

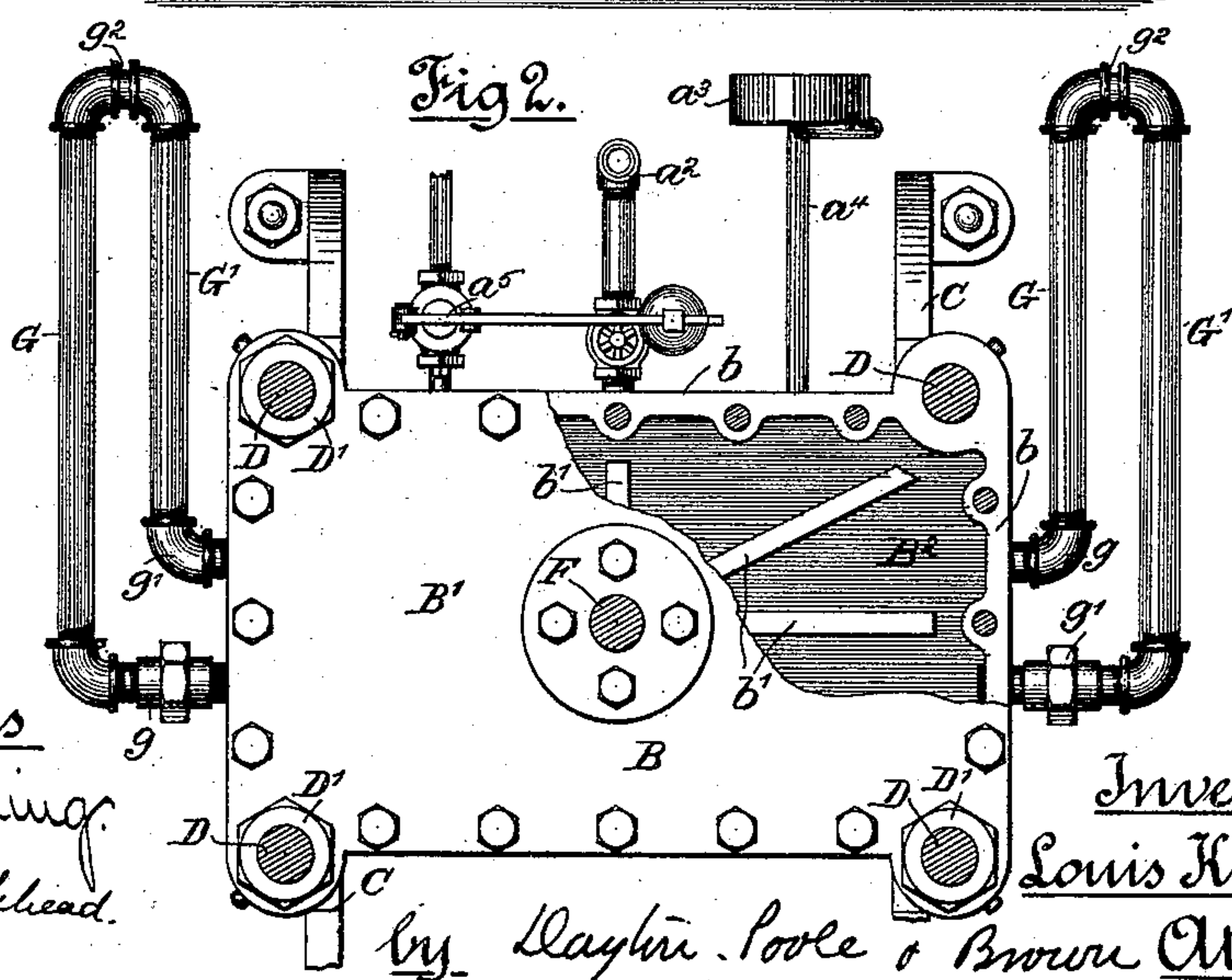
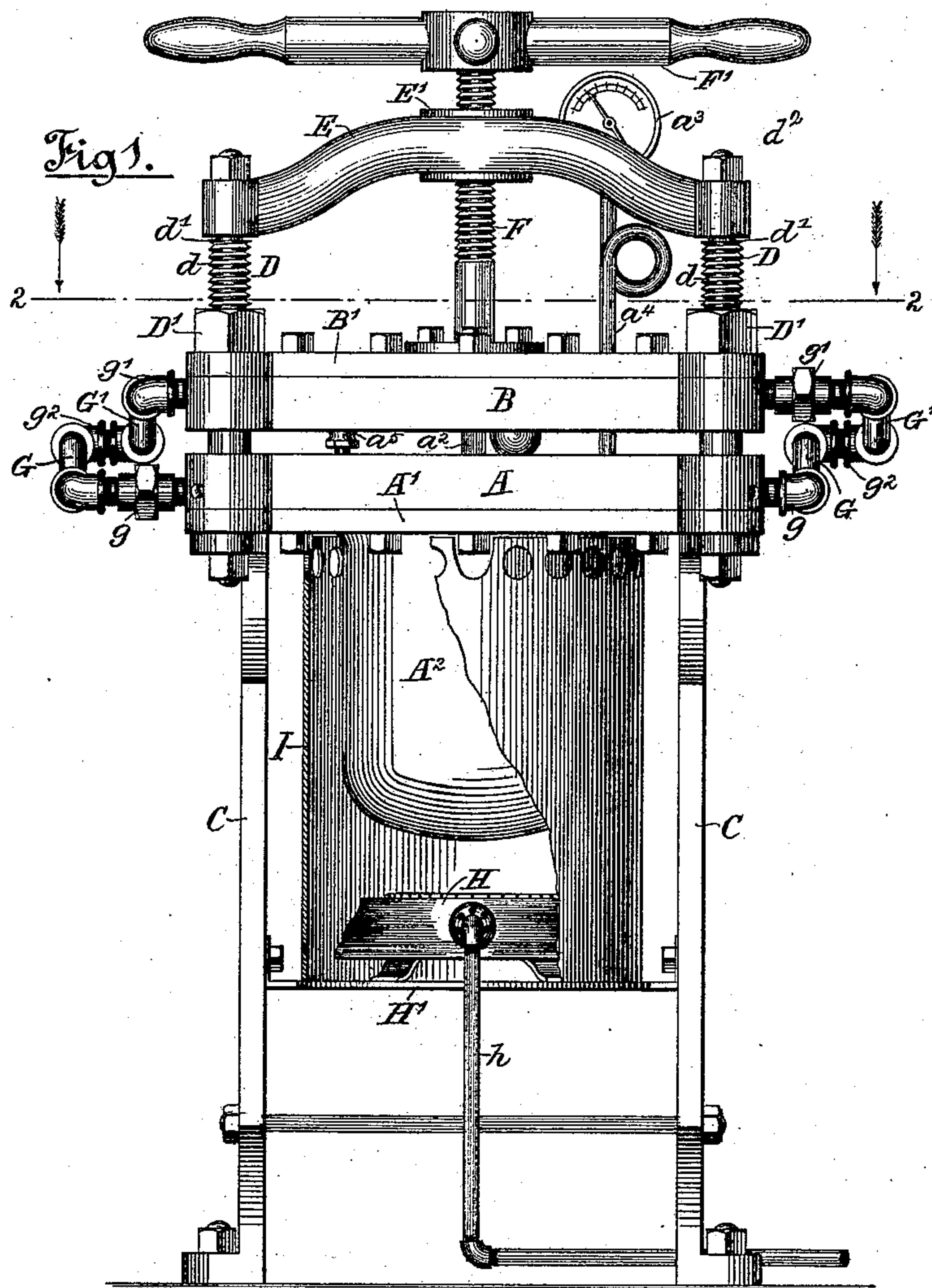
(No Model.)

3 Sheets—Sheet 1.

L. K. SCOTFORD.
APPARATUS FOR VULCANIZING RUBBER.

No. 407,255.

Patented July 16, 1889.



Witnesses

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Louis M. F. Whitehead

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Fig 3.

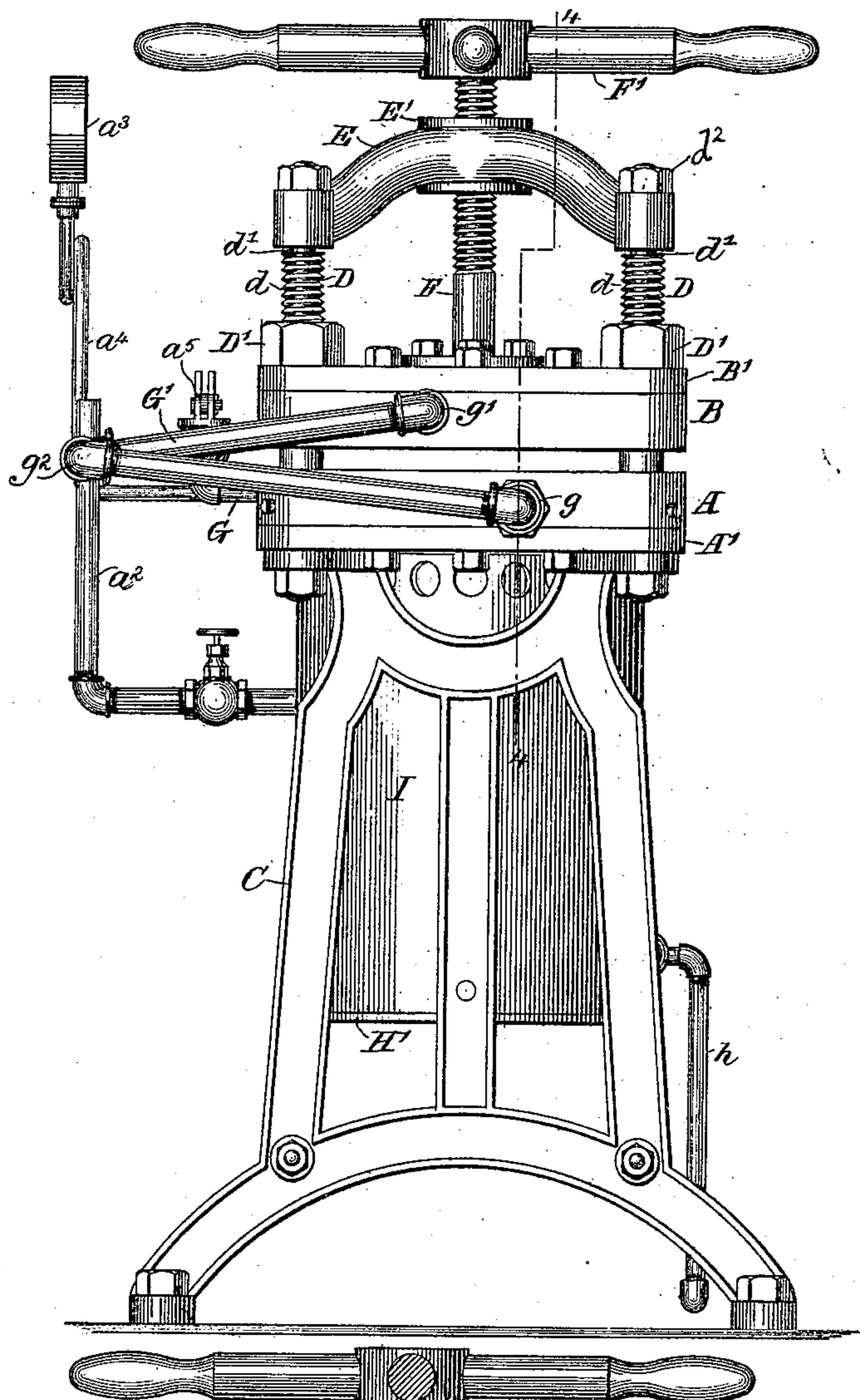
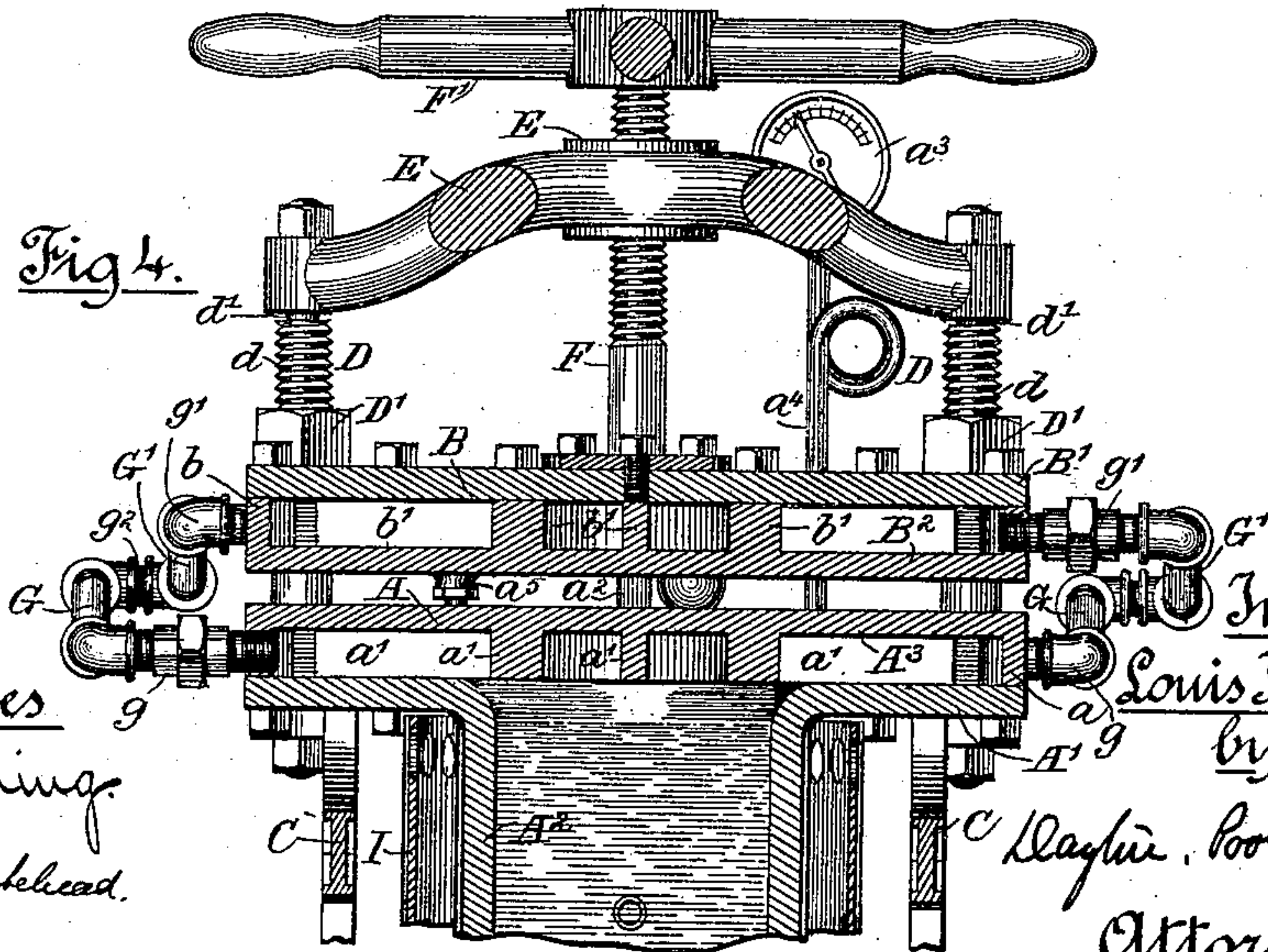


Fig 4.



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Fig 5.

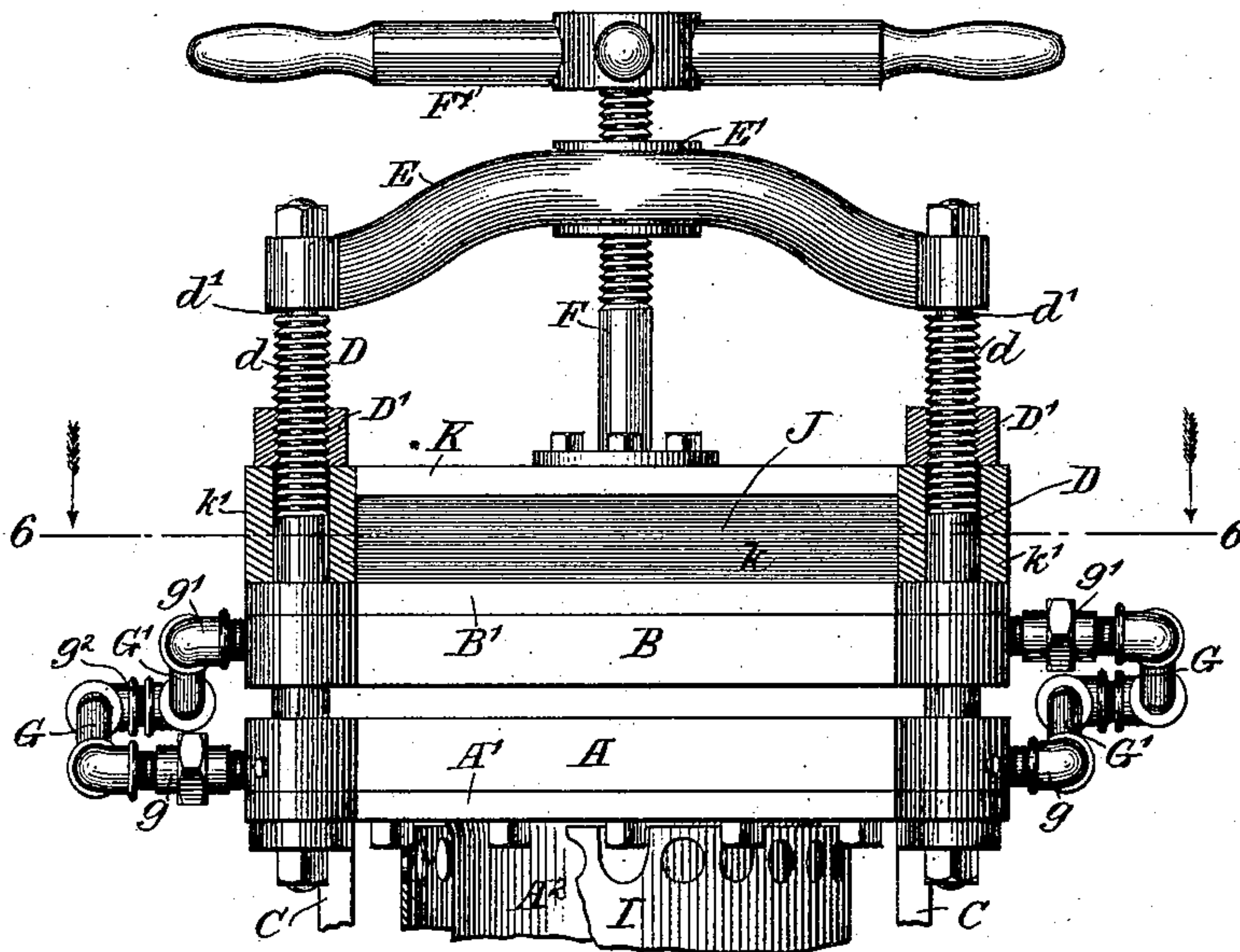
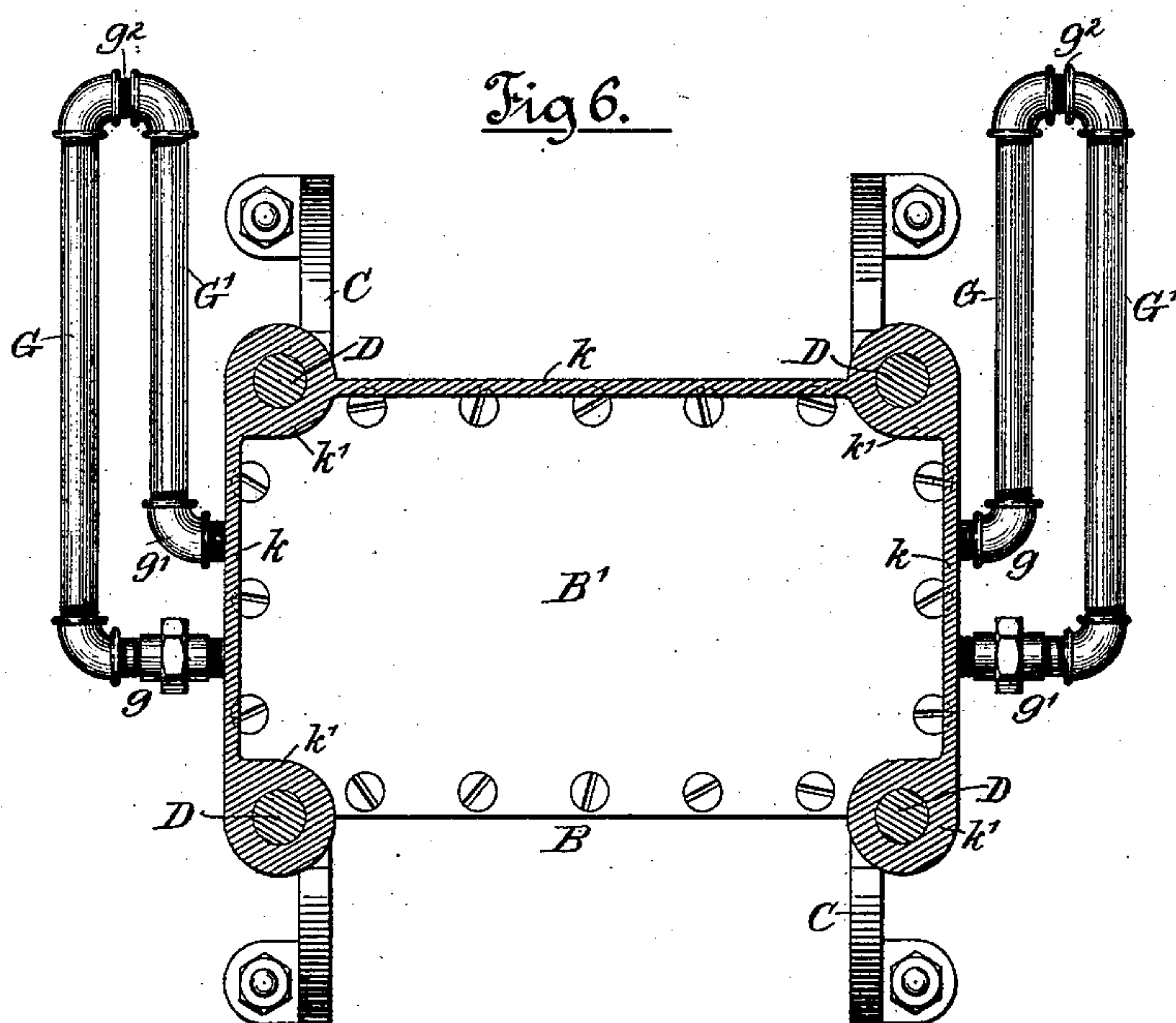


Fig 6.



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UNITED STATES PATENT OFFICE.

LOUIS K. SCOTFORD, OF CHICAGO, ILLINOIS.

APPARATUS FOR VULCANIZING RUBBER.

SPECIFICATION forming part of Letters Patent No. 407,255, dated July 16, 1889.

Application filed September 3, 1888. Serial No. 284,506. (No model.)

To all whom it may concern:

Be it known that I, LOUIS K. SCOTFORD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Apparatus for Vulcanizing Rubber; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of
10 this specification.

This invention relates to an improved apparatus for use in vulcanizing articles of rubber—such, for instance, as the rubber-type
15 sheets employed in hand-stamps.

The invention relates more particularly to apparatus of that class in which the article to be vulcanized is subjected to the direct pressure of opposing surfaces, and in which steam
20 is employed for heating the article for the purpose of affording a uniform and easily-controlled temperature in the apparatus.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

As illustrated in the accompanying drawings, Figure 1 is a front elevation of an apparatus embodying my invention. Fig. 2 is a sectional plan view thereof taken upon line
30 2 2 of Fig. 1. Fig. 3 is a side elevation thereof. Fig. 4 is a detail vertical section taken upon line 4 4 of Fig. 3. Fig. 5 is a front elevation of an apparatus containing a drying-oven. Fig. 6 is a sectional plan view taken upon line
35 6 6 of Fig. 5.

As shown in the said drawings, Figs. 1, 2, 3, and 4, A is the lower part or platen of the press, and B the upper movable part or follower thereof. The platen A is sustained upon
40 legs or standards C C, and to its corners are secured four vertical posts D D D D, to the upper ends of which is attached a rigid metal yoke E. At the center of said yoke is formed a hub E', through which passes a screw-shaft
45 F, which bears upon the top of the follower B and is provided with a hand-wheel F'. The upper parts of the posts D D are provided with screw-threads d, engaged by nuts D' D', which are adapted to be screwed down against
50 the follower B, so as to hold the latter independently of the central screw-shaft F, by which the said follower is raised and lowered.

The platen A and follower B are both made hollow or provided with interior recesses, into which steam is introduced for the purpose of
55 maintaining said parts at an equal temperature. The platen A consists of a lower horizontal plate A', made flat about its margins and provided at its center with a depending cylindric cup-shaped water-receptacle A²,
60 forming a steam-generator, and to the bottom of which heat is applied for the purpose of supplying steam for heating the apparatus. The upper part of the hollow platen A consists of a flat plate A³, provided with marginal
65 depending flanges a, which rest in contact with the edges of the plate A', and with radially-arranged stiffening-flanges a' a', for the purpose of giving suitable strength to the central portion of the plate. The plates A' and
70 A³ are joined by vertical bolts in the manner shown. The follower B consists of a top plate B' and a flat bottom plate B². The bottom plate B² is provided with marginal flanges b and with radial stiffening-flanges b', forming
75 a hollow space or recess within the follower, while at the same time affording the necessary rigidity in the said bottom plate. Said plates B' and B² are bolted together at their edges, as illustrated. A connection affording pas-
80 sage of steam from the hollow platen A to the follower B, while allowing vertical movement of the follower, is afforded by means of two steam-pipes G G', which are connected with the platen A and follower B, respectively, by
85 means of swiveled joints g and g', and are connected with each other by a swiveled joint g², said several joints allowing rotary movement of the pipes with relation to each other, and with relation to the platen A and follower B,
90 when the follower is moved, in a manner readily understood.

The water-receptacle A² may, for the general purposes of the invention, be heated by any suitable means. As herein shown, a gas-
95 burner H is placed upon a supporting-plate H' beneath the said receptacle A², the burner being supplied by a pipe h.

I is a cylindric jacket of sheet metal, desirably placed around the burner H and ar-
100 ranged to extend upwardly at the sides of the receptacle A² to a point near the bottom of the platen A. The purpose of this shield is to prevent the flames from the burner being

blown out and the receptacle cooled by accidental drafts of wind.

a^2 is a filling-pipe attached to the water-receptacle A^2 . a^3 is a pressure-gage connected therewith by a pipe a^4 , and a^5 is a safety-valve connected with the interior of the platen A. The pressure-gage affords a ready and convenient means of determining the temperature of the pressing-surfaces, inasmuch as the temperature of the steam is always the same under a given pressure.

The apparatus made in the manner described is employed for vulcanizing rubber by means of heat and direct or mechanical pressure as distinguished from steam-pressure. In the making of a rubber printing-sheet, for instance, the matrix having the reverse of the types or printing-face desired is placed upon the platen with the sheet of rubber prepared in readiness for application of heating-pressure in contact with the same. The follower is then brought against the rubber, so as to force the same into contact with all parts of the matrix and to retain the same under considerable pressure. After the follower has been brought against the rubber by the use of the hand-wheel F' the nuts D' upon the posts are forced down against the follower by the use of a wrench, so that the follower is held rigidly in place while the process of vulcanizing is taking place, without reliance upon the central screw-shaft F , which latter, in this machine, is used mainly for raising and lowering the follower. In order to prevent the central screw from acting against the nuts $D' D'$, the follower B has a limited vertical play or lost motion relatively to the posts $D D$, which may be produced at the joints between either of the parts named. In the machine shown provision is made for play or lost movement between the follower and posts by giving the yoke E a limited vertical movement on the posts, afforded by reduced parts $d' d'$ at the upper ends of the posts, which reduced parts pass through holes in the yoke and are longer than the vertical thickness of the parts of the yoke engaged therewith. The upward movement of the yoke in this construction is limited by means of nuts $d^2 d^2$ on the upper ends of said reduced parts $d' d'$. When the central screw is depressed, the yoke will be pressed upwardly against said nuts $d^2 d^2$; but when the nuts $D' D'$ are tightened the yoke will be moved downwardly, according to the amount of compression used.

The operation of vulcanizing itself does not require the application of any great pressure to the rubber; but, as is well understood by those who practice the art, the rubber swells or expands with great force when heat is applied, and a great strength in the pressing-surfaces is required to restrain the rubber from expanding and thus getting out of shape. The nuts $D' D'$ serve the purpose of holding the follower immovably parallel with the platen while the rubber is undergoing the vulcanizing process, thereby taking from the

central screw-shaft and yoke the great strain which would otherwise come upon said parts at such time.

The matrices employed for giving shape to articles of rubber—such as rubber-type sheets—are usually made of a compound or preparation containing plaster and other ingredients, and which requires heating or baking to harden preparatory to the insertion of the matrix in the vulcanizing-press with the rubber.

In Fig. 5 I have shown an apparatus which contains, in addition to the parts of the vulcanizing-press above described, a drying-oven for the matrices, such drying-oven being also heated by steam. In this instance the platen A and parts below the same are made in the same manner as before described, and are similarly lettered in the drawings. The follower B , however, is provided with a flat top plate B' , which forms the bottom of an oven or heating-chamber J . The top of said heating-chamber is formed by a flat plate K , which is provided upon three of its margins with depending flanges $k k k$, forming walls to the oven J . At its corners the plate J is provided with tubular posts $k' k' k'$, which are cast integral with said plate K , and through which pass the posts $D D$. The nuts $D' D'$ rest against the said posts $k' k'$, and the pressure of said nuts is transmitted through the posts to the top plate B' of the follower. The central screw-shaft F is in this instance connected with and arranged to act on the plate K , which latter plate is made sufficiently rigid to prevent its being bent or yielding under the pressure of said screw-shaft. The pressure of said screw-shaft in no case, however, need be very great, and it is not therefore necessary to make said plate inconveniently thick or heavy, the principal strain coming on the press being taken by the posts $D D$ and nuts $D' D'$, as above set forth.

The oven J is heated by the steam contained within the recessed follower B , the heat arising from the upper surface of said follower being ample in quantity for drying the matrices placed in the oven, while having the uniform and moderate temperature most suitable for the purpose.

The oven J is herein shown as being open at its front side; but a door may be arranged to close the opening formed by the omission of the front wall in cases where some means for closing such opening may be desired or preferred.

An important feature of my invention is embraced in the construction wherein the yoke E has a limited vertical movement relatively to the posts $D D$, so as to allow the follower to be depressed by means of the nuts $D' D'$ independently of the central screw-shaft. The same result may, however, be obtained by a similar connection involving provision for lost motion between the yoke and the central screw-shaft, or between the said screw-shaft and the follower. I therefore

claim, broadly, the parts referred to when constructed to afford lost motion at some point between the posts D D and the follower, without restriction to the particular construction 5 illustrated.

I do not wish to limit myself to the precise construction herein illustrated, as many mechanical changes may be made therein without departing from the principle of my invention. For example, I may not make the recessed platen A of separable upper and lower plates; but in some cases I cast the same integral, coring out the recess. I also in some cases cast the upper platen or follower 15 lower integral with the walls of the oven J.

The advantages of the present construction, wherein the burner and water-receptacle are supported from the same legs or standards which support the lower platen, over those devices in which the burner is supported independently of the other parts of the apparatus are greater simplicity in construction and more compactness.

I claim as my invention—

25 1. A press for the purpose set forth, comprising a stationary platen the lower wall of which is provided with a depending water-receptacle in communication with the hollow interior of the platen, a second hollow movable platen or follower the interior of which is in communication with the platen first mentioned, stationary guides for the movable platen, and mechanism operating independently of the steam-pressure within the platen 35 for forcing the movable platen toward the stationary platen, substantially as described.

2. The combination, with a recessed or hollow platen provided with a depending water-receptacle in communication with the recess 40 thereof and forming a steam-generator, of a superposed movable platen having steam con-

nection with the first platen, mechanism independent of the steam-pressure for moving said platen, supporting legs or standards attached to the lower platen, and a burner sustained upon said legs or standards beneath the water-receptacle of the lower platen, substantially as described. 45

3. The combination, with a platen and movable follower, of screw-threaded posts secured to the platen, a yoke connected with said posts, a screw-threaded shaft engaging said yoke and acting upon the follower or upper platen, and nuts placed upon said posts above the follower, said posts, yoke, screw-shaft, and follower being connected with each other by means affording lost motion between the follower and posts, substantially as described. 55

4. The combination, with the recessed platen and recessed follower and a steam-generator communicating with the recesses of said platen and follower, of top and side walls located over the said follower and forming with the top of the latter a drying-oven, substantially as described. 65

5. The combination, with the hollow platen A and follower or platen B, of the posts D D, nuts D' D' thereon, a horizontal plate K, located above the follower, tubular posts k' k', surrounding the posts D D, and walls k k', located between the said follower and the plate K, said plate and walls forming with the follower a drying-oven, substantially as described. 70

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses. 75

LOUIS K. SCOTFORD.

Witnesses:

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