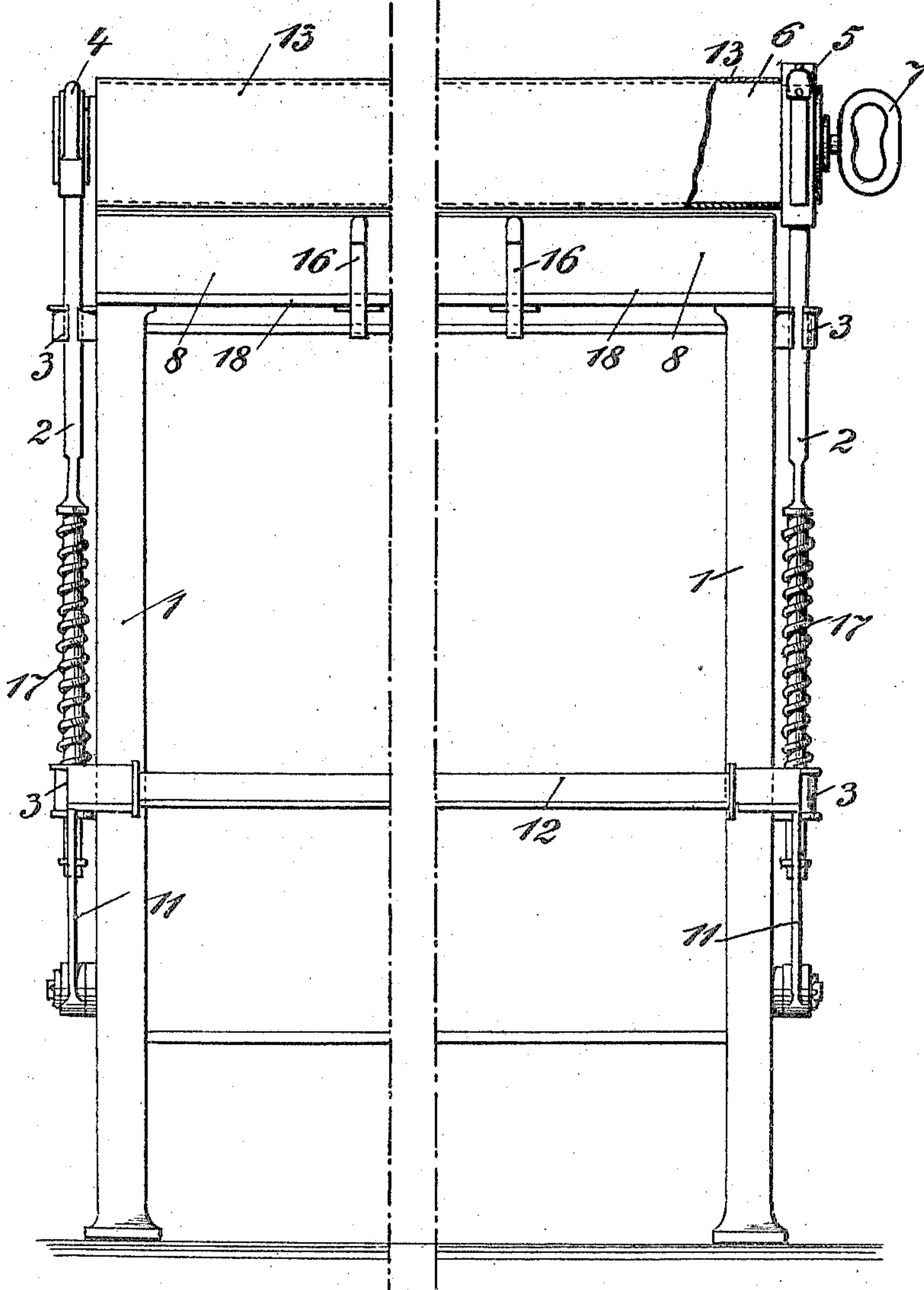


P. SCHMALE.
MACHINE FOR MANUFACTURING TUBES FROM METAL STRIPS.
APPLICATION FILED DEC. 28, 1908.

950,730.

Patented Mar. 1, 1910.
3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Georg Otto
Balthasar R. Penhke

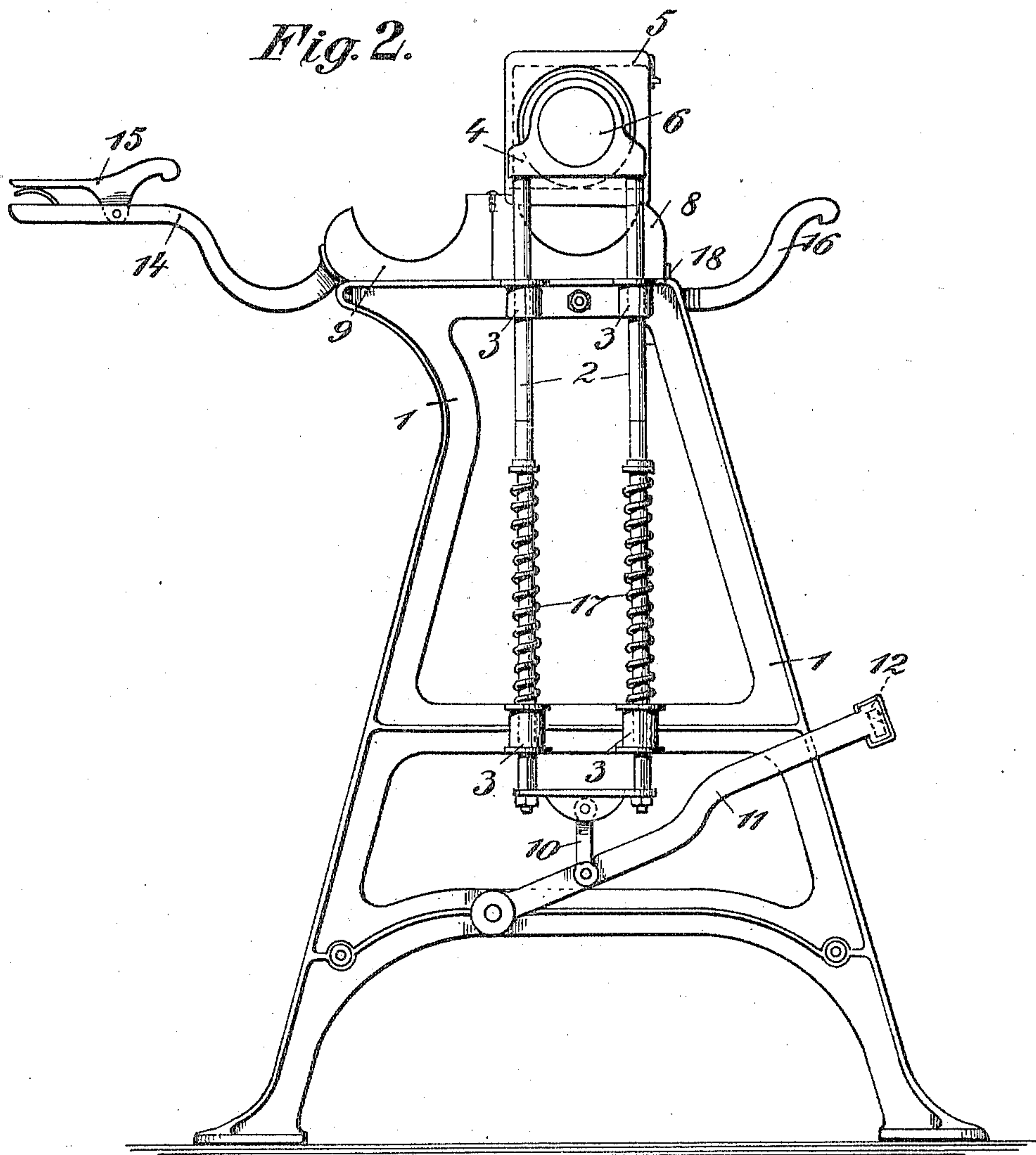
Inventor:

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Witnesses:
Zachary R. Pankra
Georg Otto

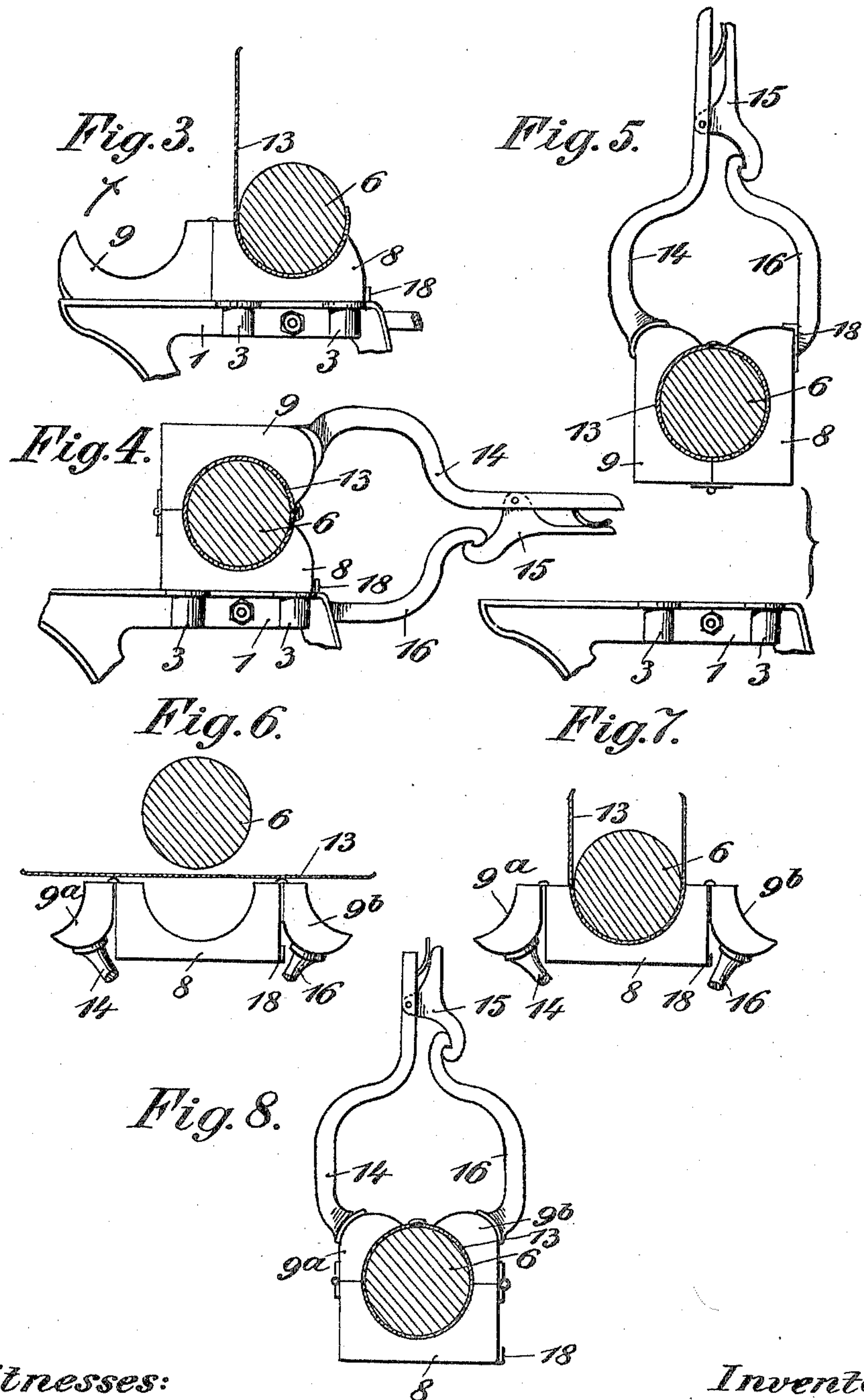
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3 SHEETS—SHEET 3.



Witnesses:
Berthold R. P. P. P.
George Otto.

Inventor:
Paul Schmale

UNITED STATES PATENT OFFICE.

PAUL SCHMALE, OF DARMSTADT, GERMANY.

MACHINE FOR MANUFACTURING TUBES FROM METAL STRIPS.

950,730.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed December 28, 1908. Serial No. 469,649.

To all whom it may concern:

Be it known that I, PAUL SCHMALE, a subject of the German Emperor, and resident of 94 Viktoriastrasse, Darmstadt, Germany, have invented certain new and useful Improvements in Machines for Manufacturing Tubes from Metal Strips, of which the following is a specification.

My invention relates to a machine for making tubes from strips of metal which are pressed by means of a mandrel into a mold or matrix which leaves one side or both sides of the strip standing out from such matrix. By means of a second matrix the projecting side, or sides, is, or are, pressed around the mandrel while only the extreme edges thereof are left free so as to allow them to be suitably connected together. The two matrices are advantageously provided with a locking contrivance by which the closed matrix is firmly locked during operation of securing the edges together. After having combined the edges, the matrices are opened and the mandrel is withdrawn from the finished tube.

My improved machine enables tubes to be manufactured in an easy manner.

The accompanying drawings show two forms of construction of matrix for use in my machine by way of example.

Figure 1 is a front elevation of the complete machine and Fig. 2 is a side elevation. Figs. 3, 4 and 5 show the various stages of manufacturing a tube in the machine. Figs. 6, 7 and 8 show a modified form of construction of the matrices and the manner of making the tubes with the aid thereof.

Referring first to Figs. 1 to 5, the standards 1 carry each at their external side two vertical rods 2 adapted to move in guide sockets 3. To the upper ends of the rods 2 are fixed the bearings 4 or 5 in which is supported a mandrel 6. The internal diameter of the bearing 5 corresponds to the diameter of the mandrel and the latter can be withdrawn from the bearings 4 and 5. Upon the top of the frame or standards 1 there is arranged beneath the mandrel 6 a matrix 8 to one side of which a second matrix 9 is hinged. The two parts correspond to the diameter of the tube being manufactured and they are so formed as to leave a free longitudinal gap between the lips of the mold along the side opposite the hinges, see Fig. 4. The two double rods 2 are connected with their lower ends to a cross plate

carrying a link 10 controlled by a lever 11 at each side of the machine, and a cross bar 12 connects the two levers 11 firmly together.

A tube is manufactured in the following manner: The metal strip 13 is properly placed on the lower matrix 8. By depressing the cross-bar 12 with the levers 11 the mandrel 6 will be lowered and caused to press the strip 13 in the lower matrix 8 as shown in Fig. 3. The upper matrix 9 is then turned by means of its hand-lever 14 in the direction of the arrow (Fig. 3) so as to rest on the lower matrix 8. The portion of metal strip 13 standing out from the latter is thereby bent around the mandrel 6 (Fig. 4) so that the edges of the tube come together. The hand-lever 14 is furnished with a spring-controlled catch 15 which, after closing the matrix, engages a hook 16 of the lower matrix and so locks the parts together. Upon releasing the levers 11, the mandrel 6 with the closed matrix will be lifted by the rods 2 by reason of the action of the springs 17, arranged on the latter, while at the same time the matrix is turned in such a manner as to cause the edges of the tube being made to be uppermost as shown in Fig. 5. As the two outsides of the parts of the closed matrix are not in contact with one another, there will be provided access to the butting edges of the tube for securing the said edges permanently together. After this has been done the closed matrix is turned back in the previous position and lowered by the levers 11 into the position shown in Fig. 4. The catch 15 is then released and the matrix opened. In releasing the levers 11, the mandrel 6 with the finished tube will be lifted from the matrix by the action of the springs 17. The mandrel is finally drawn out from the end of the bearings 4 and 5 by aid of the handle 7 while the tube is retained in the bearing 5 and can be separately removed. By placing the mandrel in the bearings, the machine is ready for the manufacture of another tube.

The modified form shown in Figs. 6 to 8, differs from the former only in the manner of constructing the matrix by making the top portion in two separate parts 9^a and 9^b which are each hinged to the lower portion 8. The metal strip is placed on the lower part 8 in such a manner as to cause the two side portions of such strip to pro-

ject from the matrix when the mandrel 6 is lowered as shown in Fig. 7. The two parts 9^a and 9^b are then turned over so as to completely bend the metal strip around the mandrel (Fig. 8). The lips of the parts 9^a and 9^b leave sufficient space between them so as to give free access to the edges of the tube for uniting them in a solid manner while the parts 9^a and 9^b are held locked together by means of locking hand-levers 14 and 16 secured by the catch 15. After joining the edges of the tube, the parts 9^a, 9^b are opened and the mandrel 6 with the finished tube is lifted from the lower part of the matrix in the manner hereinbefore described. It is then merely required to withdraw the mandrel from the tube so as to enable another tube to be manufactured.

The edges of the tubes to be manufactured are advantageously slightly bent or curved inward by means of an angular rail or bar 18 fixed to the frame so as to insure a perfect fit in the finished tube.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a machine for manufacturing tubes from metal strips the combination of a machine frame, a matrix arranged in the latter and corresponding in diameter to the diameter of the tube to be manufactured, bearings shiftably placed in the said frame, a mandrel displaceably inserted in the said bearings and adapted to press a metal strip into said matrix, and means to move the said bearings together with the said mandrel, a second matrix hinged to the first said matrix and adapted to bend the metal strip projecting from the first said matrix around the said mandrel, a hand lever on the said second matrix, and means to connect the said two matrices in the closed position, the said matrices being so formed as to leave a longitudinal gap at the side where the edges of the metal strip come together, substantially as and for the purposes set forth.

2. In a machine for manufacturing tubes from metal strips the combination of a machine frame, a matrix arranged in the latter and corresponding in diameter to the diameter of the tube to be manufactured, rods vertically guided in the said machine frame, bearings fixed to said rods, a mandrel laterally shiftable in the said bearings and adapted

ed to press a metal strip into said matrix, a foot lever arranged in the said machine frame and connected to the said rods, springs on the latter and adapted to hold the said bearings together with the said mandrel in the lifted position, a second matrix hinged to the first said matrix around the said mandrel, a hand lever on the said second matrix, and means to connect the said two matrices in the closed position, the said matrices being so formed as to leave a longitudinal gap at the side where the edges of the metal strip come together, substantially as and for the purpose set forth.

3. In a machine for manufacturing tubes from metal strips the combination of a machine frame, a matrix arranged in the latter and corresponding in diameter to the diameter of the tube to be manufactured, rods vertically guided in the said machine frame, bearings fixed to said rods, a mandrel laterally shiftable in the said bearings and adapted to press a metal strip into said matrix, a foot lever arranged in the said machine frame and connected to the said rods, springs on the latter and adapted to hold the said bearings together with the said mandrel in the lifted position, a second matrix hinged to the first said matrix and adapted to be turned over the latter and to bend the metal strip projecting from said first matrix around the said mandrel, a hand lever for turning the said second matrix, a spring catch attached to said hand lever, a hook fixed to the said second matrix, the said spring catch adapted to engage the said hook when the said two matrices are closed, the latter being so formed as to leave a longitudinal gap at the side where the ends of the metal strip come together, and an angular rail for slightly bending the edges of the metal strip and fixed in said machine frame, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name this 12th day of December, 1908, in the presence of two subscribing witnesses.

PAUL SCHMALE.

Witnesses:

JEAN GRUND,
CARL GRUND.