

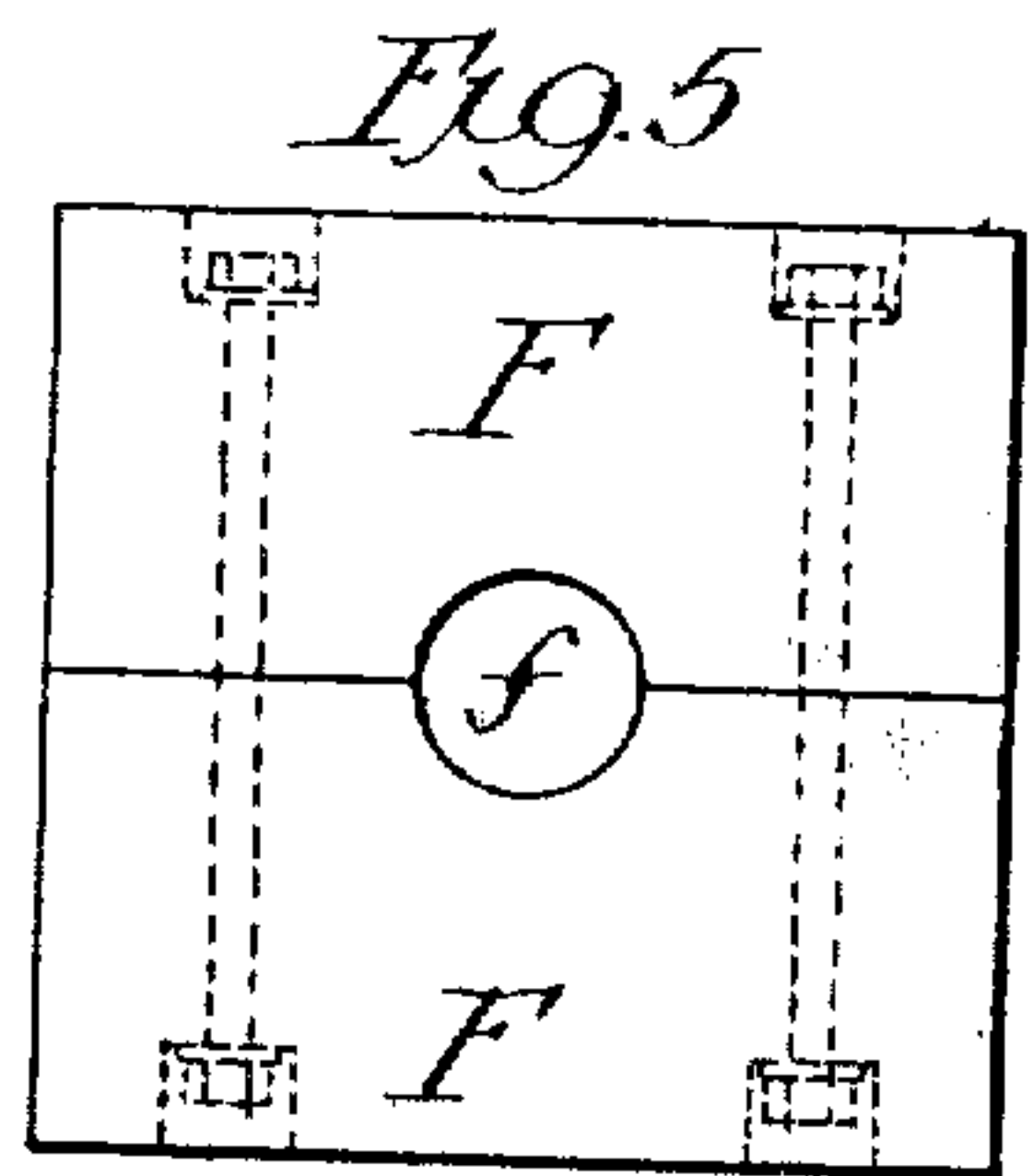
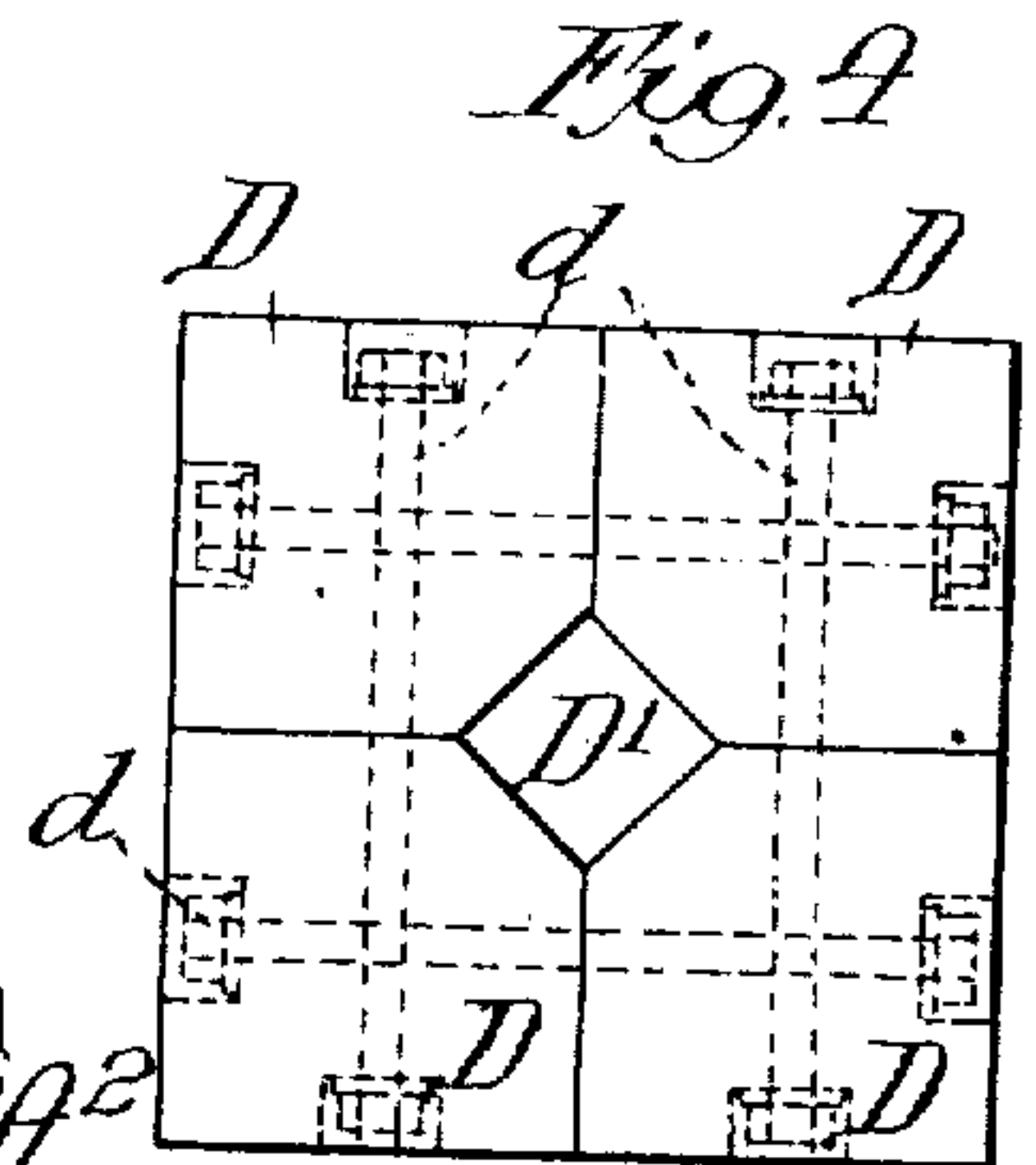
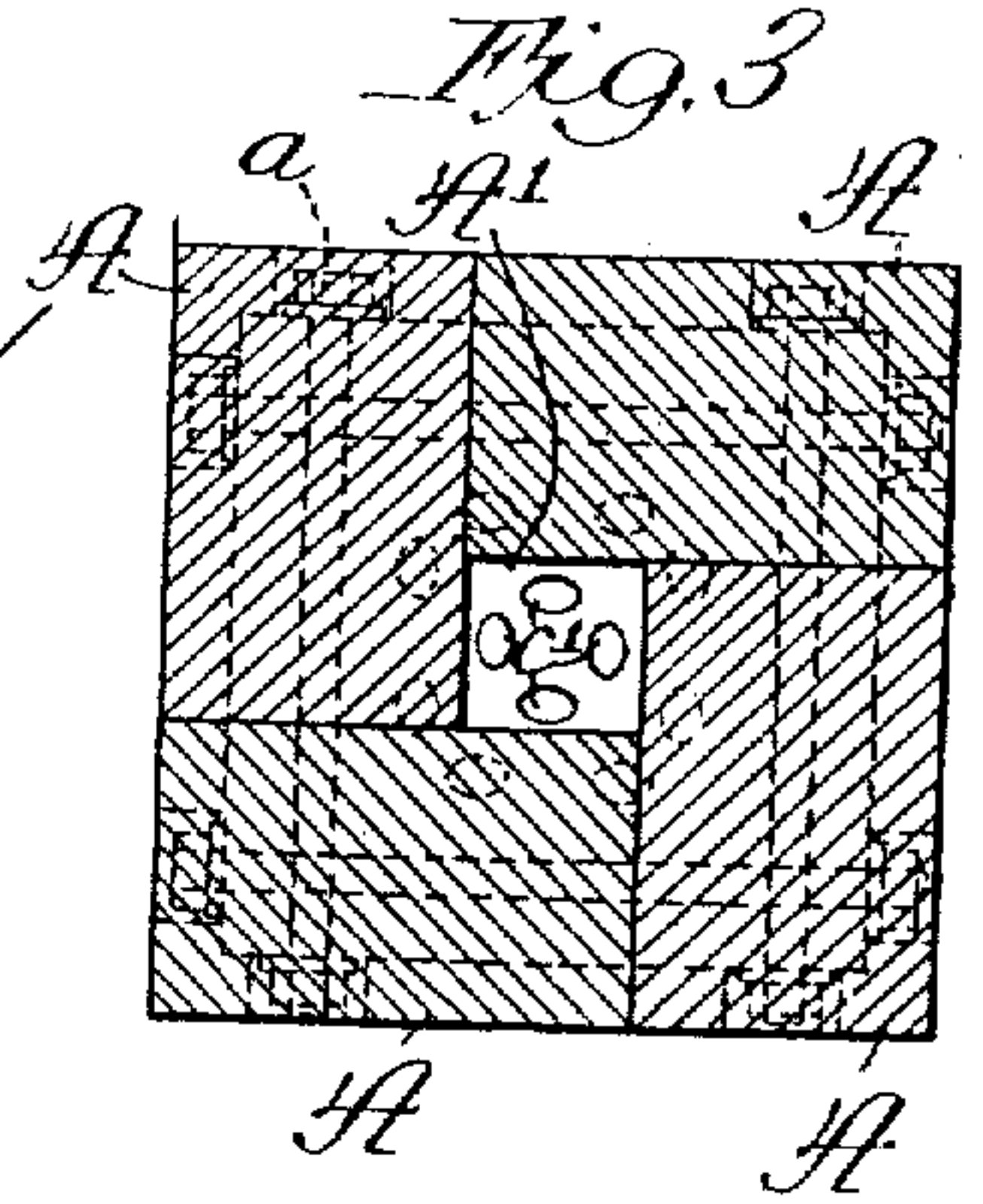
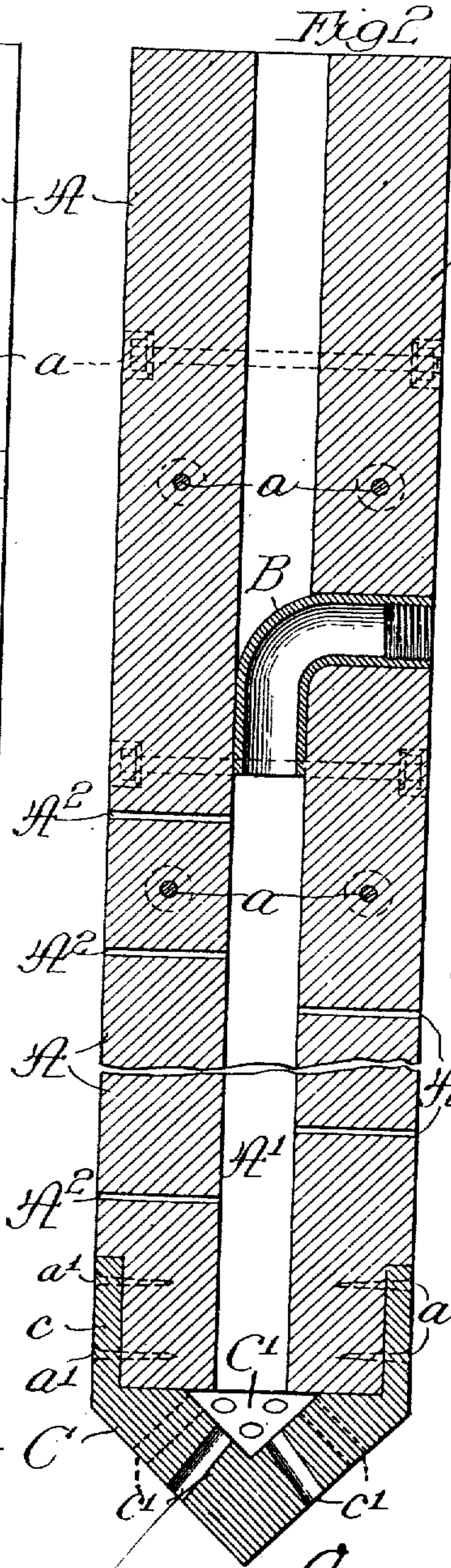
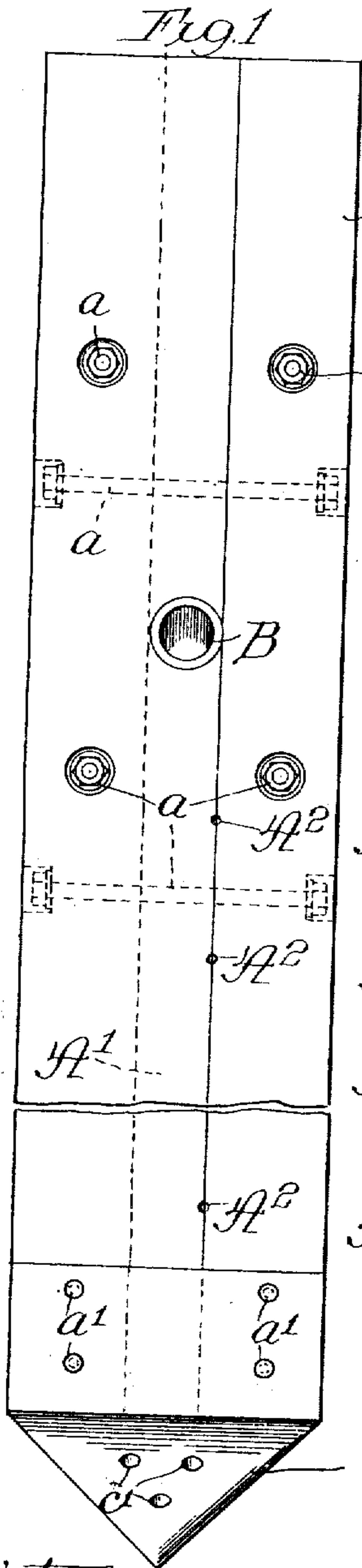
No. 841,762.

PATENTED JAN. 22, 1907.

O. BATES.
PILE.

APPLICATION FILED SEPT. 26, 1905.

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*For feeding
water and
grout.*

UNITED STATES PATENT OFFICE.

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PILE.

No. 841,762.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed September 26, 1905. Serial No. 280,143.

To all whom it may concern:

Be it known that I, ONWARD BATES, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain
5 new and useful Improvements in Piles, of which the following is a specification.

My invention relates to the construction or formation of piles; and in general terms the object thereof is to produce a pile com-
10 posed or built up of wooden members or sections (preferably commercial sizes of timbers) secured together and treated with cement, if desired, and to provide a novel
15 means for facilitating the sinking or the withdrawing of such pile and forming such cemented pile.

In the present instance my improved pile consists of two or more pieces of commercial timber bolted together and provided at their
20 junction and longitudinal of the pile with a passage for the jetting of fluid, (water, steam, or air,) which is arranged to be discharged at the foot or point of the pile or along the sides of such pile, or both at the foot and along the
25 sides thereof, to aid in sinking the pile in sand, earth, clay, or other soils, and to aid in removing the pile when desired after it has been sunk in such materials.

My invention also contemplates the employment of Portland or natural cement or grout which is forced through the longitudinal jetting-passage in the pile and through
30 vents or jet openings at the foot of the pile and along its sides into the surrounding material for the purpose of solidifying such material and forming a casing therefor.

The various features of advantage and utility of my improved pile will be apparent from the description hereinafter given.

40 In the drawings, Figure 1 is an elevation of a pile constructed according to my invention. Fig. 2 is a central vertical elevation of such pile. Fig. 3 is a transverse section thereof; Fig. 4, a transverse section of a constructional pile modified as respects the formation
45 of the longitudinal jetting-passage, and Fig. 5 a modification of the pile in which the same is composed of two timbers.

Referring to the embodiment of my invention as disclosed in Figs. 1, 2, and 3 of the
50 drawings, the pile, which may be made of any desired length, is formed of four similar wooden timbers or sections A, which in the present instance are of equal cross-sectional
55 area, the same being parallelograms in cross-

section. These timbers or sections are arranged and secured together in suitable manner, as by means of the series of bolts *a*, to provide around the central longitudinal axis of the pile a longitudinal jetting-passage A',
60 which according to the particular construction being described may extend the full length of the pile. Thus the jetting-passage is formed by merely assembling in proper
65 manner the four rectangular timbers without any cutting thereof. Inasmuch as a driving cap or ring is fitted to the upper end of the pile, it becomes necessary to lead the jetting-
70 passage laterally to one side of such pile at a point toward the upper end thereof. In the present instance I employ for this purpose an
75 elbow B, whose lower end is received within the jetting-passage and whose upper end extends laterally through one of the timbers A to form the side opening. This elbow is provided
80 at its outer end with screw-threads for the insertion of a hose-nipple or the like to form a hose connection for the delivery of the jetting fluid (water, steam, or air) to the central jetting-passage in the pile. Although
85 the jetting-passage, which is merely formed by the walls of the timbers themselves, will be found sufficient, it is obvious that a metal pipe might be inserted in such opening to form the jetting-passage.

As hereinbefore stated, the pile may be of any length desired; but in order to use commercial lengths of timber each section if required to be longer than such commercial
90 length may be built up of shorter timbers spliced together, the plan of pile with the four timbers providing in such case for the use of short timbers lapping each other with
95 only one-fourth of the cross-section of the pile cut into at any one place in its length and readily permitting piles to be built up of any length desired.

The lower end of the pile is provided with a shoe C, of metal or other suitable material, such pile being recessed at such lower end so
100 as to be received by the square flange *c* of the shoe and to preferably present a flush outer surface in connection therewith, as indicated in Figs. 1 and 2. This shoe may be securely
105 fastened to the timbers with spikes or bolts *a'* or the like to prevent any possibility of displacement from the foot of the pile by the pressure of the jetting fluid. As indicated in Figs. 2 and 3, the shoe is provided with a
110 socket or chamber C', which communicates

with the lower end of the jetting-passage A' and from which radiate a series of jet-openings c', through which the fluid is jetted to aid in the sinking of the pile.

5 My invention also contemplates the employment of jets along the length of the pile through openings extending from the jetting-passage A'. By preference I provide lateral jetting-passages A², conveniently formed in 10 one or the other or in both of the timbers at each joint or seam in the pile, although, as will be obvious, the seams themselves may be so open in the ordinary formation of the pile as to permit of sufficient passage of the 15 jetting fluid for the purposes desired, so that I do not intend to limit myself in this connection to the employment of the regularly-formed jetting-passages A² nor to jetting-passages formed at the seams, inasmuch as 20 any passage for conducting the jetting fluid from the longitudinal passage A' to the exterior of the pile along its length is entirely within the scope and meaning of my invention and claims.

25 In the form of pile illustrated in Figs. 1, 2, and 3 no shaping or cutting of the commercial timbers A is required for forming the jetting-passage A'; but as will be obvious from an inspection of Fig. 4 the pile may be 30 composed of timbers of other shapes, such as the four timbers D, assembled together and secured by the series of bolts d, so as to form the rectangular pile. The longitudinal jetting-passage D' in this instance is formed by 35 merely trimming or cutting off the inner corners of the timbers D before they are assembled and secured together in the manner explained.

40 Instead of being composed of four sections or members the pile may be composed of a less number, such as the two sections or timbers F, which are each grooved on their adjacent sides to form the longitudinal jetting-passage f, as illustrated in Fig. 5.

45 As shown in Fig. 2, the shoe C is provided with a series of jet-openings c', which are evenly distributed and balanced so as to discharge equally on all sides of the longitudinal axis of the pile, and thereby make it 50 possible to drive the pile with more precision as to location and more nearly vertical than with the ordinary jetting process. Moreover, with the holes or jet-openings arranged on the sloping sides of the shoe there 55 is less liability of their becoming clogged with earth, clay, wood, or other substances than in the case of a single hole at the point of the shoe, for in the first place there is less possibility of the entrance of such substances 60 into the openings, and in the second place it is not likely that all of the plurality of holes would become clogged or closed.

If desired, provision may be made for 65 drawing or pulling the pile in a certain direction during the process of sinking it by dis-

charging all or a major portion of the jetting fluid on one side of the pile or shoe, which will be the side toward which it is desired to draw or pull the pile laterally. This result may be brought about in several different 70 ways. For instance, the holes or jet-openings c' in the shoe may be formed on one side only thereof, so as to give a jet discharge on that side alone, or the form of shoe illustrated in the drawings may be utilized by plugging up 75 the holes on one or more sides, so as to leave open the jet-passages on that side only toward which it is desired to draw the pile laterally. Moreover, the result may be obtained by making the jet-passages on one 80 side more numerous or of greater carrying capacity than the jet-openings on the other sides.

When piles are sunk through sand, for instance, it is sometimes desirable to force cement into the sand in order that it may form 85 a concrete around the piles to incase and protect them and to hold them in place, and to this end the lateral jetting-passages in the sides of the piles, as well as the longitudinal 90 passage, is taken advantage of as a means for discharging the cement in the form of thin grout into the surrounding sand, it being understood that the pile is first sunk into the sand in the manner hereinbefore explained 95 and that the grout is subsequently forced into the jetting-passages in the manner just explained.

By the use of my invention I am enabled to build up a wooden pile of any suitable length 100 by simply using commercial lengths and forms of timbers and to provide in a simple manner means for jetting along the length of the pile and also at the bottom or foot thereof, with the result that the sinking of the pile is 105 facilitated by the jetting operation, and, moreover, the withdrawal of pile after being sunk is facilitated by again putting the jetting system of the pile in operation, unless, of course, the cement process above described 110 has been employed, in which event the jetting process cannot be taken advantage of in a withdrawing operation of the pile.

Although I have herein shown and described a square pile, yet it will be understood 115 that the same may be so built up as to be a parallelogram in cross-section by the employment of timbers such as those illustrated in Fig. 3, but relatively disposed or arranged as in Fig. 4, the dimensions and 120 cross-section of the pile depending upon the dimensions of the timbers employed.

I claim—

1. A pile made of sections each of which is shaped to form a part of a longitudinal jetting-passage, said sections having lateral jet-openings along their length. 125

2. A pile made of sections, each of which is shaped to form a part of a longitudinal jetting-passage, terminating at its lower end in 130

a series of radiating jet-openings, said sections having lateral jet-openings along their length.

3. A pile having a longitudinal jet-passage
5 and a shoe arranged at the lower end of such pile and having a chamber C' communicating with the jet-passage, said shoe also having a series of radiating jet-openings communicating with said chamber.
- 10 4. A pile composed of a series of longitudinal sections secured together to form the complete pile and having a longitudinal jet-passage formed at the junction of all of said sections.
- 15 5. A pile composed of a series of longitudinal sections secured together to form the complete pile and having a longitudinal jet-passage formed at the juncture of all of said sections, and a shoe fitting the lower end of the
20 pile and having radiating jet-openings communicating with said jet-passage.
- 25 6. A pile composed of a series of longitudinal sections secured together to form the complete pile and having a longitudinal jet-passage formed at the junction of all of said sections and an elbow communicating with the jet-passage near the upper end of the pile and extending laterally thereof for connection with the sources of jetting fluid.
- 30 7. A pile composed of a series of longitudinal sections or members which are equal parallelograms in cross-section and are so ar-

ranged and secured together as to form a longitudinal jet-passage around the central longitudinal axis of the pile.

8. A pile formed of a plurality of sections
35 secured together and having a jetting-passage and a shoe or point on the lower end thereof provided with jet-openings communicating with said passage and at that
40 side of the shoe toward which it is desired to draw the pile in the sinking operation.

9. A pile made in sections each of which is shaped to form a part of a longitudinal jetting-passage, and a pointed shoe provided on
45 a sloping side with jet-openings communicating with said passage.

10. A pile made in sections each of which is shaped to form a part of a longitudinal jetting-passage, and a pointed shoe provided
50 with jet-openings communicating with said passage and distributed evenly on the sloping sides of said shoe.

11. A pile made in sections each of which is shaped to form a part of a longitudinal
55 jetting-passage and lateral passages extending therefrom to the sides of the pile, and a shoe having a series of radially-directed jetting-passages communicating with said passage.

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