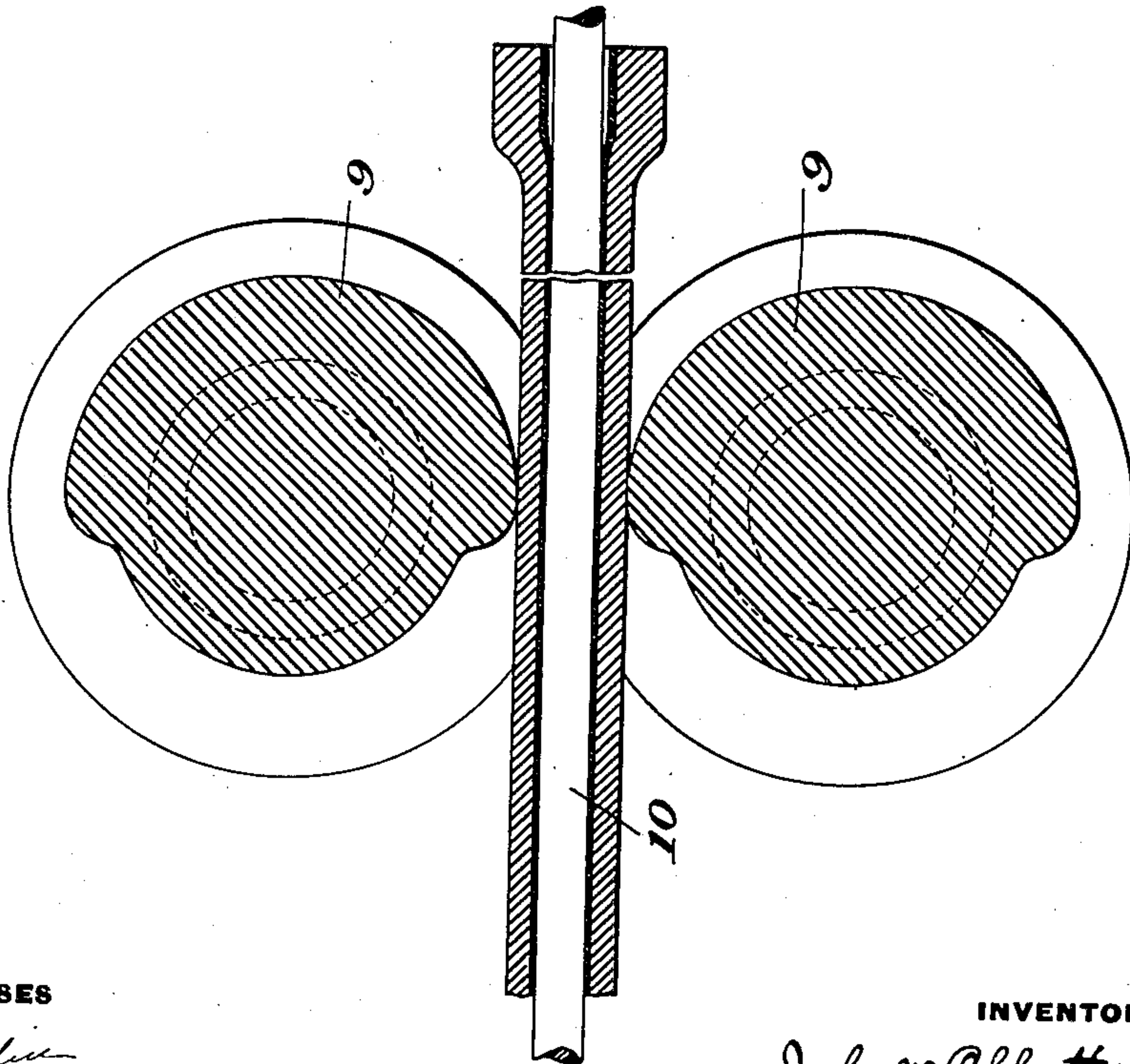


Fig. 3.



WITNESSES

M. M. Griffin
L. A. Comings

INVENTOR

John W. Offutt
by Russell & Byrnes
his Attorneys

UNITED STATES PATENT OFFICE.

JOHN W. OFFUTT, OF ELLWOOD CITY, PENNSYLVANIA, ASSIGNOR TO SHELBY STEEL TUBE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

MANUFACTURE OF COMPOUND PIPES AND TUBES.

No. 860,232.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed June 30, 1904. Serial No. 214,753.

To all whom it may concern:

Be it known that I, JOHN W. OFFUTT, of Ellwood City, Lawrence county, Pennsylvania, have invented a new and useful Improvement in the Manufacture of
5 Compound Pipes and Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional plan view illustrating the
10 piercing of an iron or steel billet and the application of a thin tubular lining thereto; Fig. 2 is a view similar to Fig. 1 illustrating the application of a thin tube to a hollow billet; Fig. 3 illustrates the subsequent reducing and welding operation; Fig. 4 shows a modified
15 apparatus, and Fig. 5 is a sectional elevation showing how the lining is applied to the outside of the tube.

My invention provides means by which iron or steel tubes or pipes can be made with an interior lining
20 either of the same metal or of some other metal such as nickel, applied in such manner that there shall be perfect contact of the lining without any intermediate body of scale or oxid. It also provides for the coating of such pipes or tubes by the same operation in which they are manufactured and therefore without previous
25 pickling or cleansing, and with little or no increase in the cost of labor. The advantages which the invention affords in this respect are of great commercial importance and will be appreciated by those skilled in the art.

30 The invention is especially applicable to coating iron or steel tubes with nickel or alloys of nickel, since it enables me to obtain the advantages of a solid nickel tube without its high cost. The article is of excellent quality, the lining will not separate from the tube
35 when subjected to manipulation in corrugating or bending it, and no apparatus need be employed in its manufacture other than that now used in making seamless pipes and tubes.

In practicing my invention, I pierce a heated blank
40 of iron or steel with a mandrel, preferably in the manner in which billets are now usually pierced for the manufacture of weldless tubes, and simultaneously with this operation I apply an interior lining which follows the mandrel in its traverse of the billet. The
45 mandrel or piercing instrument and the lining are preferably stationary, and the iron or steel billet or blank is drawn over them by means of rolls, but the effect is a progressive piercing of the billet or blank and a simultaneous and progressive application of the
50 lining.

Apparatus suitable for the practice of the invention is shown in the drawing, in which 2, 2 represent angularly arranged rolls or disks which force the billet 4

with a rotary motion of high speed over the mandrel 3 and pierce it from end to end. The mandrel is provided just forward of its place of largest diameter with a shoulder 5, and against this shoulder I set the end of a tube 6 of nickel or other desired metal which extends over the mandrel rod 7 and abuts against the back-stop 8 or an extension 8' thereof. As the pierced
55 billet passes over the mandrel, it is immediately delivered upon the lining 6 and passes over the surface of the same, fitting thereto with perfect contact. The billet is thus delivered upon the lining without any interval of time sufficient to oxidize the clean interior
60 surface exposed by the action of the mandrel, and at the end of the operation it will be extended over the lining from end to end. I then remove the lined tube from the mandrel rod and heat it for a short time in a furnace so as to prepare it for the swaging process, and
70 I then pass it between swaging rolls or other reducing apparatus, in which it is reduced and elongated and thoroughly welded to the lining. Swaging rolls suitable for this purpose are illustrated in Fig. 3, in which 9, 9 are the rolls and 10 is the mandrel-rod on
75 which the tube is rolled. This operation welds the tube perfectly to the lining.

In Fig. 4 I show reducing rolls 11 and a mandrel 12 for reducing the tube and welding the lining thereto. The compound tube may then be further reduced by
80 cold drawing, and as the lining and tube are perfectly welded they will act in the same way as if they were an integral piece of metal.

In Fig. 5 I illustrate the application of the invention to the placing of a nickel coating on the outside of the
85 tube. The nickel tube 6' to be applied as a coating is set around the piercing mandrel 7', being centered by a loose ring 13. As the billet 4 passes from the rolls and is pierced by the mandrel it enters the coating and it is then welded to the coating by reheating it and
90 passing it again through the piercing mill or through the swaging mill. The fresh surface exposed on the heated billet by the rolls 2 is delivered at once into the coating before oxidation can occur.

If desired the invention may be practiced not only
95 in the piercing of steel billets and forming weldless tubes and pipes, but in forcing a mandrel through a tube or tubular blank 4' previously formed either by piercing or welding, and applying the tubular lining simultaneously and progressively to the clean surface
100 exposed by the mandrel, as described above.

Apparatus of many different kinds may be employed in the practice of my invention, since

What I claim is:—

1. The method herein described which consists in shaping a heated metal billet by pressure and simultaneously

and progressively telescoping a metal tube with the shaped blank; substantially as described.

2. The method herein described which consists in piercing a heated metal billet, and simultaneously and progressively forcing a metal tube into the cavity of the shaped blank; substantially as described.

3. The method herein described which consists in shaping a heated metal billet, and simultaneously and progressively applying a metal tube to the shaped blank and subsequently welding the tube to the surface of the shaped blank; substantially as described.

4. The method herein described of making a compound tube or pipe which consists in piercing a metal blank, and

simultaneously forcing a metal tube into the cavity of the shaped blank; substantially as described.

5. The method herein described of making a compound tube or pipe which consists in piercing and shaping a metal blank into a tubular form and simultaneously applying a metal tube to the exposed surface of the tubular portion; substantially as described.

In testimony whereof, I have hereunto set my hand.

JOHN W. OFFUTT.

Witnesses:

THOMAS W. BAKEWELL,
H. M. CORWIN.