

997,602.

G. L. CHATFIELD.
PIPE MAKING MACHINE.
APPLICATION FILED OCT. 22, 1908.

Patented July 11, 1911.

3 SHEETS—SHEET 1.

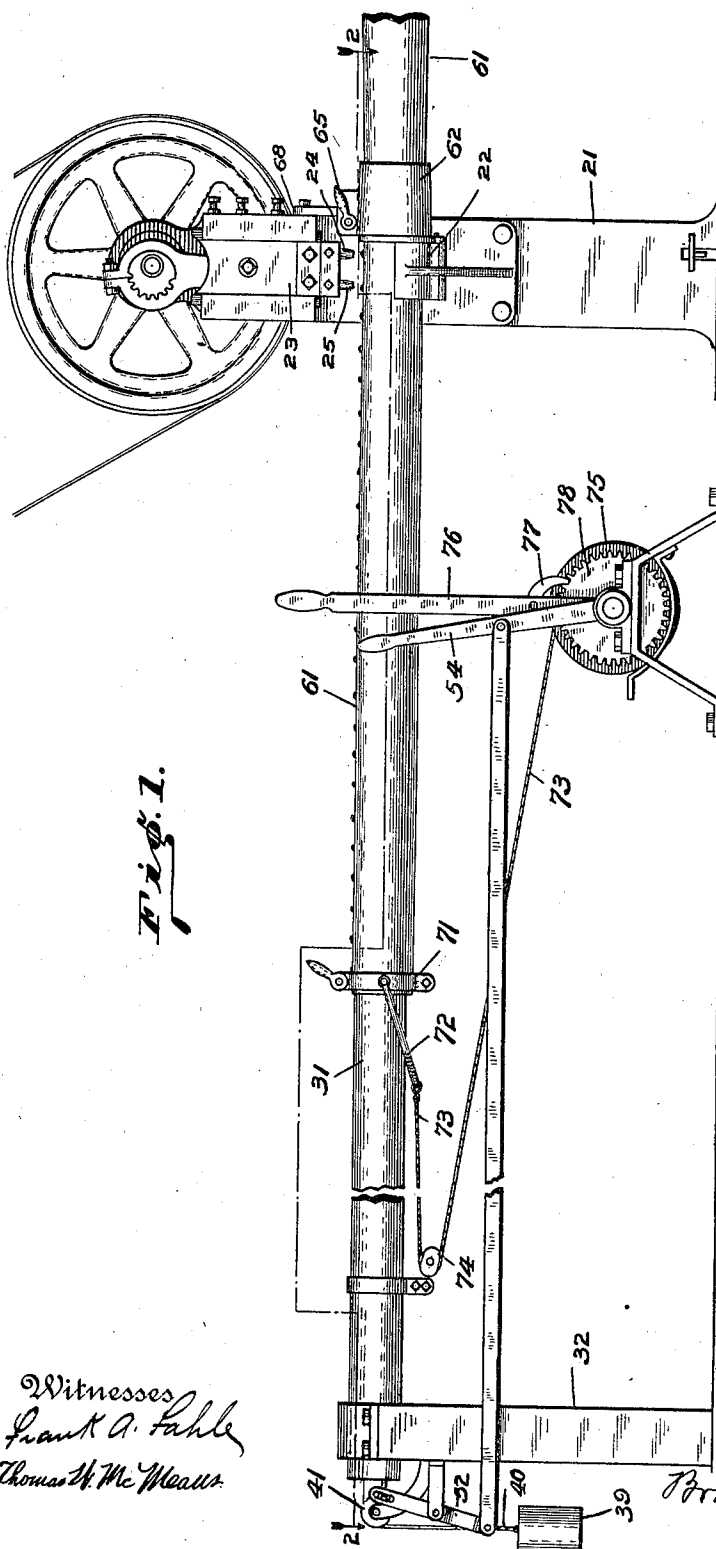


Fig. 1.

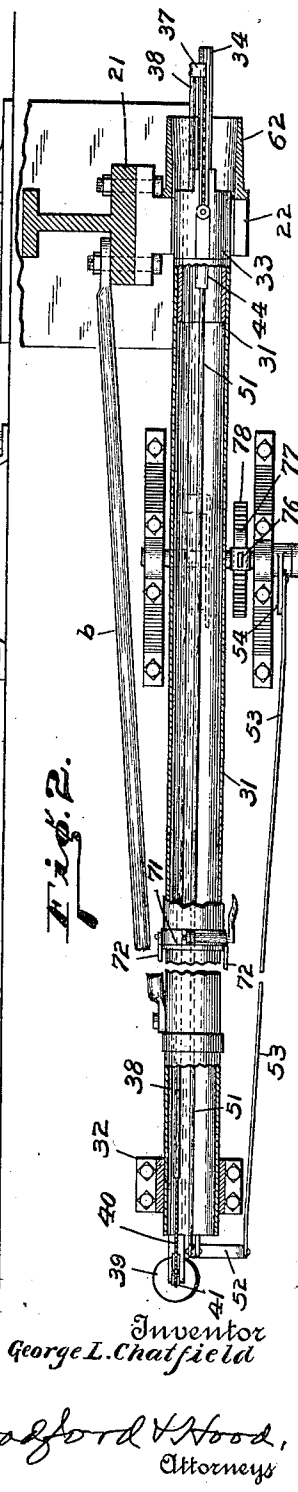


Fig. 2.

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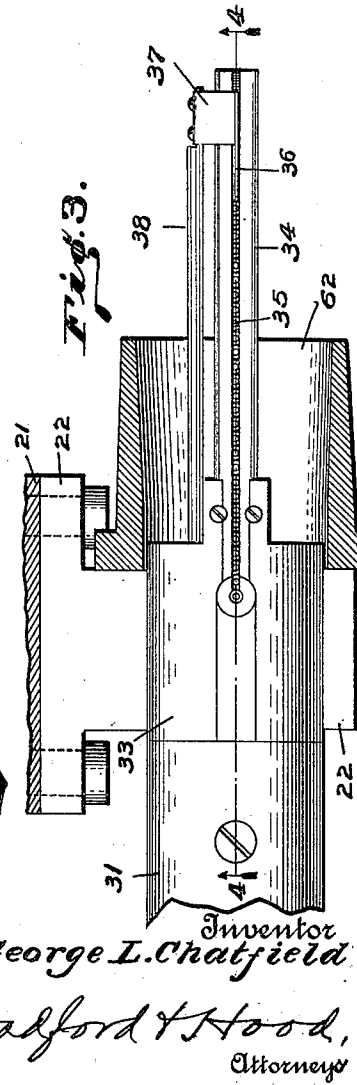
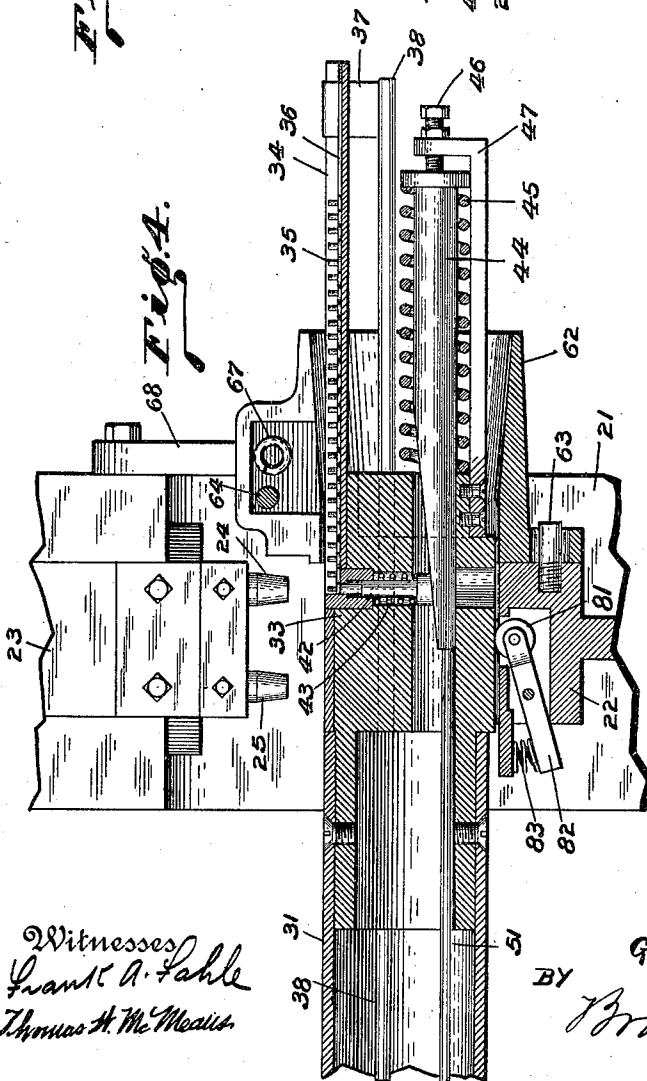
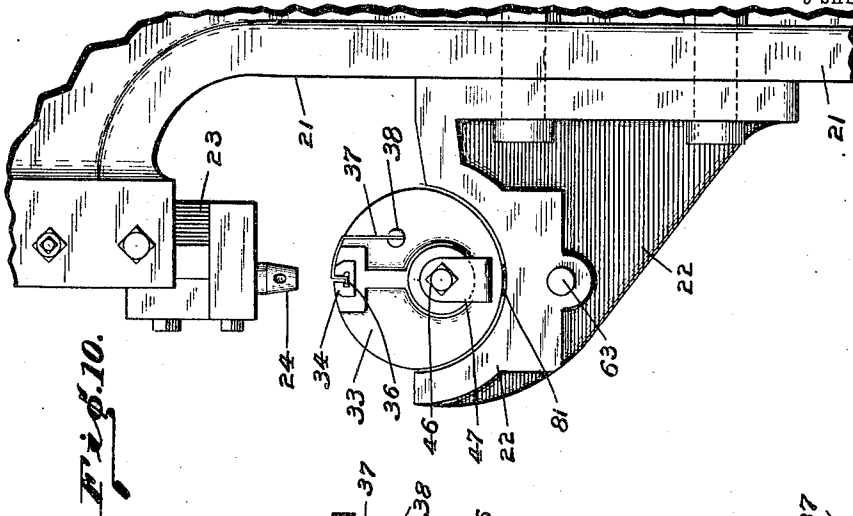
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3 SHEETS—SHEET 2.



Witnesses
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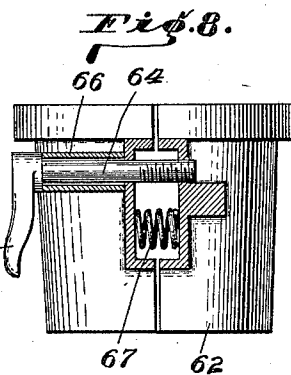
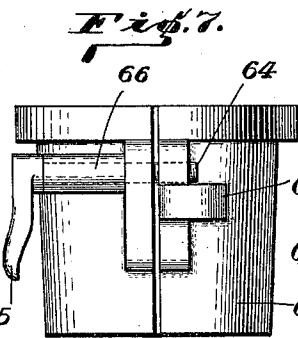
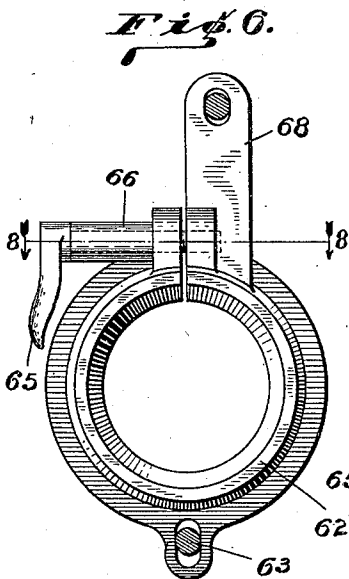
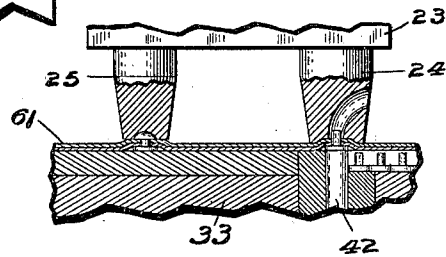
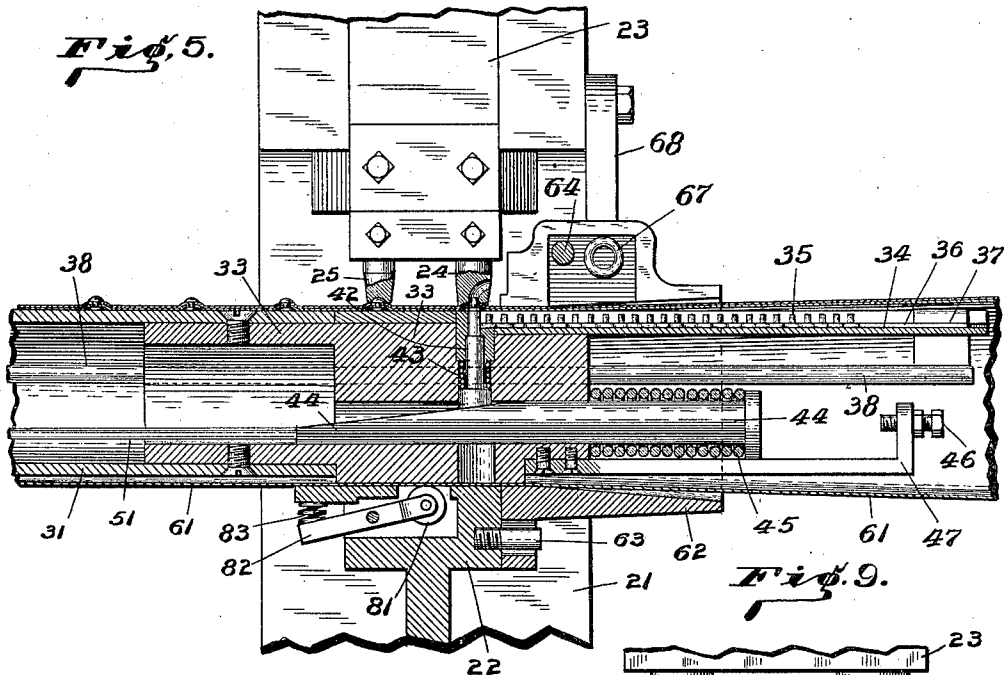
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GEORGE L. CHATFIELD, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO CHESTER
BRADFORD, OF INDIANAPOLIS, INDIANA.

PIPE-MAKING MACHINE.

997,602.

Specification of Letters Patent. Patented July 11, 1911.

Application filed October 22, 1906. Serial No. 340,030.

To all whom it may concern:

Be it known that I, GEORGE L. CHATFIELD, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Pipe-Making Machines, of which the following is a specification.

Sheet metal pipe, as is well known, is made in two ways. That which is under little or no pressure in use (such as ordinary stove pipe) is commonly "seamed" as it is called, at the edges which are united, while pipe designed for heavier and rougher uses requires to be riveted. It is with this last-named variety of pipe that my invention has to do. In the making of such pipe by methods commonly employed, the rivet holes are first punched or drilled along the edges of the sheets, the sheets are then rolled into tubular form bringing the edges together, and the rivets are inserted, one by one, and hammered down.

It is the object of my invention to produce a machine by means of which the rivets may be inserted and riveted successively without previous drilling or punching.

In carrying out my invention I roll the sheets into tubular form, without any previous drilling or punching, and then pass them through the machine, which is adapted (by the operations presently to be described) to force the rivets through the sheet metal, said rivets thus punching their own holes by means of one of a series of dies, while another die completes the riveting operation.

A machine embodying my said invention will first be fully described, and the novel features then pointed out in claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of a machine of the character in question; Fig. 2 a view of said machine, partially in plan and partially in section, as seen when looking downwardly from the dotted line 2 2 in Fig. 1; Fig. 3 a plan view, on an enlarged scale, similar to a portion of Fig. 2 but showing the pipe-guiding sleeve in section; Fig. 4 a detail central sectional view at the point indicated by the dotted line 4 4 in Fig. 3; Fig. 5 a view similar to Fig. 4, but showing the parts in operative position, as when pipe is being formed thereon, one rivet being

shown as just inserted and others as when riveted down, the dies of the press being in the position where they have just accomplished the initial part of these operations; Fig. 6 an end elevation of the sleeve for determining the external diameter of the pipe and immediately adjacent parts; Fig. 7 a top or plan view thereof; Fig. 8 a horizontal sectional view as seen when looking downwardly from the dotted line 8 8 in Fig. 6; Fig. 9 a fragmentary sectional view similar to a portion of Fig. 5 but on an enlarged scale, and Fig. 10, an end elevation of a portion of the press and connected mechanism.

The press shown is of a well-known type, and any suitable form of press may be employed. Upon its column 21 is a suitable bolster 22 for carrying the pipe and pipe-riveting devices, and its ram 23 carries the two dies 24 and 25, by one of which the rivets are first forced through the metal and by the other of which said rivets are then riveted or hammered down.

The riveting mechanism I prefer to mount upon a tubular bar 31. Said bar is supported at its outer end by a standard 32 and at its other end rests on the bolster 22, and is also connected to the column 21 of the press by a brace *b*. Said bolster is shown as of a construction especially adapted to the work in question, and I prefer to make it concave on the upper side of a form approximately fitting the outside diameter of the finished pipe to be made thereon, although this is not essential to the invention—it only being required that this bolster shall be of a character to support and guide the pipe. Upon the end of the tubular bar 31 which rests on the bolster 22 is secured a suitable head or "horn" 33. To this head is secured a rivet magazine 34, which is charged when in use with the number of rivets required in the making of the particular length of pipe being made, arranged in a row, as best shown in Figs. 3 and 4. In the groove in said magazine, behind the rivets 35, is a finger 36 carried by an arm 37 on a rod 38, and to this rod (see Fig. 1) a weight 39 is connected by means of a cord 40 running over a sheave 41. A spring might of course be substituted for this weight, but in this situation I consider the weight to be preferable.

At the inner end of the rivet magazine I

place a vertically positioned plunger 42, the upper end of which is approximately the same diameter as that of the heads of the rivets being used. The rivet at the extreme
 5 end of the row is positioned directly above this plunger. In operation the plunger is forced upwardly against the inner surface of the sheet metal of the pipe being formed, and the tubular die 24 of the press, being
 10 in line therewith, causes said rivet to punch its own hole through said metal. This plunger is held to its seat, or against the operating means, by a spring 43. The means by which I operate the plunger 42 is preferably a wedge-like cam 44 which passes
 15 under the head of said plunger 42. Said cam is normally held back, so that the plunger is in its retracted position, by means of a coiled spring 45. Exact adjustment is
 20 provided for by means of an adjusting screw 46 carried by an arm 47 secured to the machine head or "horn" 33. The means which I have provided for operating this cam consists of a rod 51 running back
 25 through the tubular bar 31 to the outer end thereof, where it is connected to a lever 52, and said lever 52 is in turn connected by means of a link 53 to a hand lever 54 positioned
 30 conveniently to the point where the operator stands in front of the machine. At the proper moment said operator forces a rivet up by pulling on said hand lever and thus forcing the cam 44 under the head of the plunger 42, as above described.
 35 When the operator releases his pull on the hand lever 54, the spring 45 retracts the cam 44 to its position against the adjusting screw 46.

The best results are obtained by two operations of the press during the insertion of each rivet. The plunger is first moved up until the point of the rivet is far enough
 40 above the surface of the riveting head to enable it to perforate the metal. The press is then given one blow, which performs the perforating operation, while the other die 25 is delivering one blow upon the rivet previously inserted. The plunger 42 is
 45 then moved upwardly the remainder of the distance by an additional movement of the cam 44, and this forces the rivet up into place with the head in close contact with the inner surface of the metal. The lower end
 50 of the die which coöperates with the rivet to form the perforation, is cup-shaped; and the head of the rivet is thus enabled to correspondingly cup the metal, so that the inside of the pipe, when finished, is substantially smooth, the heads of the rivets being
 55 so sunken into the cups thus formed as to be approximately flush with the general inner surface of the pipe.

The pipe 61 is, as before stated, rolled into tubular form from the sheets. Said
 60 rolled tubular pipe, before being riveted

and finished, is approximately of the size desired. However, in order to bring it to the exact external diameter required, it is necessary that it should have a means for
 70 preventing variation. This means I have provided in the form of a sleeve 62 which is mounted on an adjacent part of the machine (as the bolster 22) by means of a supporting stud 63 and hanger 68. At its outer
 75 end this sleeve is somewhat larger than the pipe to be formed, in order that the pipe may enter it easily. At its other end, however, next to the riveting mechanism, its internal diameter is exactly the desired external diameter of the finished pipe. I provide
 80 for slight adjustment of this size, and for compensating for wear, by making the sleeve of a split form, and providing a means, as a screw 64, for adjusting the position of the two sides relative to each other. This screw is shown as provided with an
 85 operating handle 65, between which and a suitable cheek on the sleeve 62 a long sleeve-like washer 66 is interposed. This may be utilized also in loosening up the sleeve slightly, in case it is desired to shift the position of the pipe therein by hand for any reason, and also in facilitating the removal of the pipe therefrom. A spring 67 (see
 90 Fig. 8) assists in spreading the parts of this sleeve when the screw is loosened. An unriveted pipe is inserted in this bell-shaped sleeve by hand, and its end pushed through until it extends slightly beyond the riveting dies, when a clamping band 71 is secured
 95 thereto. This is connected in any suitable manner, as by means of a bail 72 and a cord 73 running over a sheave 74 to a suitable winding drum 75, which is operated by a hand lever 76 and a pawl 77 engaging with
 100 a ratchet 78 on the same shaft as the drum. This means for operating the pipe may, of course, be varied as desired; and I desire to be understood as reserving the right to adopt any suitable mechanical devices for the purpose. Those shown are such as I consider of a simple and convenient character.

I have shown an anti-friction roller 81 mounted in a swinging housing 82, which
 105 in turn is pivotally mounted in the bolster 22. The roller is normally held somewhat above the surface of the bolster by means of the spring 83, and in this position supports the riveting head so that said head is kept slightly above and out of contact with
 120 the surface of the bolster. This permits the pipe to be riveted to be introduced easily between said riveting head and the surface of the bolster. When the pipe comes in contact with the roller 81, the spring 93 will yield slightly so that said roller will be depressed sufficiently to permit the pipe to pass between it and the riveting head. The roller
 125 in question also facilitates the movement of

the pipe as it travels from point to point during the riveting operation, as it reduces the friction which would otherwise exist between said pipe and the concave surface of the bolster on which it rests. It will be understood, of course, that the sheet metal pipe is moved just the distance between the two die parts 24 and 25 at each operation—or, in other words, said die parts are positioned just that distance apart which it is desired that the rivets shall be in the finished pipe. While one of said die parts is coöperating with the rivet being inserted to form a hole in the sheet metal, the other is operating upon the rivet just previously inserted to head it down.

By the use of my invention I am therefore enabled to punch and rivet pipe simultaneously. Not only this, but as the rivet itself forms its own hole in both edges of the sheet forming the pipe to be riveted, there is no possible variation in the position of the two holes. By means of the surrounding sleeve the external diameter of the pipe is maintained throughout with an unusual degree of exactness. The work is performed very rapidly, and in a very superior manner.

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

1. In a pipe-making machine, the combination of an external support for the pipe, an internal riveting head adjacent thereto, a rivet magazine attached to said head, means for forcing the rivets successively from said magazine up against the interior surface of the pipe, and an external hollow die arranged in line with said rivet and adapted in connection therewith to cause said rivet to form its own hole in the metal from which the pipe is formed.

2. In a pipe making machine, the combination of a support adapted to receive a curved pipe-sheet and hold the same against transverse movement while permitting extensive longitudinal movement, coöperating means adapted to lie within the pipe-sheet and support a rivet within said pipe-sheet substantially radially of the overlapping edges thereof, means for moving said rivet support outwardly, and means arranged exteriorly of the pipe to coöperate with the rivet when projected outwardly to pierce the pipe-sheet.

3. In a pipe making machine, the combination of a support adapted to receive a curved pipe-sheet and hold the same against transverse movement while permitting extensive longitudinal movement, coöperating means adapted to lie within the pipe-sheet

and support a rivet within the pipe-sheet substantially radially of the overlapping edges thereof, means for moving the rivet support to project the rivet outwardly, and means coöperating with the projecting means exteriorly of the pipe to coöperate with a rivet when projected outwardly to pierce the pipe-sheet and outwardly cup the overlapping edges of the pipe-sheet to receive the internal head of the rivet.

4. In a pipe making machine, the combination of a support adapted to receive a curved pipe-sheet, coöperating means adapted to lie within the pipe-sheet and support a rivet within the pipe-sheet substantially radially of the overlapping edges thereof, means for moving the rivet support to project the rivet outwardly, and means coöperating with the projecting-means exteriorly of the pipe to coöperate with a rivet when projected outwardly to pierce the pipe-sheet and outwardly cup the overlapping edges of the pipe-sheet to receive the internal head of the rivet.

5. The combination, in a pipe-making machine, of the riveting mechanism, a split guiding sleeve adjacent thereto through which the pipe is to be fed, and means for adjusting said sleeve.

6. The combination, in a pipe-making machine, of the riveting mechanism, the split guiding sleeve adjacent thereto through which the pipe is to be fed, and means for adjusting said sleeve consisting of a screw for drawing the seats of the sleeve together and a spring interposed between adjacent cheeks thereon for forcing the same apart.

7. The combination, in a pipe-making machine, of an external support for the pipe, a suitable riveting mechanism between which and said support the pipe to be riveted is introduced, and a roller carried by said support for facilitating the movement of the pipe over said support.

8. The combination, in a pipe-making machine, of an external support for the pipe, a suitable riveting mechanism between which and said support the pipe to be riveted is introduced, and a roller carried by said support for facilitating the movement of the pipe over said support, said roller being carried by a spring-mounted housing.

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana, this 20th day of October, A. D. one thousand nine hundred and six.

GEORGE L. CHATFIELD. [L. S.]

Witnesses:

CHESTER BRADFORD,

THOMAS W. McMEANS.