

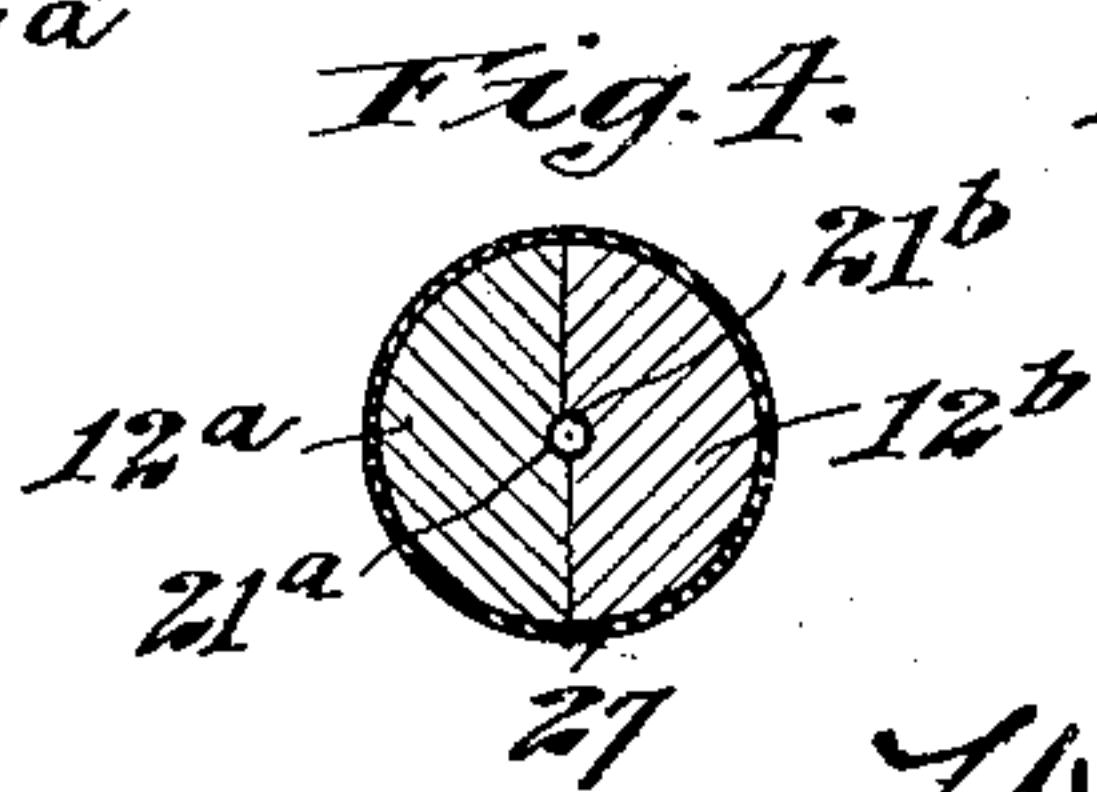
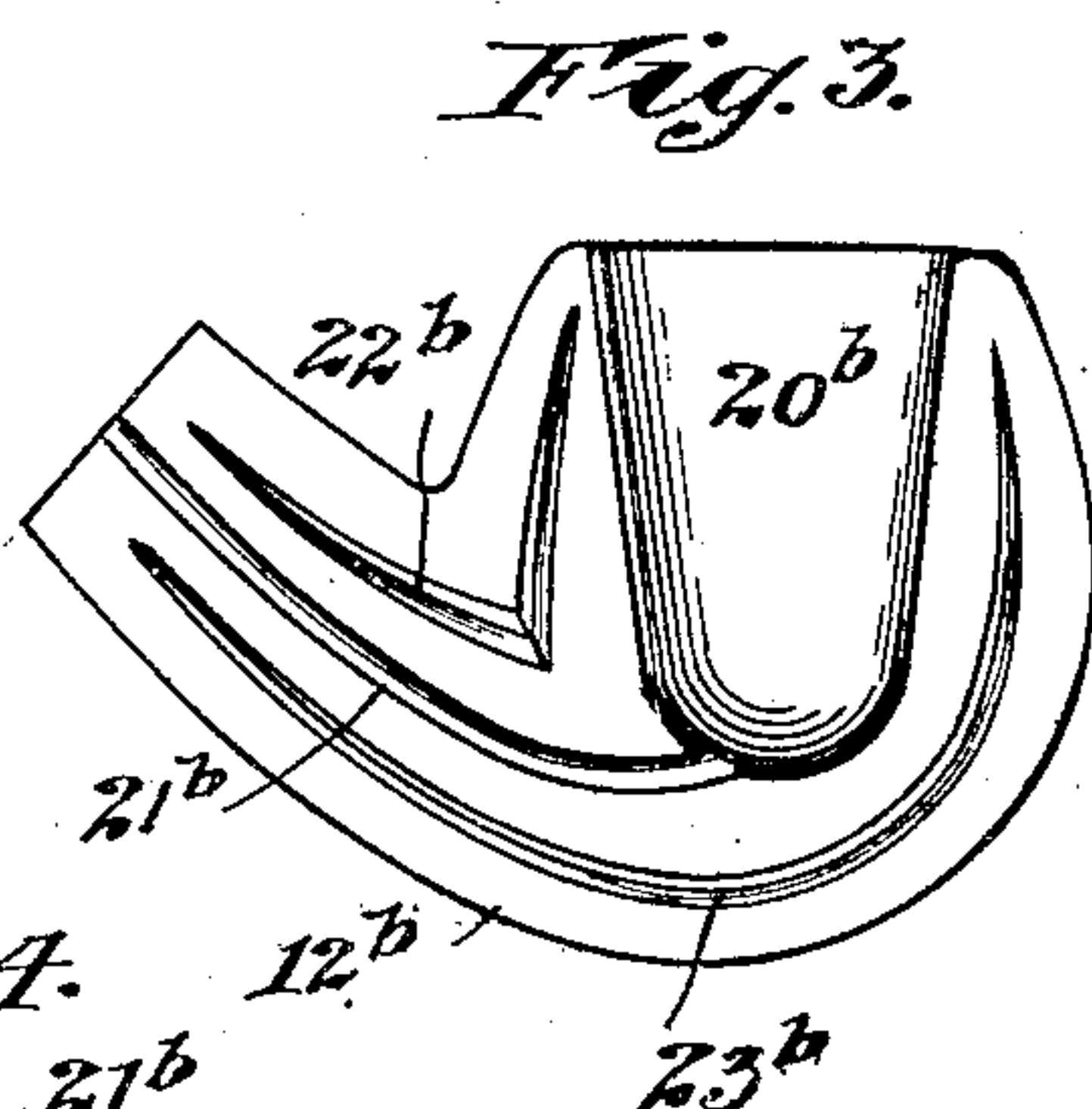
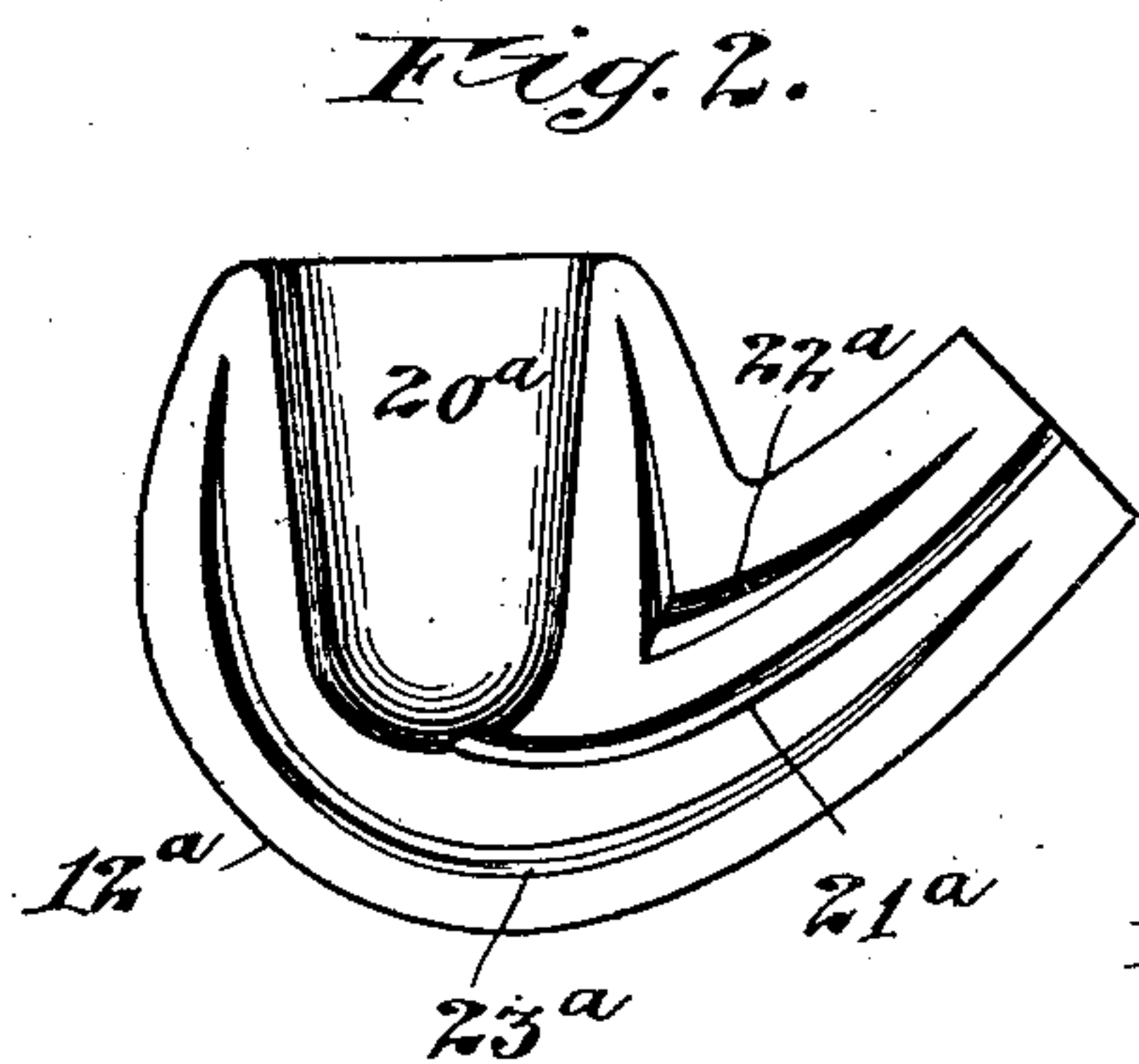
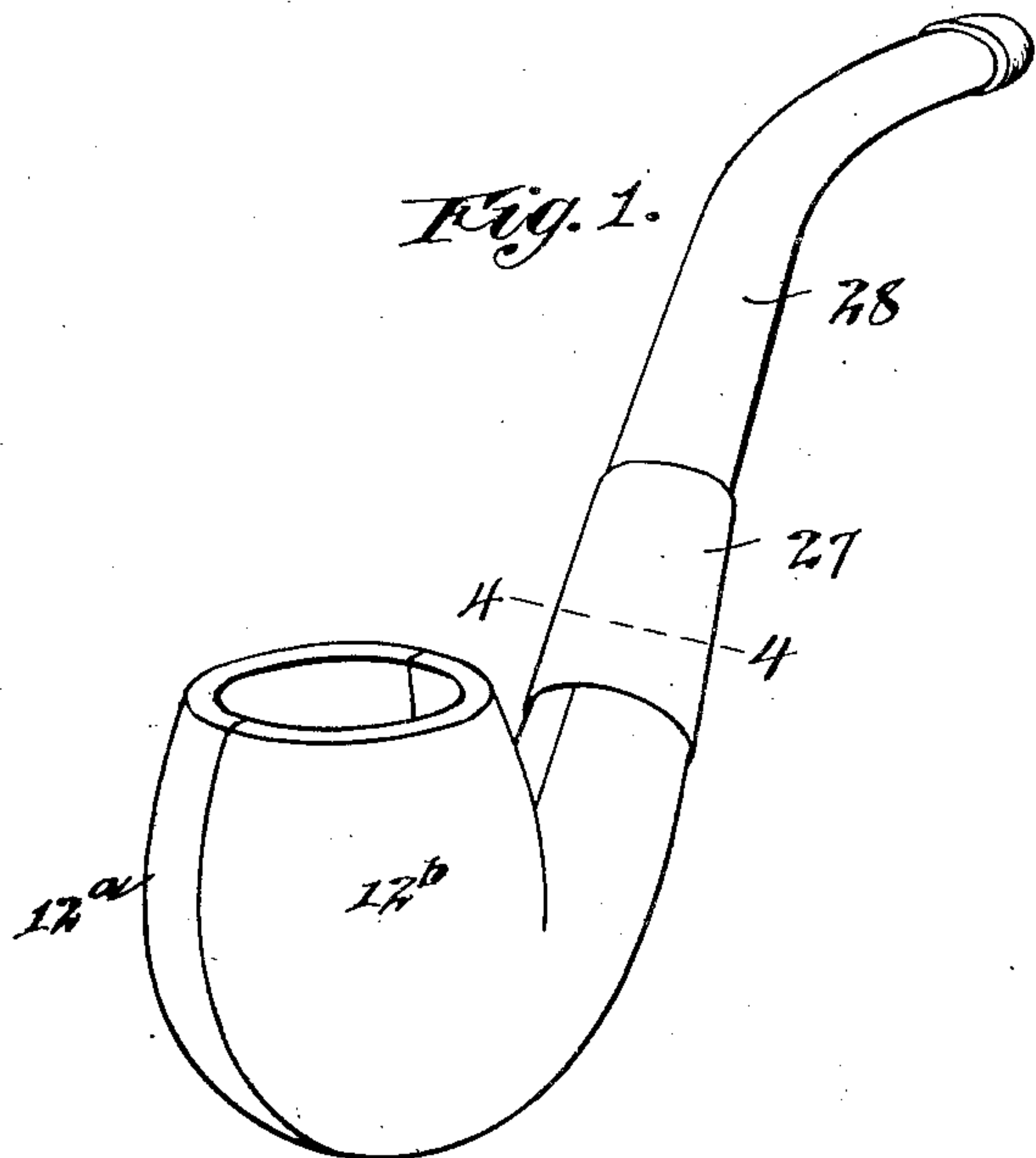
W. C. CUNNINGHAM.

PROCESS OF MANUFACTURING SMOKING PIPES.

(Application filed Mar. 21, 1902.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 5.

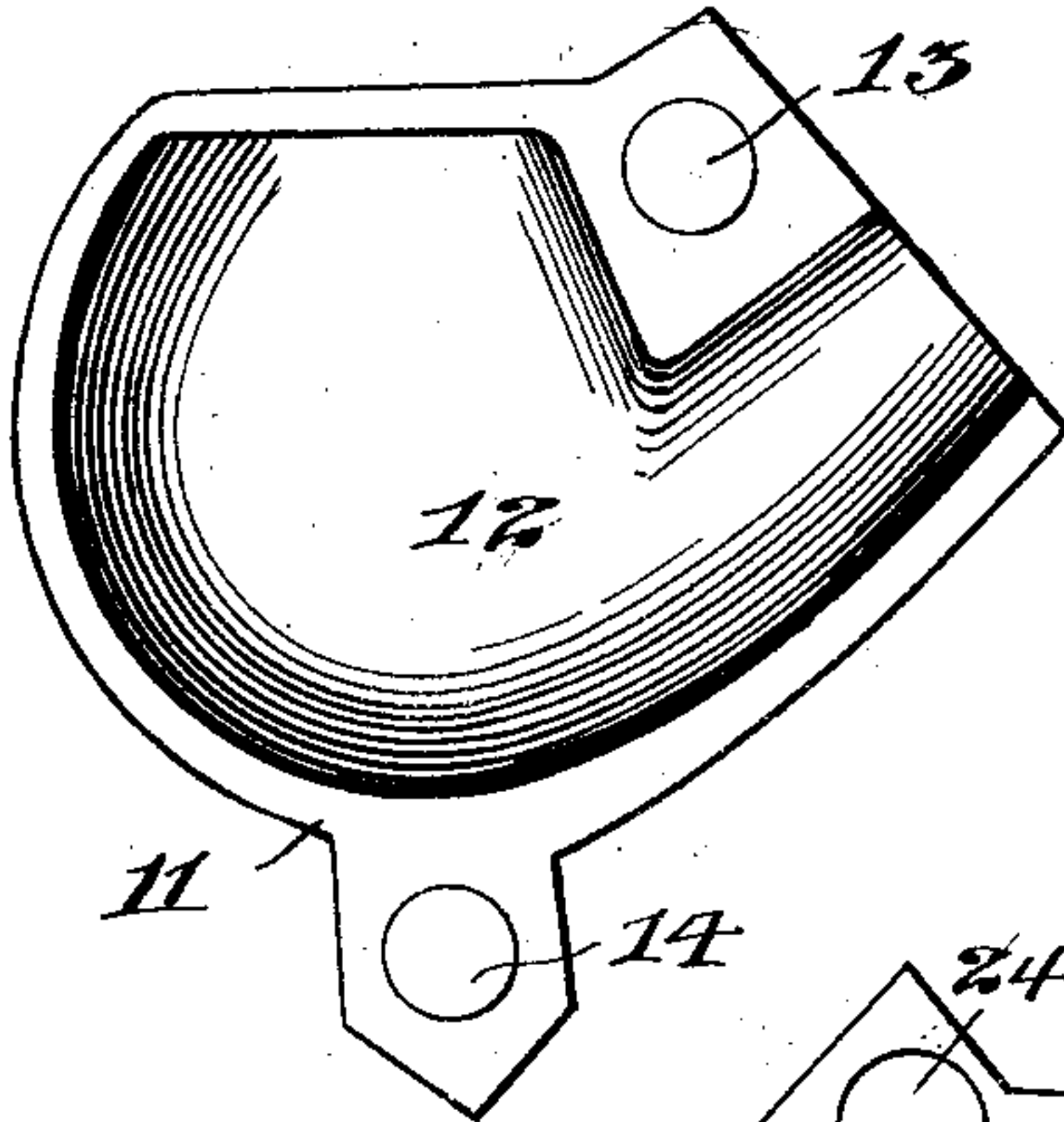


Fig. 6.

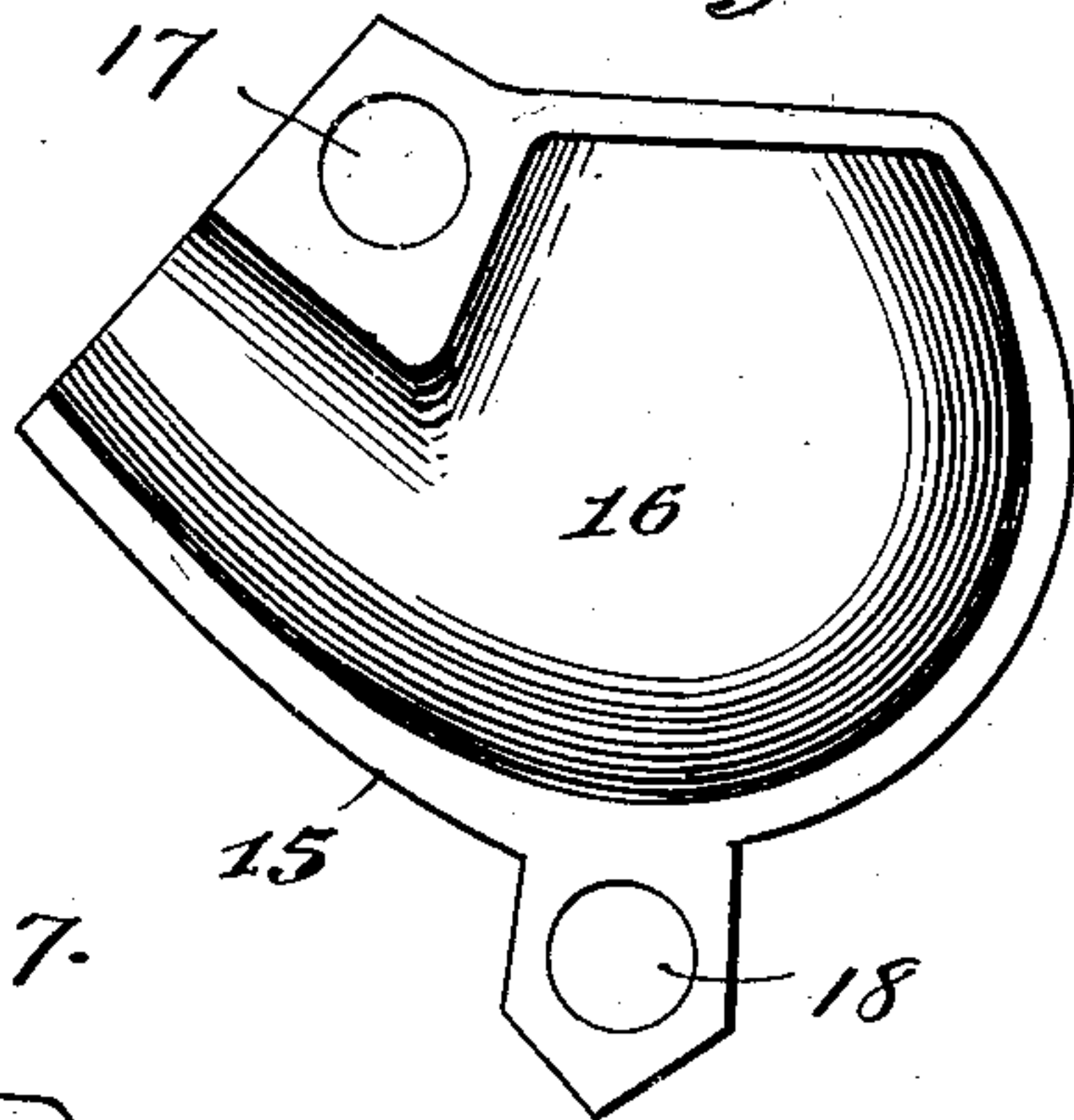


Fig. 7.

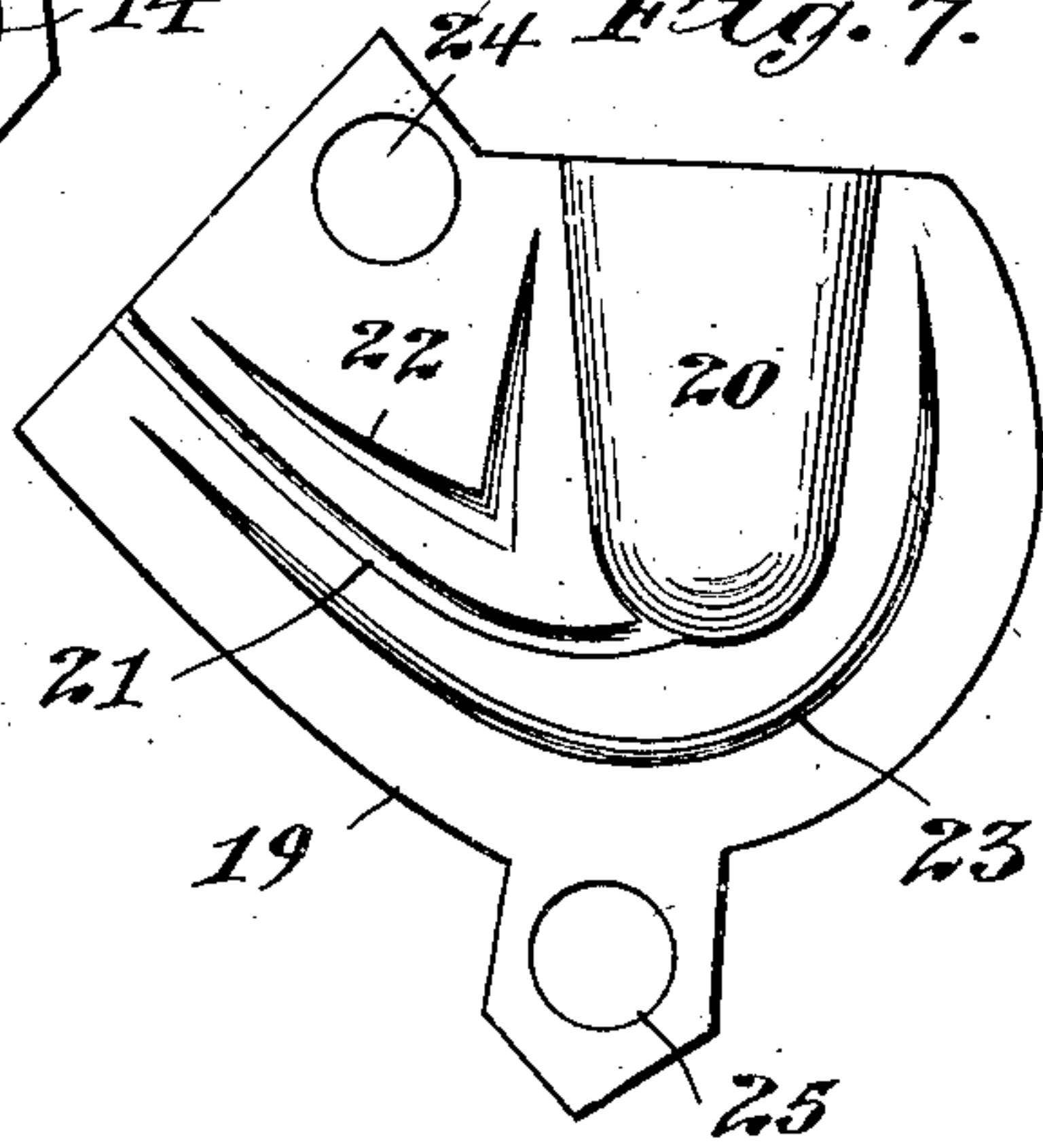


Fig. 9.

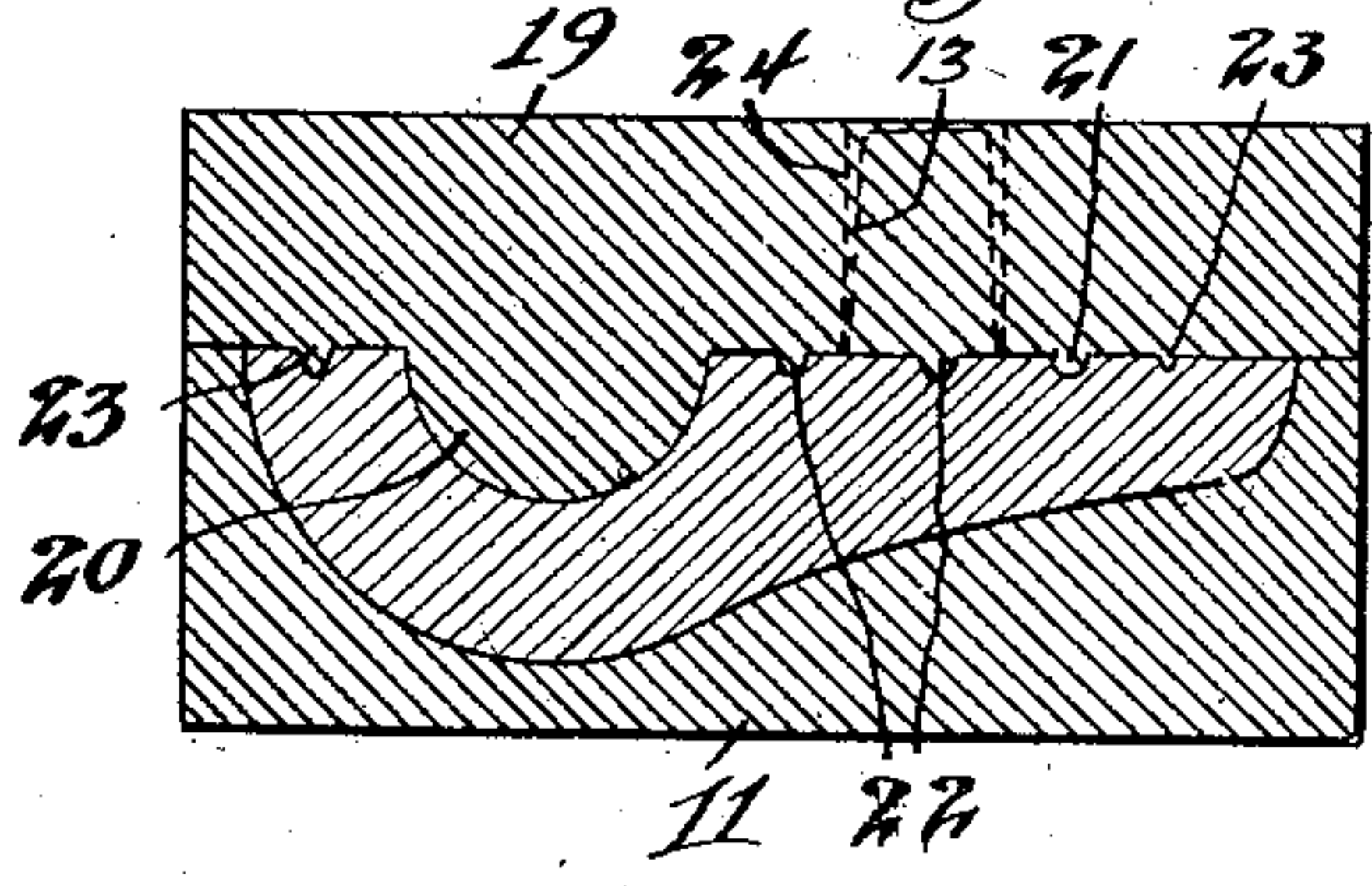


Fig. 10.

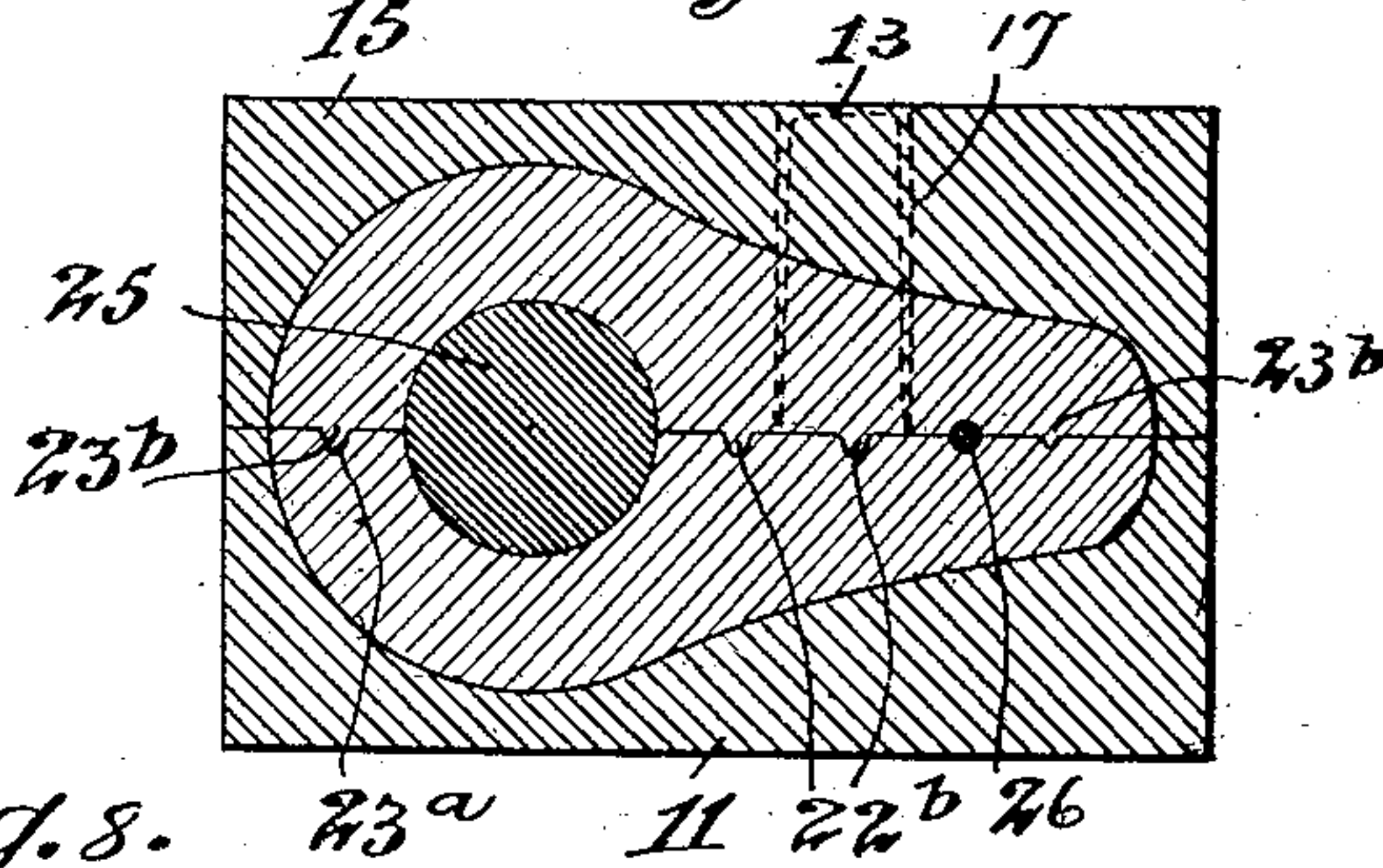
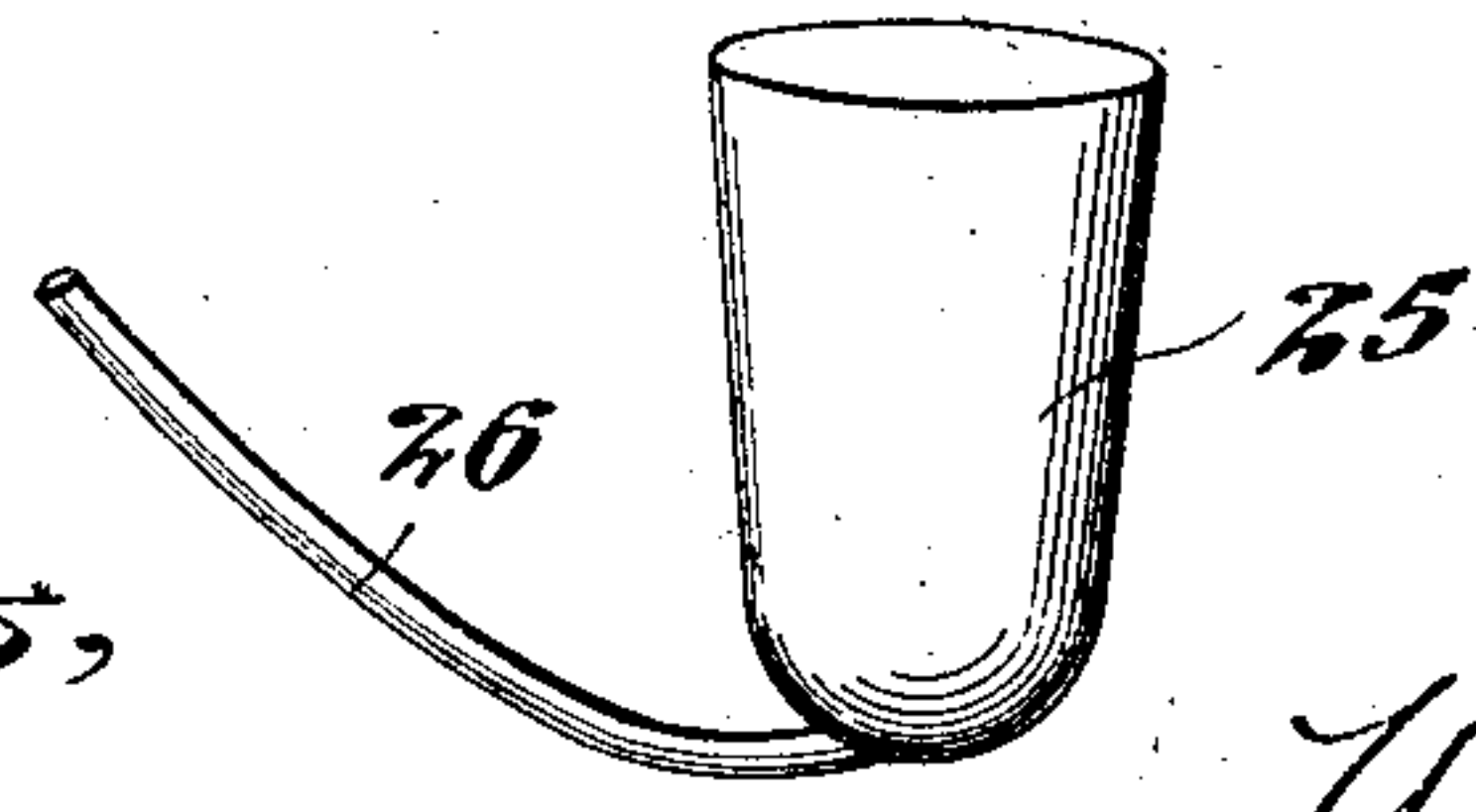


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PROCESS OF MANUFACTURING SMOKING-PIPES.

SPECIFICATION forming part of Letters Patent No. 702,708, dated June 17, 1902.

Application filed March 21, 1902. Serial No. 99,242. (No model.)

To all whom it may concern:

Be it known that I, WALTER C. CUNNINGHAM, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new, useful, and Improved Process of Manufacturing Smoking-Pipes, of which the following is a specification.

This invention has relation to that class of smoking-pipes in which the bowl and its shank are divided lengthwise of the pipe into two companion sections which are detachably interlocked, so that upon separating the sections the interior of the bowl and the smoke-passage are exposed and can be conveniently and thoroughly cleansed. Pipes of this general character are illustrated in Letters Patent of the United States No. 628,395, granted to me July 4, 1899, and in Letters Patent of the United States No. 665,187, granted to me January 1, 1901.

The object of my present invention is to produce an improved pipe of the character specified, which object is carried out through the employment of a new and improved method or process of manufacturing such a pipe, which method or process constitutes the subject-matter of my present invention.

In carrying out the process of manufacture involved in my present invention I separately form the constituent elements of the pipe by the operations of molding. I have discovered that in order to secure accurate and satisfactory results in the manufacture of a molded pipe the constituent elements of the pipe should be formed or cast in a certain order and in a certain intimate relation to and association with each other.

My invention therefore resides in a process or method of manufacture which has as its most salient feature the molding of the pipe-bowl and its shank successively in contacting mating sections which are adapted to register with each other.

My invention further consists in the above-described process of manufacture, wherein the several operations are carried out in a certain order and the separable elements of the device are formed in a certain relation to each other.

In the accompanying drawings, Figure 1 is a perspective view of a divided or open pipe the bowl and shank of which are formed by my improved process of manufacture. Figs. 2 and 3 are side elevational views illustrating the cooperating faces of the companion halves of the bowl. Fig. 4 is a cross-section on the line 4 4 of Fig. 1. Figs. 5, 6, and 7 are detail plan views of interchangeable and cooperating members of a mold, whereby my invention may be carried out. Fig. 8 is a detail side elevation of a core-block or displacer which is adapted to cooperate with the members of the mold in the production of the pipe; and Figs. 9 and 10 are cross-sectional views through different cooperating members of the mold, illustrating the order and manner in which the mating halves of the pipe bowl and stem are formed.

I will first describe the structure and formation of the mold members by the aid of which my present invention is carried out, and will then describe the manner or process of forming the article thereby.

Referring to Fig. 5, 11 designates a mold member, which may conveniently and cheaply be made of lead, clay, or any other suitable material and which has a bed 12, shaped to conform to the external contour of a longitudinal half of a pipe bowl and shank. The mold member also preferably has on opposite sides of the open face thereof a pair of upstanding pins 13 and 14. In Fig. 6 is shown a companion mold member, (designated as an entirety by 15,) which mold member is provided with a bed 16, shaped to conform to the external contour of the other longitudinal half of the bowl and shank and having on the opposite sides of the face thereof a pair of sockets or holes 17 and 18, adapted when the two members are brought into mating juxtaposition to be entered by the pins 13 and 14, respectively, of the member 11.

Fig. 7 represents a third mold member, which is designated as an entirety by 19. This member has formed upon its upper face a displacer 20, which conforms in respect to size, external contour, and location with the size, form, and relative location of one-half of the chamber of the pipe-bowl. It has also

formed thereon a rib 21, which conforms in size, external contour, and relative location to the size, contour, and location of the smoke-passage in the bowl and shank of the pipe.

5 The mold member 19 is still further provided with a pair of ribs 22 and 23, located on either side of the rib 21 and between the latter and the outer margins of the mold. The ribs 21, 22, and 23 have the same function as the displacer 20 to displace the material which in
10 the molding operation lies directly opposite and in the path of said projections. The mold member 19 also has a pair of sockets or holes 24 and 25, corresponding in relative location
15 to the similar sockets and holes 17 and 18 of the member 15.

Referring now to Fig. 8, 25 designates a core-block or displacer, which may be made of the same material as that of the molds.
20 The dimensions and external contour of this core-block correspond with the dimensions and form of the complete chamber of the bowl, and to the lower end of the core-block is connected a tail-like extension 26, which in the
25 operation of molding is adapted to form the smoke-passage in one-half of the bowl and shank and which corresponds in form, dimensions, and relative location to the core-block to the form and dimensions of the complete
30 smoke-passage and its location relatively to the chamber of the bowl.

The operation of molding and forming the pipe with the aid of the implements hereinabove described is carried out as follows: A
35 suitable quantity of plaster-of-paris is mixed with the required amount of water to reduce the same to a sufficiently plastic condition for molding purposes and is preferably colored with a solution of Bismarck brown. A suitable
40 quantity of this material is then packed in the chamber 12 of the drag 11, said chamber being filled until the upper surface of the material is flush or substantially flush with the top of the walls of the drag. The top sur-
45 face of the material in the drag 11 is then oiled, after which the cope member 19 of the mold is deposited face downward upon the filled drag, the holes 24 and 25 being carried down over the dowel-pins 13 and 14 to insure
50 an accurate registration of the two mold members, after which a sufficient pressure is applied to the top or back of the cope to force the margins of its face into contact with the corresponding meeting margins of the drag,
55 all as plainly shown in Fig. 9. The mold, with its contents, is then allowed to rest about ten minutes, which insures a proper set and hardening of the material. Upon then removing the cope the molded and set material
60 lying in the drag will be found to possess the form of a half-section of the pipe bowl and shank, such as is illustrated and designated as an entirety by 12^a in Fig. 2, the several displacers 20, 21, 22, and 23 of the cope hav-
65 ing formed a hemibowl-chamber 20^a, a hemismoke-passage 21^a, and joint-grooves 22^a and 23^a, respectively, in the manner plainly indi-

cated in Fig. 9. The indented and cham-bered top surface of the pipe-section 12^a without removal from the drag is then oiled, 7c
after which the core-plug 25 and its connected tailpiece 26 are laid in the chamber 20^a and smoke-passage 21^a, the lower longitudinal halves of said parts just filling the said indentations and their upper longitudinal 75
halves lying above the plane of the top surface of the already-molded pipe-section, as plainly shown in Fig. 10, and occupying the proper relative positions to serve as dis-
80 placers for the companion section of the pipe in the second molding operation, now to be described. The third mold member 15, which, like the member 19, possesses the character of a cope member, is then filled with similar
85 plastic material in precisely the manner already described in connection with the loading of the drag member 11. The exposed flat surface of this material having been oiled, the loaded cope 15 is inverted and deposited
90 face downward upon the drag 11 and its contents, which, it will be remembered, consist of the already-formed pipe-section 12^a and the core-block 25 and tailpiece 26, seated therein. The sockets 17 and 18 of the member 15 are
95 carried down over the dowel-pins 13 and 14 of the drag in order to insure an accurate registration of the meeting faces of the two mold members, after which pressure is applied to the top
100 or back of the member 15, forcing the edges of its containing-walls down into contact or substantial contact with the corresponding
and mating edges of the containing-walls of the underlying drag in the manner clearly
105 evident from Fig. 10. In this operation it will be observed that the core-block 25 dis-places and compresses the plastic material of the upper section 12^b, Fig. 3, of the bowl be-
110 ing molded, forming therein the hemibowl-chamber 20^b, while the tailpiece 26 in the same manner forms the hemismoke-passage 21^b, which communicates with the lower end of the
115 hemibowl-chamber. In this operation of pressing together the meeting faces of the hard and soft pipe-sections the plastic material of the latter section enters and fills the oiled locking-grooves 22^a and 23^a of the hard-
120 ened and already-formed pipe-section 12^a, thus creating on the face of the later-formed sections 12^b upstanding ribs 22^b and 23^b, which exactly conform to and fit the mating grooves
125 22^a and 23^a, forming therewith an interfitting and virtually air-tight joint when the companion halves of the pipe bowl and shank are connected, as shown in Fig. 1. The mold and its contents are then allowed to rest about ten
130 minutes, which effects a complete hardening and set of the upper section, after which the mold is opened by separating the two sections thereof and the contents removed. The molded and hardened pipe-sections after re-
moval from the mold are then dipped in boiled linseed-oil or melted paraffin-wax or some
other equivalent hardening and preserving medium, which penetrates and fills all the

fine interstices in the surface of the material and gives to the latter a smooth, hardened, and finished appearance and in connection with the coloring-matter produces in the finished article an appearance closely resembling that of French brier and similar forms of wood from which pipe-bowls are extensively made. This done, the two sections thus molded and finished may be united in complete pipe form, as illustrated in Fig. 1, by the application of a suitable clamping-ferrule 27, connecting said shank with a stem and mouthpiece 28. By virtue of the described method of molding the two sections one on top of and in contact with the other the fit between the meeting faces is rendered so perfect as to form an air-tight joint thereat, which in an article of this character is a prime necessity, while the interlocking ribs and grooves effectually prevent any relative sliding movement or displacement between the meeting faces of the sections.

From the foregoing it will be seen that the important and salient feature of my improved process of manufacturing a molded pipe-bowl resides not alone in the molding of the same in separate mating and interfitting sections or halves, but also in molding said halves by successive as distinguished from simultaneous operations, and, furthermore, in molding one section upon the other previously molded and hardened section, whereby the mating and interfitting elements of one section receive their form and character from the companion mating or interfitting elements of the other section, so as to effect therewith an exceedingly-intimate and practically perfect and air-tight joint. I have found from repeated experiments and failures that in order to secure an interfitting joint between the contacting faces of the two sections of an open or divided pipe it is essential to mold the face of one section directly upon the opposing and previously-molded face of the other section. My experience has satisfied me that it is impossible to mold two such sections as are shown in Figs. 2 and 3 in two separate and independent molds, for the principal reason that it is practically impossible to make two such molds such perfect counterparts of each other as that the resulting products therefrom will perfectly interfit each other to the extent required for the purposes of such an article as that herein de-

scribed. What I regard, therefore, as the most important step in my present process of manufacturing pipes of this type consists in the molding of one section directly upon and against the opposing meeting face of the other section previously molded and hardened, whereby results are secured that can be obtained in no other way.

It will be observed that so far as the formation of the interfitting ribs and grooves is concerned the ribs might be formed on the section 12^a instead of the grooves in the first molding operation, the result of which would be that grooves instead of ribs would be formed on the section 12^b in the second molding operation. Such a modification in the process would be self-evident and fully within the scope of my invention.

I claim—

1. The herein-described improvement in the art of making open smoking-pipes, which consists in first molding a section of the bowl and its shank, subsequently molding the companion section of the bowl and its shank with its inner face against and in contact with the inner face of the section first molded, and finally separably uniting said sections in operative and complete form, substantially as described.

2. The herein-described improvement in the art of making open smoking-pipes, which consists in first molding a longitudinal half-section of the bowl and its shank, subsequently molding the companion half-section of the bowl and shank with its inner face against and in contact with the inner face of the section first molded, and finally separably uniting said sections in operative and complete form, substantially as described.

3. The herein-described improvement in the art of making open smoking-pipes, which consists in first molding a longitudinal half-section of the bowl and its shank, then molding the companion half-section of the bowl and shank with its inner face against and in contact with the inner face of the section first molded, then subjecting the molded and hardened sections to an oil-bath, and finally separably uniting said sections in operative and complete form, substantially as described.

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