

(No Model.)

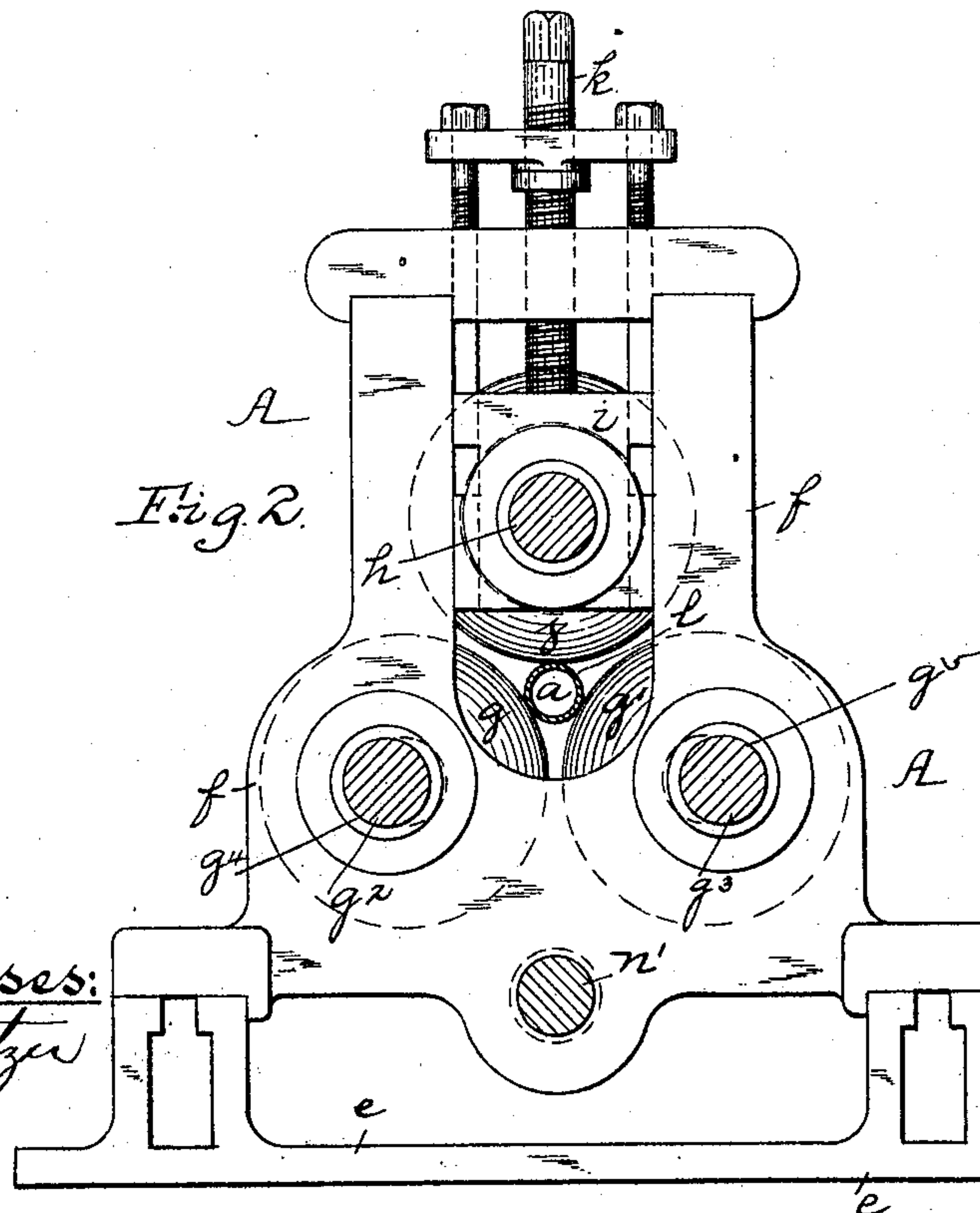
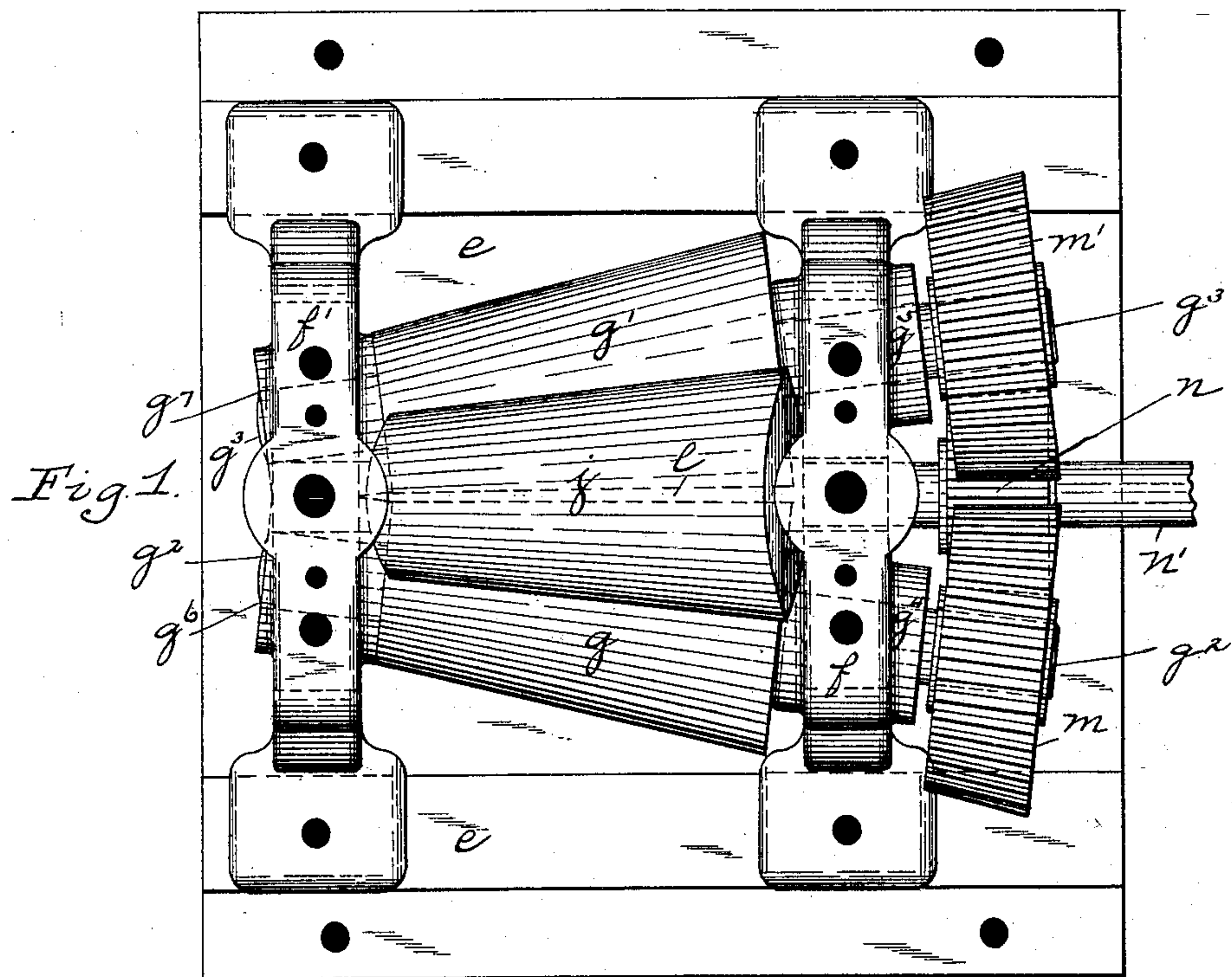
2 Sheets—Sheet 1.

T. COATES.

METHOD OF AND APPARATUS FOR MANUFACTURING TUBING.

No. 603,812.

Patented May 10, 1898.



Sicknesses:

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M. H. Blaney

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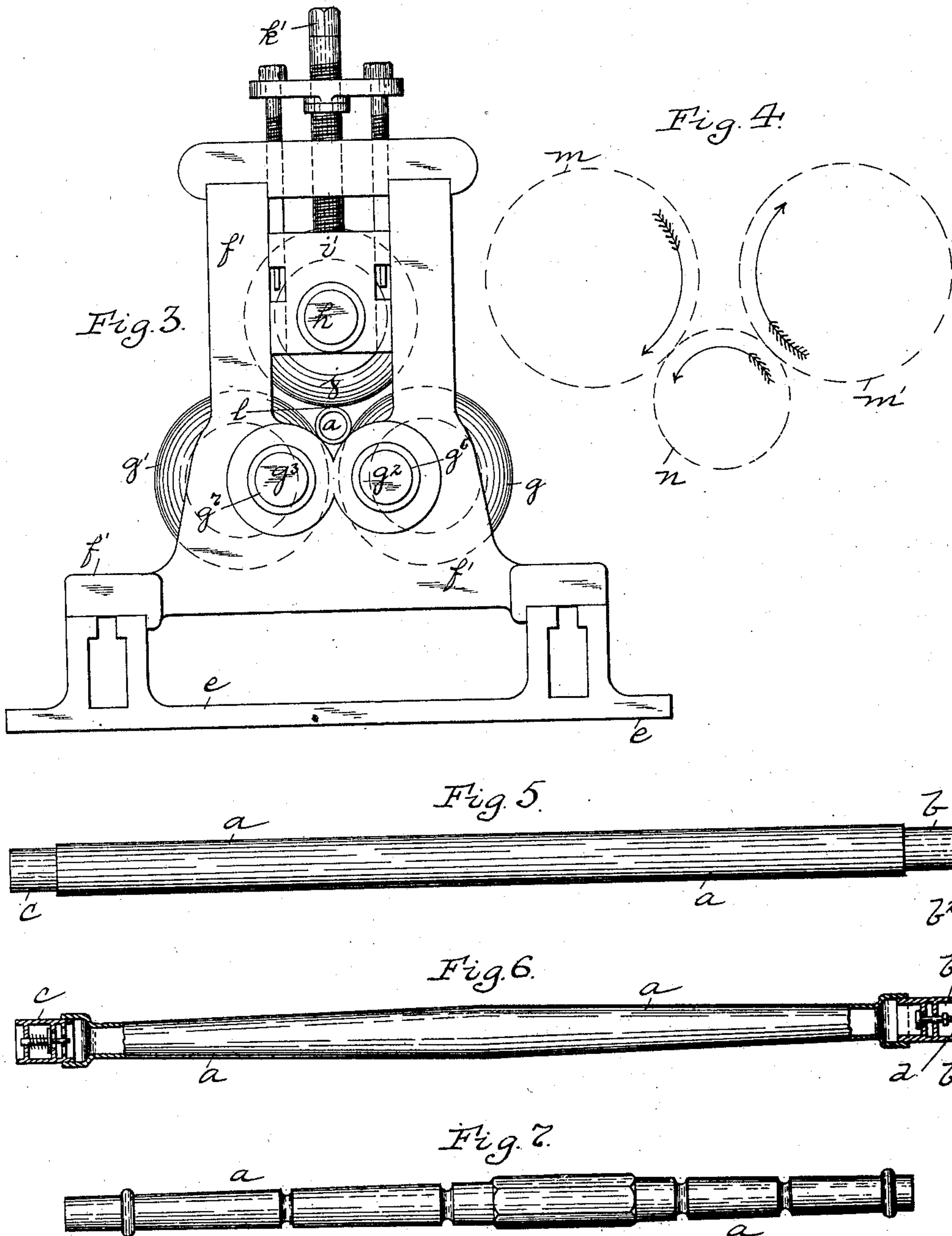
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Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS COATES, OF YOUNGSTOWN, OHIO, ASSIGNOR OF ONE-HALF TO
JOHN KENWORTHY, OF PITTSBURG, PENNSYLVANIA.

METHOD OF AND APPARATUS FOR MANUFACTURING TUBING.

SPECIFICATION forming part of Letters Patent No. 603,812, dated May 10, 1898.

Application filed June 30, 1897. Serial No. 642,912. (No model.)

To all whom it may concern:

Be it known that I, THOMAS COATES, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented a new and useful Improvement in Methods of and Apparatus for Making Tapered Tubing; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to method and apparatus for the manufacturing of tubing.

The object of my invention is to provide a method and apparatus for the making of tubing which is simple and effective in its operation and construction and by which such tubing can be formed cheaply and rapidly into any form, size, or design required.

My invention consists, generally stated, in the novel method practiced and arrangement, construction, and combination of parts used in the apparatus, such as is hereinafter more specifically set forth and described, and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to practice my method and construct and use the apparatus, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a top or plan view of a device suitable for making tubing under my improved method and apparatus. Fig. 2 is an end view with the gearing mechanism removed. Fig. 3 is a view looking at the opposite end from that shown in Fig. 2. Fig. 4 is a diagram view showing the movement of the gearing mechanism. Fig. 5 is a plan view of a section of a blank or pipe ready for operation. Fig. 6 is a plan view of the section of a blank or pipe in a tapered form and showing the valves in section; and Fig. 7 is a plan view of the finished tube or pipe, showing a suitable ornamentation or design thereon.

Like letters herein indicate like parts in each of the figures of the drawings.

My improved method and apparatus for making tubing is practiced with the ordinary form of a straight blank or tubing, as shown in Fig. 5, for forming straight, seamless, or tapered tubing, as desired. The blank or section of tubing *a* is provided on one end with the check-valve *b*, of any desired con-

struction, through which the blank or tubing *a* can be charged with fluid air under pressure having a flowing action, such as compressed air, so as to act to hold up the blank or section of tubing *a* during the operation of reducing or tapering. A safety-valve *c* of any approved form can be placed on the opposite end of the blank or section of tubing *a* to allow the fluid air to escape and relieve the pressure within the blank or tubing *a* during the operation thereon. At one end of the blank or section of tubing *a*, preferably within the check-valve *b*, is the socket *b'*, to which can be attached the connection *b²* for charging the blank or tubing *a* with the fluid air under pressure, and to which can also be attached the plug or rod *d* for driving and handling the blank or tubing *a* within the apparatus for reducing or tapering the same, as hereinafter described.

The apparatus suitable for reducing or tapering the blank or tubing *a* is shown at A, and consists of the bed-plate *e*, having the housings *f f'* thereon, between which are the lower power-driven conical rolls *g g'*, journaled on the shafts *g² g³*, mounted within the housings *f f'*. Journaled on the shaft *h*, mounted within the adjustable blocks *i i* in the housings *f f'*, is the upper conical roll *j*, which is an idle-roll and is adapted to be raised and lowered to and from the lower conical rolls *g g'* to form the pass *l*, by means of the adjusting-screws *k k'* passing through the housings *f f'* and engaging with the adjustable blocks *i i'*. The lower conical rolls *g g'* have their shafts *g² g³* journaled in the front bearings *g⁴ g⁵* and rear bearings *g⁶ g⁷*, formed at an angle to each other, with the large ends of the rolls *g g'* next to the front bearings *g⁴ g⁵* and the small ends of the rolls *g g'* next to the rear bearings *g⁶ g⁷*, so as to present a straight pass *l* for the blank or tube *a* in connection with the upper conical roll *j*, whose bearings are formed on a straight line. Secured upon the shafts *g² g³* in front of the housings *f* are the gear-wheels *m m'*, which are adapted to mesh with a gear-wheel *n*, mounted upon the main shaft *n'* and journaled in the housing *f*, as shown in Fig. 1 and the diagram Fig. 4, for operating the rolls *g g'*. It is evident that other pressing means

can be applied to the blank or section of tubing to reduce or taper same, if desired.

The operation of my improved method and apparatus for making tubing is as follows:

5 The blank or section of tubing *a* is filled in any suitable manner with the fluid air under pressure, such as compressed air, from a tank or compressor, as desired, through the check-valve *b*, and when so filled the supply of fluid
10 air can be shut off, so closing the check-valve *b*. The conical rolls *g*, *g'*, and *j* being in operation and adjusted to position, the blank or tube *a* after it is heated can then be taken and inserted within the pass *l*, between the
15 rolls *g*, *g'*, and *j*, by means of the plug or rod *d*, inserted in the socket *b*. The upper conical roll *j* can then be brought down into engagement with the blank or tube *a* by means of the adjusting-screws *k* *k'*, and the power
20 can then be applied to the shaft *n'* and through the gear-wheels *m* *m'* turn the rolls *g* *g'*. By the turning of the rolls *g* *g'* the idle-roll *j* is rotated through the medium of the blank or tube *a* within the pass *l* during roll-
25 ing, and while being so rolled into a reduced or tapered form the ends of the blank or tube *a*, having the check-valve *b* and safety-valve *c*, extend beyond the pass *l* of the rolls *g*, *g'*, and *j*, so as to prevent injury thereto during
30 such rolling operation. By such an operation the blank or tube *a* can be reduced or tapered into such form or size required by the simple adjustment of the idle conical roll *j* during the rolling thereof, if desired, or the reducing
35 and tapering of the blank or tube changed by such adjustment of the roll *j*. The movement of the rolls *g* *g'*, operating upon the blank or tubing *a*, will turn the roll *j* when the blank or tubing *a* is within the pass *l*, while the fluid
40 air under pressure within the blank or tube *a* will flow, support, and give resistance to the same and prevent any flattening or distortion of the blank or tube *a* during the process of reducing or shaping, and any surplus fluid
45 air within the blank or tube *a* will escape through the safety-valve *c* while the blank or tube is being reduced or tapered. After the blank or tube *a* has been reduced or tapered into the size or form required it can be re-
50 moved from the pass *l* in the rolls *g* *g'* and *j* and the check-valve *b* and safety-valve *c* removed therefrom in any manner for another operation, which will allow the fluid air to es-

cape from the completed tube *a*. The tube *a* can then be finished by trimming the ends 55 thereof, and, if desired, can be made into any shape, design, or form desired by the action of other shaping-rolls or any other suitable forming and shaping mechanism.

It will thus be seen that my improved method 60 and apparatus for making tubing is simple and effective in its construction and operation. The method of practicing the operation is cheap and rapid, and the blank or tube is pre- 65 vented from any flattening or distortion during the process by the support and resistance of the fluid within the same. By this method and apparatus the blank or tube can be rolled to any size or taper required and afterward can be formed of any irregular shape and de- 70 sign desired.

It is evident that spiral, lap, or butt weld or any other form of tubing can be reduced or tapered by the above method and apparatus.

What I claim as my invention, and desire 75 to secure by Letters Patent, is—

1. The herein-described method of forming tubing, consisting in filling a blank or section of tubing with fluid air under pressure, and then applying pressing means to the blank or 80 tubing to reduce or taper the same, substantially as described.

2. The herein-described method of forming tubing, consisting in filling a blank or section of tubing with fluid air under compression, 85 and then rolling the blank or tube in rolls to reduce or taper the same, substantially as described.

3. In apparatus for making tubing, the combination of a blank or section of tubing hav- 90 ing fluid air therein under pressure, and a check-valve on the end of said blank or tubing, substantially as and for the purposes set forth.

4. In apparatus for making tubing, the com- 95 bination of a blank or section of tubing having fluid air therein under pressure, a check-valve on one end of said blank or tubing, and a safety-valve on the opposite end thereof, substantially as and for the purposes set forth. 100

In testimony whereof I, the said THOMAS COATES, have hereunto set my hand.

THOMAS COATES.

Witnesses:

THOMAS THOMAS,
ALFRED C. COATES.