(No Model.)

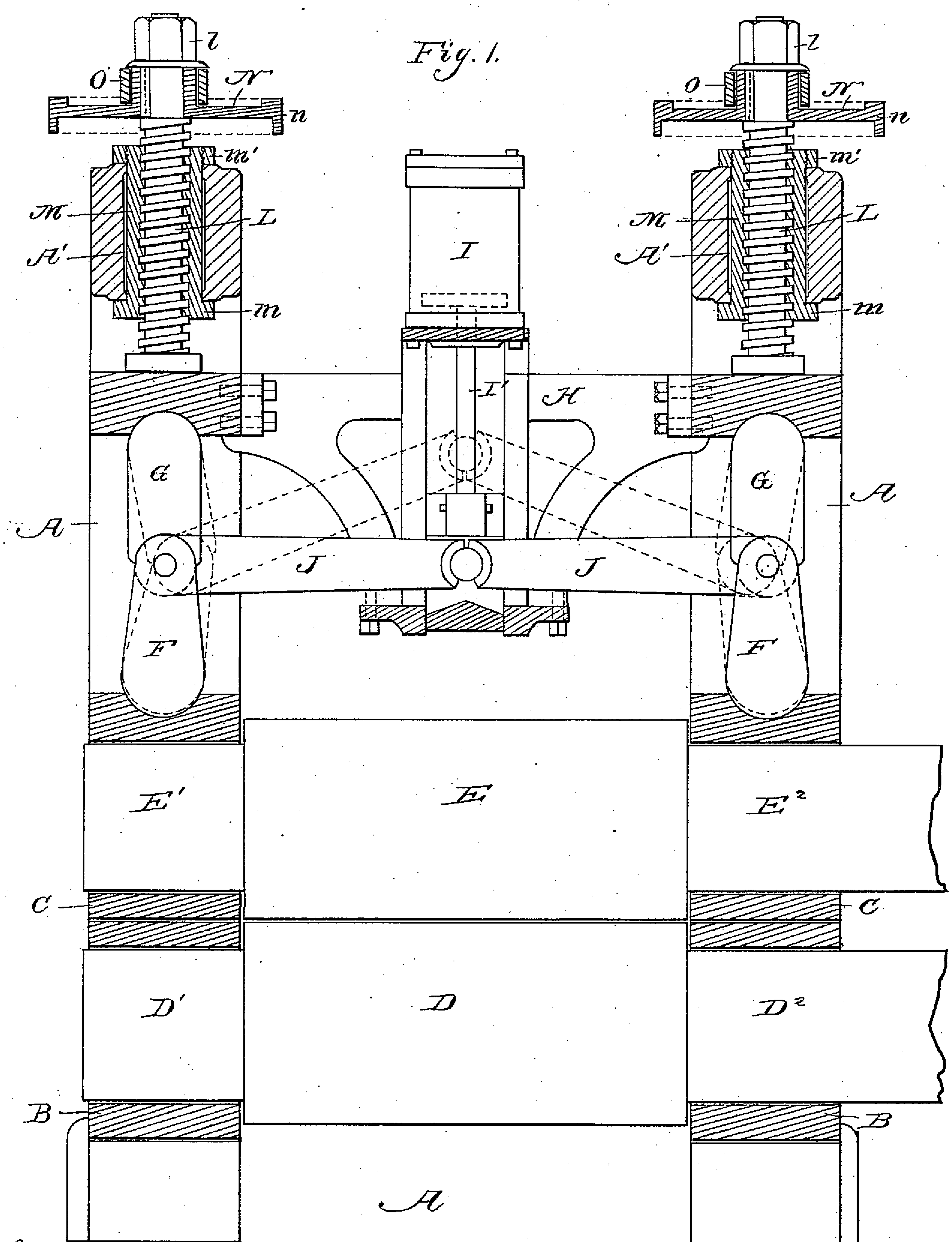
3 Sheets—Sheet 1.

F. H. WRIGHT.

METHOD OF ROLLING SHEET METAL.

No. 381,746. Patented Apr. 24, 1888.

Fig. 1.



Witnesses:

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John W. Brown.

Inventor:

Franklin H. Wright.

by Cyrus Kehr.

Atty.

(No Model.)

3 Sheets—Sheet 2.

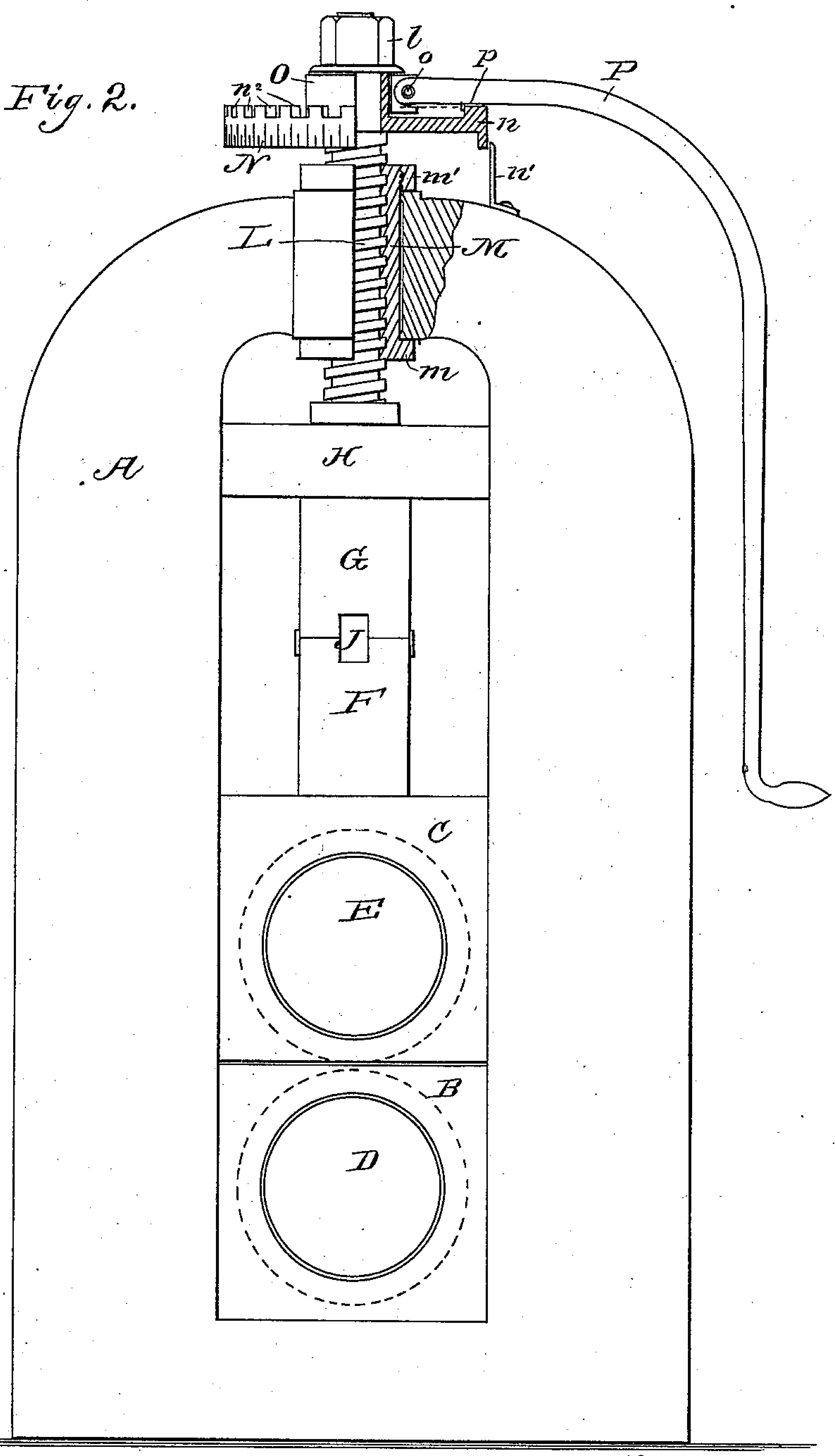
F. H. WRIGHT.

METHOD OF ROLLING SHEET METAL.

No. 381,746.

Patented Apr. 24, 1888.

Fig. 2.



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N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

3 Sheets—Sheet 3.

F. H. WRIGHT.

METHOD OF ROLLING SHEET METAL.

No. 381,746.

Patented Apr. 24, 1888.

Fig. 3.

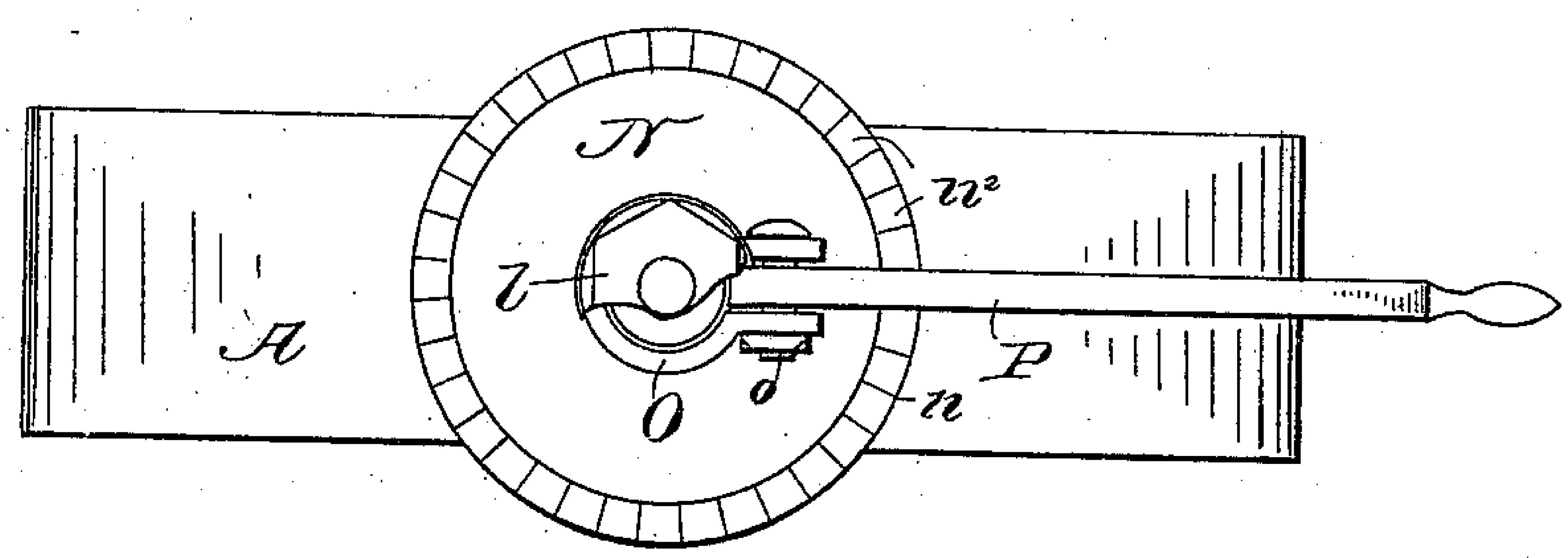
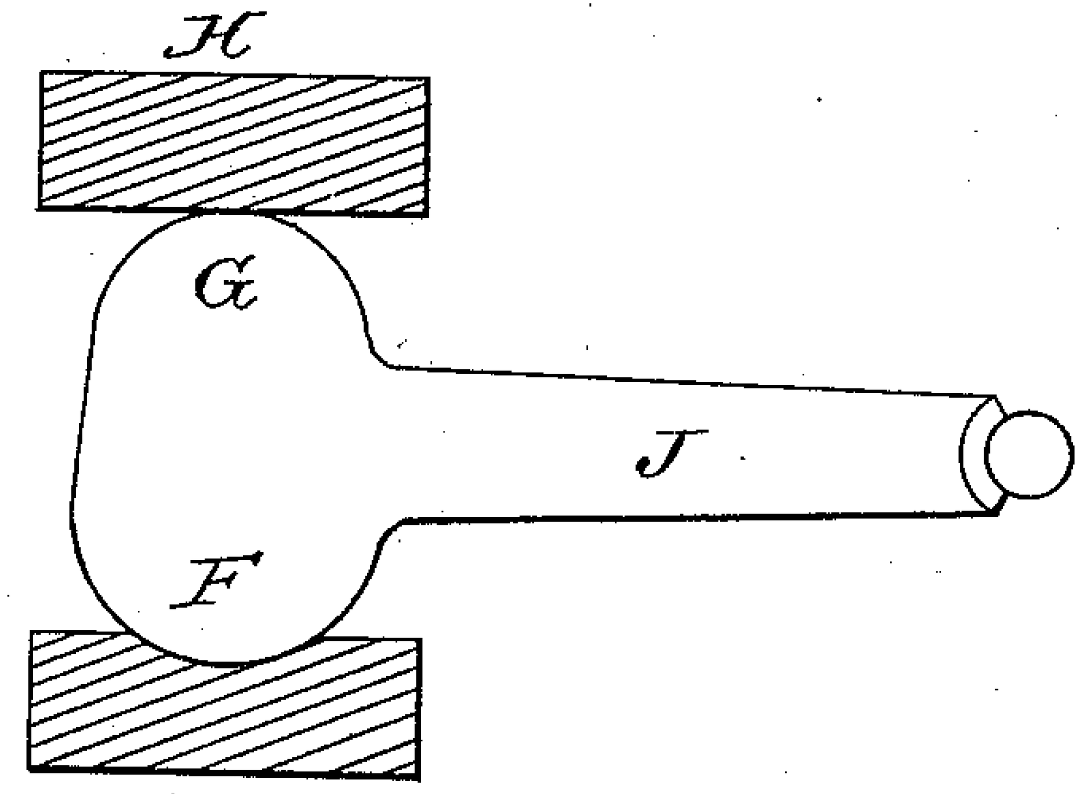


Fig. 4.



Witnesses:

Charles H. Roberts.

John W. Brown.

Inventor:

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by Cyrus Kehr,

Atty.

UNITED STATES PATENT OFFICE.

FRANKLIN H. WRIGHT, OF LAKE VIEW, ILLINOIS.

METHOD OF ROLLING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 381,746, dated April 24, 1888.

Application filed January 16, 1888. Serial No. 260,871. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN H. WRIGHT, a citizen of the United States, residing at Lake View, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Rolling Sheet Metal; 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 or figures of reference marked thereon, which form a part of this specification.

This invention relates more particularly to methods of completing the reduction or finishing of sheet metal after the stock has been partially reduced or broken down, the object being to produce sheet metal of superior quality as to smoothness of surface and uniformity of thickness and density. For many purposes sheet metal lacking uniform smoothness, thickness, and density is worthless. For example, the sheet-brass used in the manufacture of reed-tongues for organs must not lack in these particulars, else such tongues will be defective. For this purpose sheet-brass varying from ten to fifteen one-thousandths to one-eighth of an inch in thickness is used. The sheets are first cut into strips and the strips are cut into blanks of the length and width of the finished tongue. These blanks are shaved to a proper thickness to afford the weight and flexibility necessary to produce the various tones of the organs. To produce good tones each piece of brass used for a tongue must be faultless, and all the pieces should have the same density and finish. If a blank has a defective place in it, it is impossible to make a good reed of it. If the tongue does not break while it is being planed or voiced, which it is very apt to do, its tone will never be of the best quality.

A large portion of the sheet-brass now manufactured cannot be used at all in reed-making, and it is difficult to procure any that is passably good for this purpose, while none can be procured that is satisfactory. These statements are based on my experience. I am engaged in the manufacture of reeds, and have often made efforts to obtain satisfactory sheet-brass for this purpose; but I am convinced that it is not yet manufactured.

After examining the machinery and methods employed in the manufacture of brass and consulting with manufacturers regarding the difficulties encountered, I am convinced that the imperfections in the sheet-brass are due to imperfections in the surfaces of the rolls between which the sheets are rolled, and that said imperfections in the rolls are due to the impressions made by the superhardened ends formed upon the sheets of brass during the process of rolling.

Beginning work with a pair of perfectly-polished rolls and passing the sheets of brass through them it is found that the first sheets are well finished; but the surface of subsequent sheets shows small streaks, scratches, pin-marks, indentations, and elevations, and these grow more numerous until the rolls are removed and reground. During the process of rolling the surface of the rolls becomes scratched and indented. These indentations are, I am convinced, made by the ends and not by the body of the sheet of brass, and the manufacturers with whom I have consulted upon this subject agree with me. In passing the sheet through the rolls the ends of the sheet acquire a high degree of hardness. These on leaving and entering the rolls offer an enormous resistance to the latter. When the sheet is to be inserted, it is difficult for the rolls to grasp this hardened end. Often there is violent slipping and scraping of the brass upon the surface of the rolls before it enters. I avoid this injury to the surfaces of the rolls, and the subsequent injury done to the sheet of metal, by effecting the reduction of the sheet without subjecting the rolls to the strain of the ends of the sheet of metal. This I accomplish by releasing the pressure of the rolls while the end of the sheet is entering or leaving, as hereinafter described and claimed.

For the purpose of illustration, I describe an improved rolling-mill which may be used in the practice of my method. Said rolling-mill is the subject-matter of an application for Letters-Patent filed by me September 20, 1887, Serial No. 250,169.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of a mill embodying my invention. Fig. 2 is an end elevation of said mill. Fig. 3 is a plan of the adjusting mechanism. Fig. 4 shows a cam substituted for the toggle shown in Fig. 1.

A is the usual frame for supporting the rolls and the adjusting-screws. The upright ends of the frame are each open to receive the bearings for the rolls and the locking and adjusting devices.

B B are the bearings for the lower roll, and C C are the bearings for the upper roll. The latter lie loosely within the opening in the ends of the frame A.

D is the lower roll, having journals D′ D² extending into the bearings B B.

E is the upper and movable roll, having the journals E′ E² extending into the bearings C C.

The journals D² and E² are extended farther than is shown by the drawings, and the driving-power is applied to them in the usual way. Heretofore the upper roll, E, has been forced down upon the lower roll, D, by means of screws pressing upon the bearings C C. These screws have been turned until the rolls were brought into such proximity to each other as to press the sheet of metal passing between them to the required thinness. When thus set or adjusted, the rolls had to remain unchanged until a new adjustment was made by means of the screws.

For my purpose it is necessary to provide for instantly releasing the upper roll from the pressure of the screws, and as quickly subjecting them again to said pressure with the same adjustment as before. This I accomplish by interposing a toggle between each screw and the end of the roll beneath it, and connecting said toggles with a steam-piston by which they are operated.

F F are the lower links of the toggles. Each rests in a depression, C′, on the upper side of the bearing C beneath it, or is otherwise attached to said bearing.

G G are the upper links of the toggle. These support the outer ends of the bridge H, whose ends extend into the open portion of the ends of the frame A. At a point midway between its ends the bridge H supports a vertical steam-cylinder, I, whose piston-rod I′ extends downwardly, when at its lower limit, to about the level of the joints of the toggles. Supposing the toggles to be straight and that the piston-rod I′ is at its lower limit, an arm, J, is inserted between the end of said piston-rod and the joint of each toggle, and suitably attached to said piston-rod and toggle.

L L are the adjusting-screws. These press upon the outer ends of the bridge directly above the toggles, and transmit their pressure through the latter, while they are straight, upon the upper roll, E. The screws L L may be adjusted when the piston is down and the toggles are straight; but it is preferable to adjust them while the piston is up and the toggles are unlocked, because then the screws are free and may be readily turned, while it requires great power to turn them when they are applied to the rolls.

Now, when a sheet of metal is to be inserted between or removed from the rolls the steam is made to raise the piston, and the latter in turn raises the inner ends of the arms J and brings the toggles to an angle, as is obvious from an inspection of the drawings. The pressure of the screws is thus wholly withdrawn from the upper roll with practically no resistance, and with none when the upper roll is counterbalanced, so as to rise when the screws are raised, as is the case in some of these mills. When pressure is again desired, the steam is reversed in the cylinder, the piston forced down, and the toggles driven into a line. Thus when the ends of the sheet have become superhardened the pressure may be taken from the rolls as often as said sheet is inserted or withdrawn.

In order that the work of the mill may be carried on with sufficient rapidity for economy, the toggles must be controlled by an agency which operates instantly and with great power. Steam is best suited for this purpose; but water and other agents might be used in lieu of steam.

Cams F′ may be substituted for the toggles F G, as shown in Fig. 4. Each cam is attached to one of the arms J, and is partially rotated when the latter is moved by the piston, with the obvious result of removing or restoring the pressure of the screws upon the rolls.

Each of the screws L is threaded through a sleeve, M, inserted from below into a hole, A′, in the frame A. The sleeve M has a flange, m, at its lower end, which rests against the frame A, while a collar, m', is threaded upon the upper end of the sleeve, and, with the flange m, serves to hold the sleeve in its place.

A wheel, N, is keyed upon the upper end of each screw L. Its circumference is broadened into a flange, n, the outer face of which is graduated, and a pointer, n', rising from the frame A, stands before such graduations. The upper edge of the flange n is provided with notches n^2.

O is a band loosely surrounding the upper portion of the hub of the wheel N or the screw L. The end of the arm P is inserted between the ends of the band O, and a bolt, o, passes through said ends and binds them together in a hinge-joint. A nut, l, on the screw L, above the band O, holds the latter on the screw. A projection, p, on the arm P, or said arm itself, engages in the notches n^2. When thus engaged, the arm P may be drawn laterally to turn the wheel N and the screw. The graduation on the circumference of the wheel is an aid in effecting an accurate adjustment of the screw.

I deem it unnecessary to illustrate the mechanism for controlling the supply of steam to the steam-cylinder, because the same may be of any well-known form, and all machinists will understand how to apply it.

It will be seen that the surfaces of the cells above described constitute two advancing surfaces which press upon opposite sides of the sheet of metal and carry the latter along and compress it, and that in the practice of my method the body of said sheet of metal is subjected to said pressure, but that said pressure is released while said surfaces pass over the ends of said sheet.

I claim as my invention—

The herein-described method of rolling sheet metal, which method consists in subjecting the body of the sheet of metal to the pressure of the rolls and withdrawing the pressure of said rolls from said sheet while said rolls pass over the ends of said sheet, substantially as and for the purposes herein described.

In testimony whereof I affix my signature in presence of two witnesses.

Dated at Toronto, Ontario, this 28th day of December, A. D. 1887.

FRANKLIN H. WRIGHT.

Witnesses:
GEO. W. CLARK,
C. H. RICHES.