

A. R. CHAMBERS.
 PROTECTOR FOR BLOW-OFF PIPES.
 APPLICATION FILED JAN. 5, 1909.

940,427.

Patented Nov. 16, 1909.
 2 SHEETS—SHEET 1.

Fig. 1.

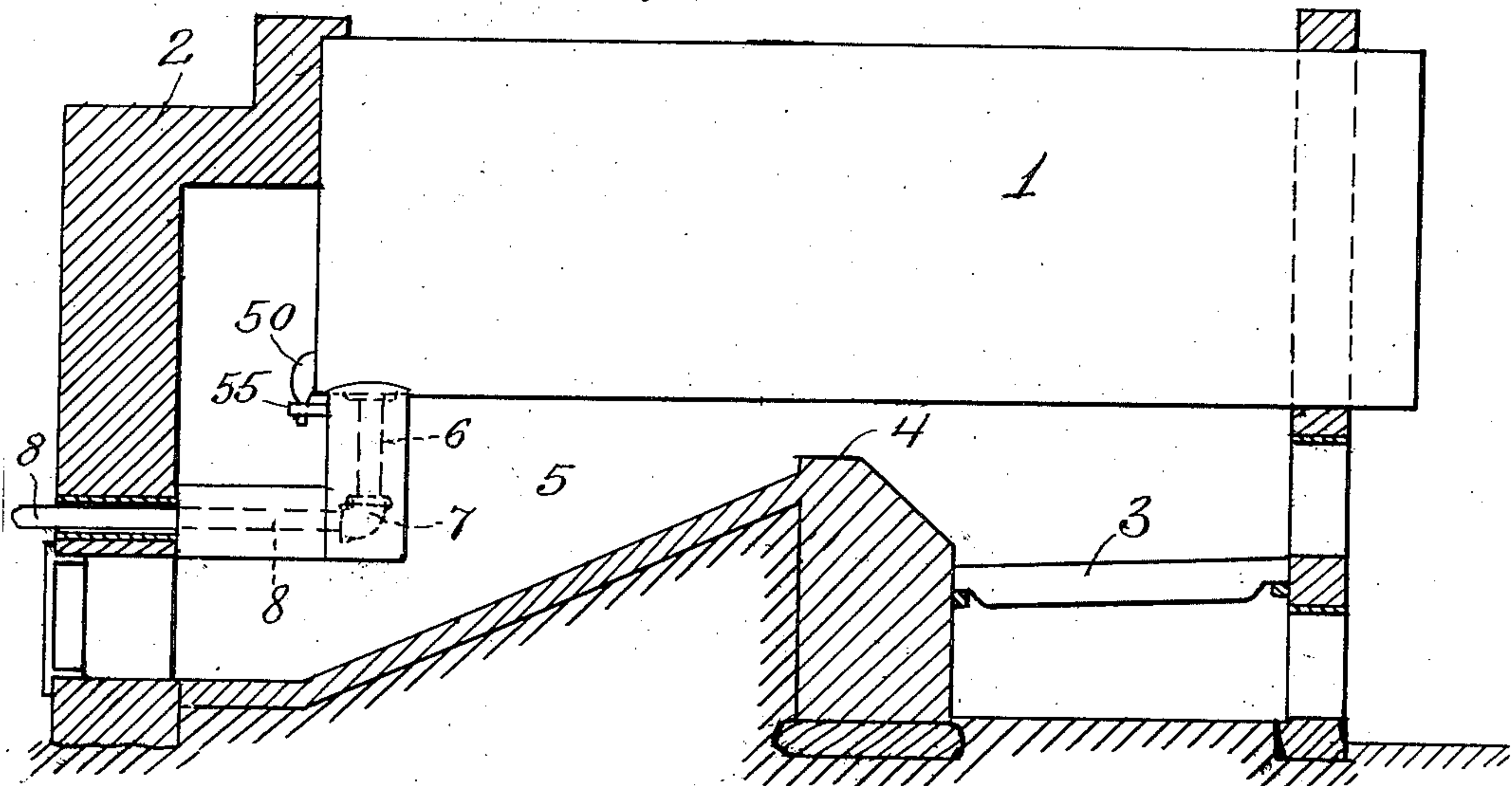


Fig. 2.

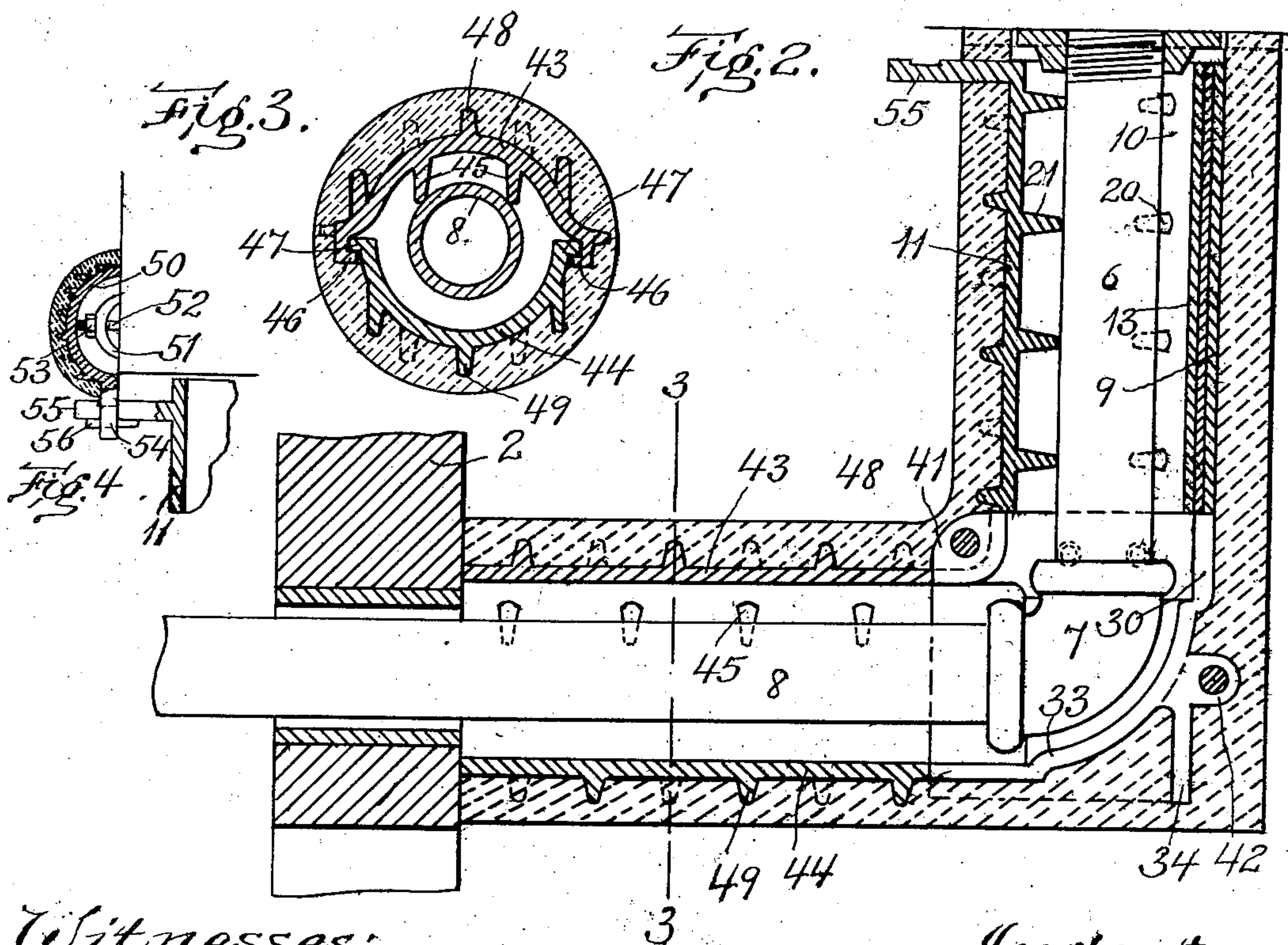


Fig. 3.

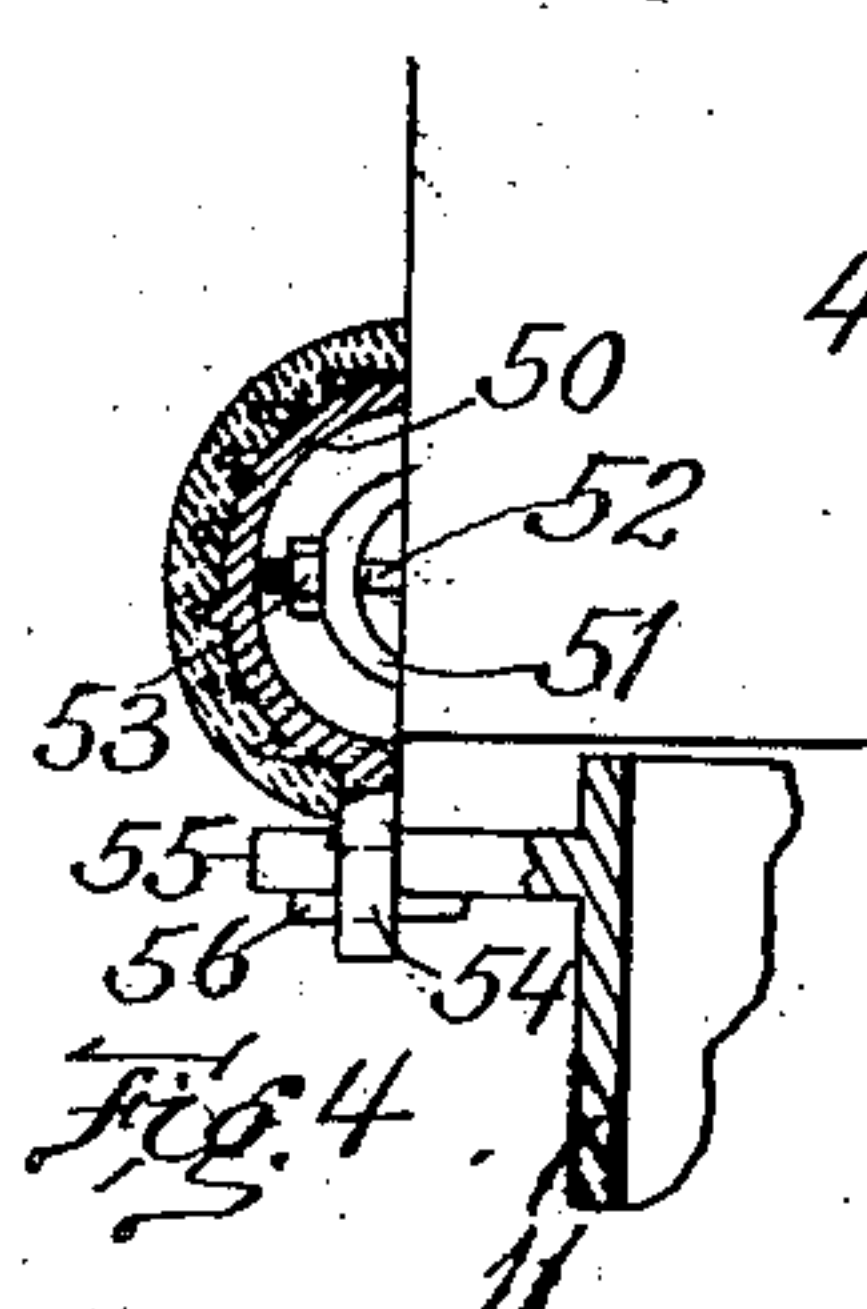


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 5.

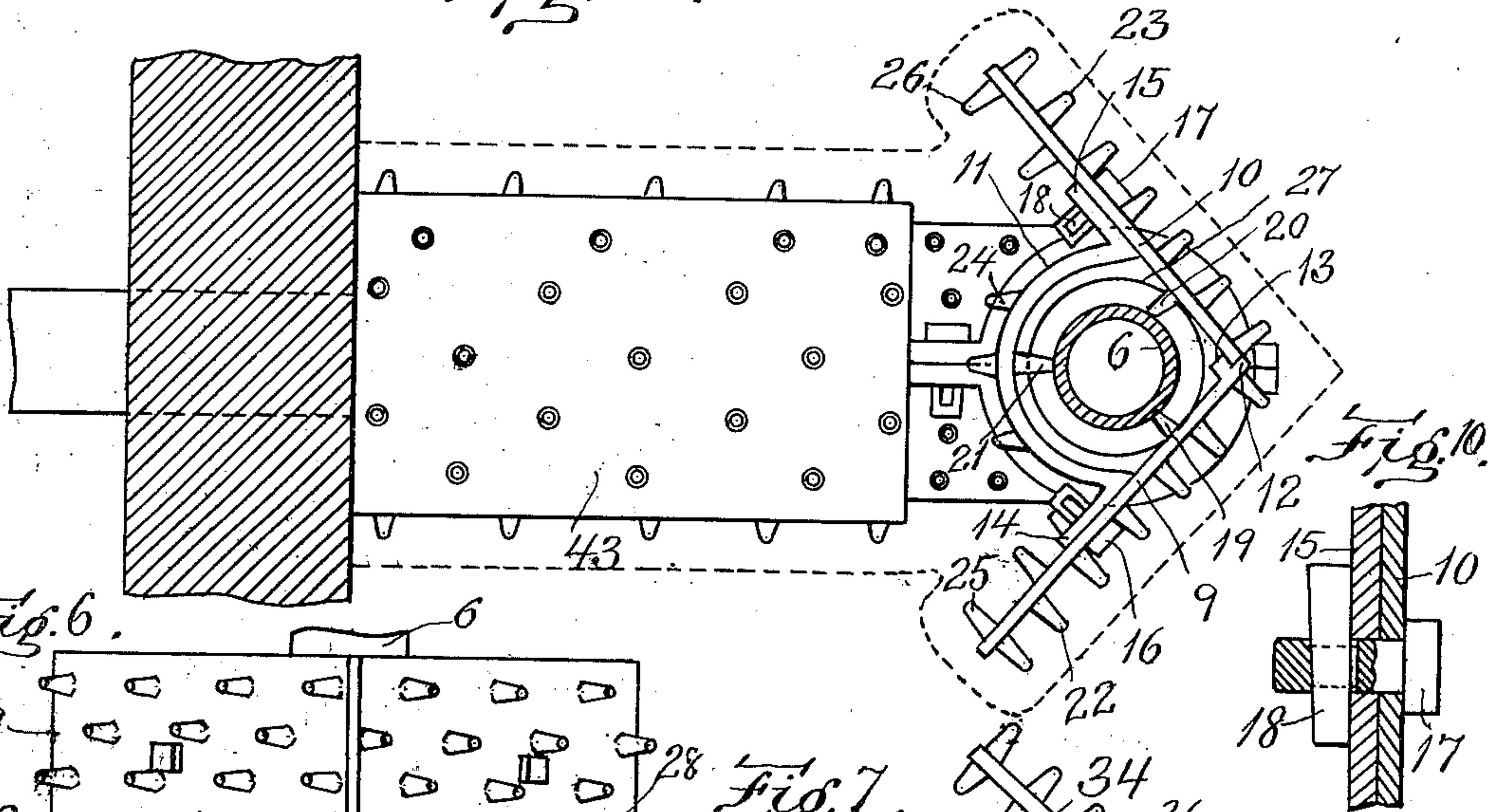


Fig. 6.

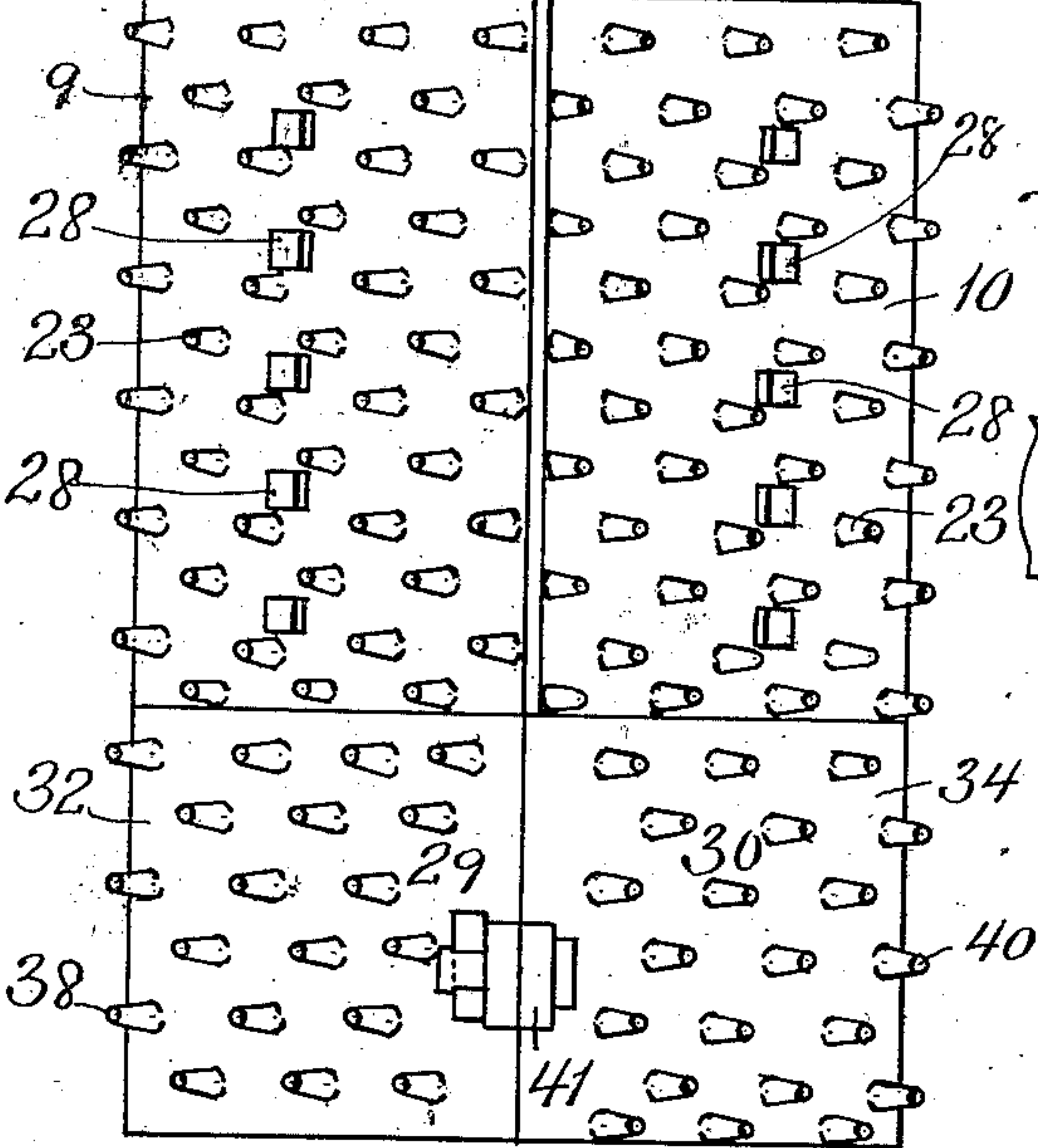


Fig. 7.

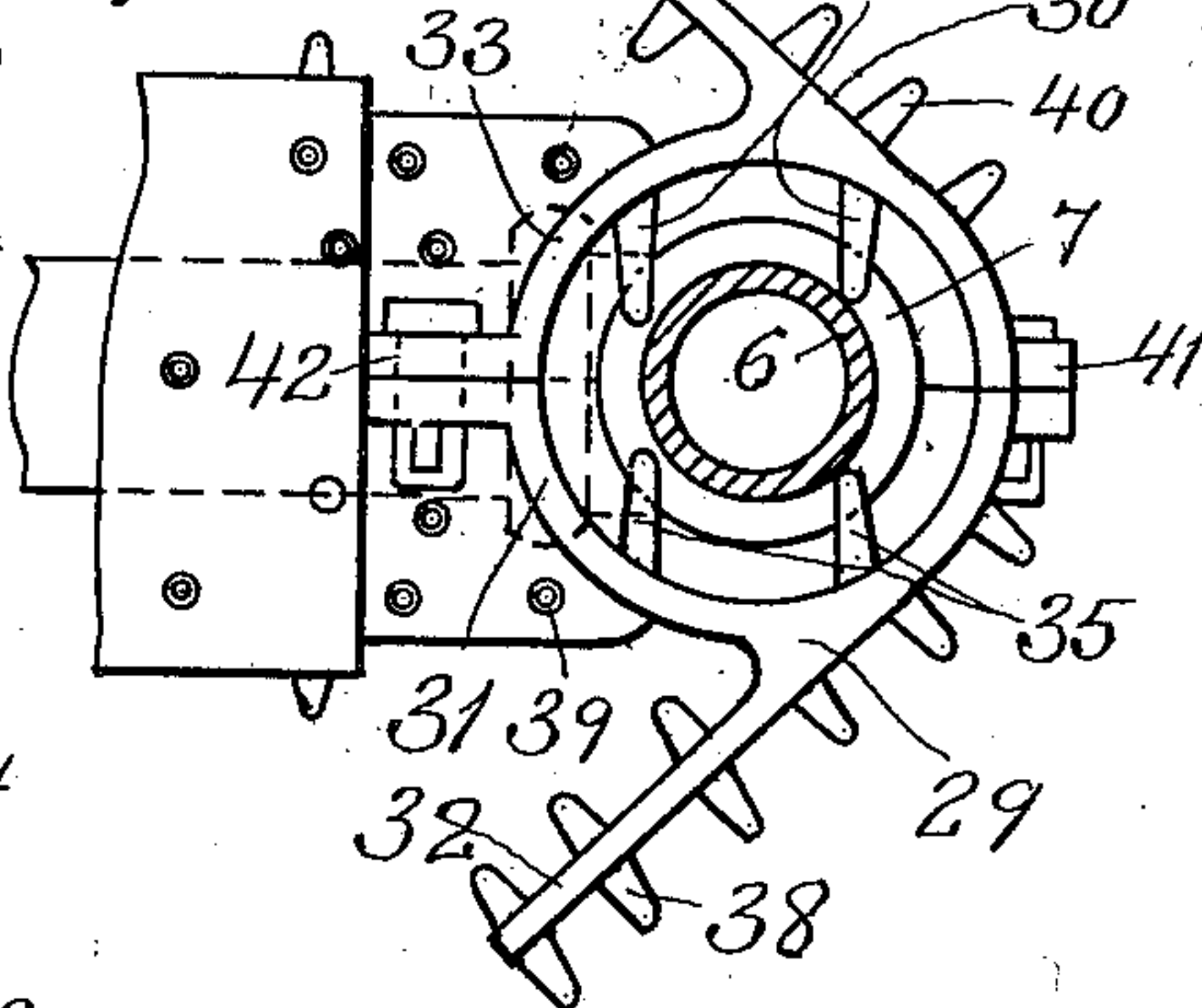


Fig. 10.

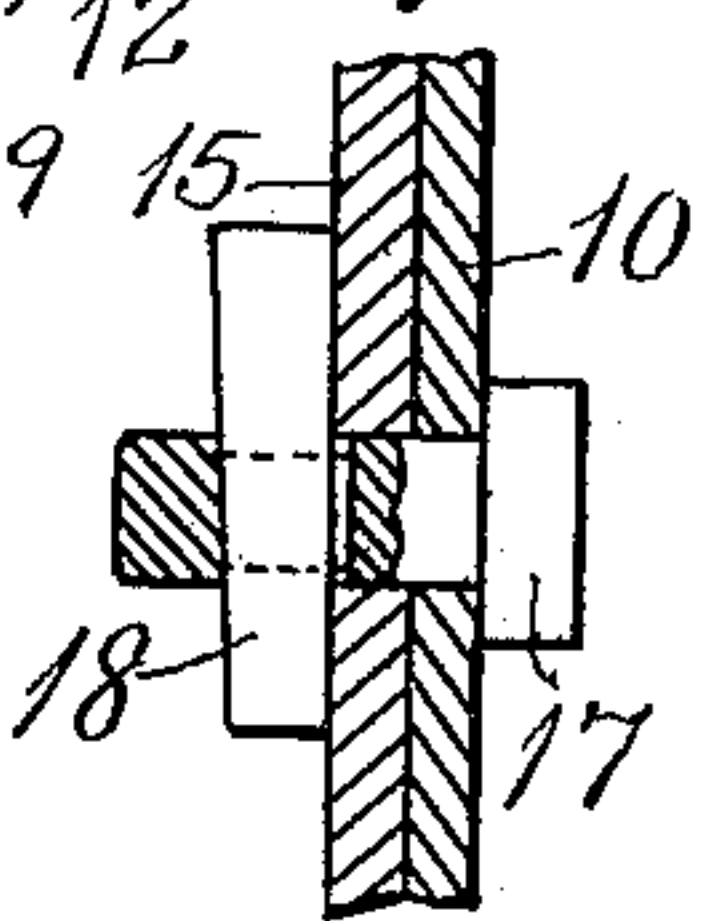


Fig. 8.

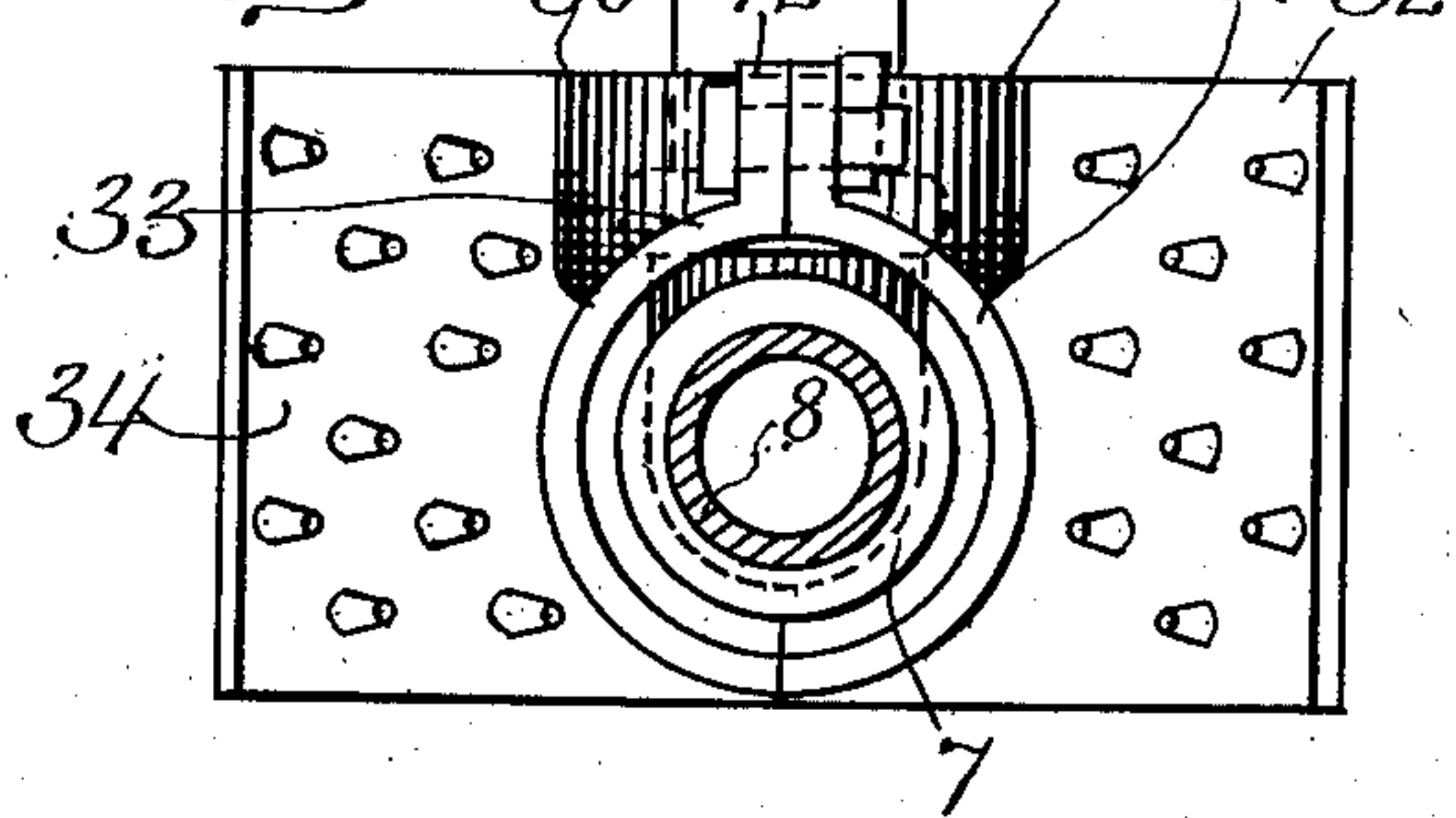
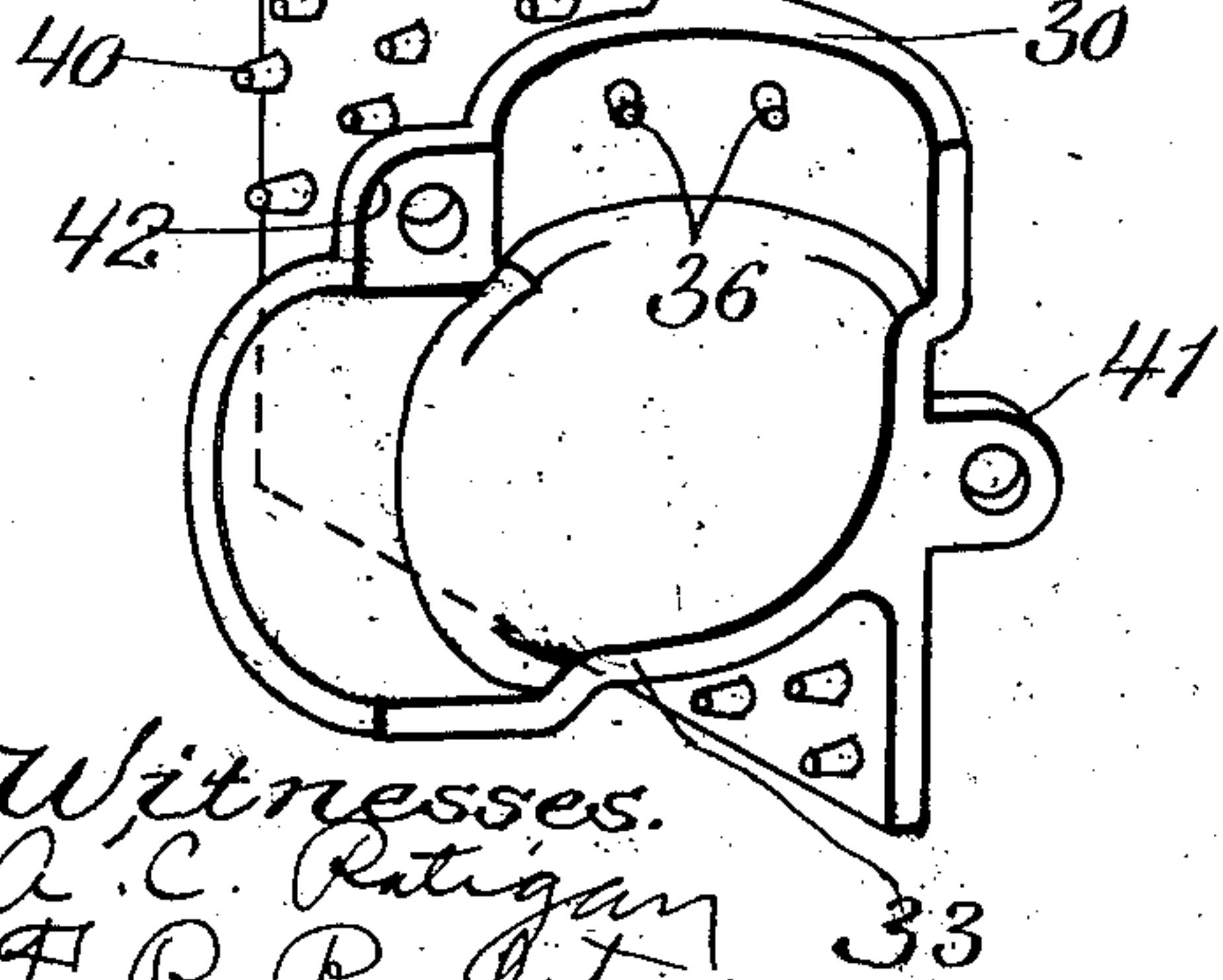


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALDEN R. CHAMBERS, OF SOMERVILLE, MASSACHUSETTS.

PROTECTOR FOR BLOW-OFF PIPES.

940,427.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed January 5, 1909. Serial No. 470,829.

To all whom it may concern:

Be it known that I, ALDEN R. CHAMBERS, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Protectors for Blow-Off Pipes, of which the following is a specification.

The invention relates to protective covering for the blowoff pipes with which steam boilers are provided. The invention has for its object to provide a heat-resisting casing for such pipes, to construct the protector in such a way that it will deflect the hot products of combustion to the outer tubes of the boiler instead of being concentrated in the tubes near the center, and to make the construction of the protector such that it can be readily removed to permit inspection of the blow-off pipe, and as readily replaced.

The preferred form of protector, which includes the features of my invention, is illustrated in the accompanying drawings, in which,—

Figure 1 represents an elevation of a boiler, showing a blow-off pipe and the protector applied thereto. Fig. 2 represents a sectional view of the protector, showing the same in position around a blow-off pipe. Fig. 3 represents a sectional elevation of the portion of the protector which incloses the hand-hole of the boiler. Fig. 4 is a detail view illustrating a hand hole cover associated with the protector. Fig. 5 represents a plan of the complete protector. Fig. 6 represents a front elevation of the protector. Fig. 7 represents a plan view of that portion of the protector which incloses the elbow coupling of the blow-off pipe. Fig. 8 represents a rear elevation of the part shown in Fig. 7. Fig. 9 represents a perspective view of one section of the elbow protector. Fig. 10 represents a detail view of a type of fastening capable of holding the sections of the protector together.

The same reference characters indicate the same parts in all the figures.

The invention is applicable to all boilers which have blow-off pipes exposed to the heat of the fire, and is particularly applicable to the common horizontal tubular boiler. Such a boiler is illustrated by 1. 2 represents the brick setting therefor in which the boiler is inclosed, 3 represents the grate, 4 the bridge wall, and 5 the space in back of the bridge wall where the combustion of the furnace gases is completed.

Near the rear of the boiler and extending downward therefrom is a blow-off pipe consisting of a vertical section 6, an elbow coupling 7, and a horizontal section 8.

The protector which forms the subject-matter of the present invention is adapted to surround all parts of the blow-off pipe and is constructed so as to insulate the heat therefrom, the insulation being further made by an air space which is left between the inner walls of the protector and the outer walls of the blow-off pipe.

The protector has members inclosing the vertical section 6, the elbow 7 and the horizontal section 8 respectively of the blow-off pipe. The first of these sections consists of front plates 9 and 10 and a semi-cylindrical rear piece 11. The plates 9 and 10 are plane and are fitted so as to meet at one edge thereof, forming a wide V. The plate 9 has a lip 12 and a flange 13 which positions the adjacent edge of the plate 10. These plates are located in front of the vertical section of the blow-off pipe with their meeting edges directed toward the front of the furnace, and exposed directly to the flames and hot gases passing over the bridge wall.

The rear section 11 of the protector is curved concentrically with the pipe and is secured to the plates 9 and 10. The securing means consist preferably of flanges 14 and 15, the former of which is connected to the plate 9 by bolts 16, and the latter of which is detachably connected to the plate 10 by slotted bolts 17 and cotter pins 18. The parts 9 10 and 11 are preferably made of cast metal. It is possible to cast the parts 9 and 11 in one piece, but it is more practical to make them separately and attach them by bolts, as here shown, which is the preferred construction.

The radius of the curved piece 11 is such that when the latter is put in place above the pipe section 6, there will be a clear space on all sides of about one inch around the largest size of pipe used for the blow-off. The plates 9 10 and 11 have each a line of pins 19 20 and 21 respectively, which bear against the blow-off pipe at separated points and locate the protector members so that the air space will be left on all sides of the pipe.

On the external sides of the protector members are pins 22 23 and 24 respectively, which have a staggered arrangement, as appears from the elevation of the protector. On the rear surfaces of the plates 9 and 10

are also pins 25 and 26. These pins are provided for the purpose of retaining the refractory heat-resisting medium, such as asbestos, fire-clay, or the like, which is applied in a plastic condition and allowed to harden.

5 Preferably the parts 9 and 11 are united together before being covered with the refractory material so that the heads of the bolts 16 and the nuts therefor are entirely covered and protected from the heat of the fire. The plate 10 is separately covered with the material, the bolts 17 being previously inserted, and their heads being embedded in this material. At the meeting edges of the plates the outer covering of asbestos is beveled so that a smooth and close joint will be formed. In covering the member 11 spaces are left for the reception of the bolts 18, and after the plate 10 is applied and these bolts and keys secured in place, the spaces left for the bolts are filled with the plastic composition.

It will be seen that when the parts of the protector are all in place, the blow-off pipe is surrounded by an envelop of air and by an outer casing of protective material, which is of practically perfect heat-insulating qualities. When it becomes necessary to inspect the blow-off pipe the protector can be removed by simply breaking away the asbestos or other material which incloses the wedge pins 18, removing the latter, and then taking off the plate 10. The space between the flange 11 and the opposite edge 27 of the member 9 is wider than the pipe 6 so that the combined pieces 9 and 11 may be slipped on or off the pipe.

It will be noted that the outer ends of the plates 9 and 10 extend some distance beyond the member 11 and provide wings. The function of these wings is to separate and divert the hot gases and flames to the outer sides of the boiler setting so that these gases will be distributed more to the outer tubes. It is found that in return tubular boilers there is a tendency for the gases to be concentrated in the central tubes, and that the peripheral portions of the boiler are not thoroughly heated. This construction of protector plates deflects the gases and flames outward so that the tendency to concentrate in the center is overcome, and a general distribution of the heat takes place.

The section of the protector which surrounds the elbow section 7 of the blow-off pipe is made of two parts 29 and 30 which have meeting edges on a vertical longitudinal plane. The member 29 has a part 31 curved to embrace the elbow coupling 7, and a plane portion 32 which diverges therefrom and follows the direction of the plate 9. The other section 30 has similar parts 33 and 34. The parts 31 and 32 inclose the elbow and an intermediate air space, while the wings 32 and 34 extend vertically ap-

proximately in the same planes with the plates 9 and 10, down to or below the lowest level of the blow-off pipe. The sections 29 and 30 have spacing pins 35 and 36 respectively, which bear against the blow-off pipe to center the protector and rest against the upper flange of the elbow 7. These pins support the weight of the elbow and vertical protector sections and prevent them from resting on the horizontal section 8 of the blow-off pipe. The elbow protector is provided with pins 38 39 and 40 to hold in place the outer covering of refractory material, and they also have lugs 41 and 42 by which they are secured together.

The third section of the protector consists of the members 43 and 44 which inclose the section 8 of the blow-off pipe. The member 43 has internal studs 45 which rest upon the pipe section and hold the body of the protector away therefrom to provide the necessary air space of about one inch. The edges of this section extend about to the central plane of the pipe and are spread outward, having internal lips 46. The lower section 44 is curved concentrically with the pipe and has on its edges external lips or flanges 47 which rest on the lips 46 and support the weight of the lower section. This arrangement of lips enables the sections to be put together and taken apart by simply sliding the lower one longitudinally into the upper one.

Each of the sections has external pins or studs for holding the plastic refractory covering in place, of which certain of the studs, as 48, are parallel to one another in order that the pattern may be drawn from the mold.

In putting the complete protector together upon a blow-off pipe, the procedure is as follows: The section 43 is placed upon the horizontal pipe section 8 and the section 49 slid rearwardly into engagement therewith. The internal diameter of this latter section is great enough so that it will pass radially over and clear the enlarged threaded end of the elbow 7. The two members 29 and 30 of the elbow covering are then clamped together by bolts or the like passing through the lugs 41 and 42. The ends of the curved portions 31 33 of these sections abut against the forward end of the horizontal covering. Then the vertical covering, consisting of the plate 9 and semicylinder 11, which, being secured together, make practically one piece, are placed over the vertical pipe sections and allowed to rest on the top of the elbow cover. Last of all, the plate 10 is applied, the bolts 17 secured by the pins 18, and the latter are covered by a quantity of the asbestos or the like refractory material.

Another function of the protector is to guard the hand-hole cover, the yoke there-

for, and particularly the end of the holding bolt and nut by which the cover is tightened, against the deleterious action of the hot furnace gases. Accordingly I provide a cover or cap 50 which is associated with the section 11 of the protector and is arranged so as to inclose the hand-hole opening at the rear of the boiler, the yoke, and the end of the bolt whereby the hand-hole cover is held in place. 51 represents the yoke which spans the hand-hole, 52 the bolt by which the cover is held in place, and 53 the nut which is screwed upon the bolt. It is preferably made of cast metal and has a lug 54 which slides upon a bar 55 projecting rearwardly from the section 11 of the pipe protector. This bar has one or more notches into which a portion of the lug projects, and in which it is held by a key 56. On the rear of the member 50 are pins similar to those on the other protector sections, which serve to secure a covering of refractory material.

I claim:—

1. A protector for the blow-off pipe of a boiler, comprising a casing shaped to surround such pipe and having diverging wings to deflect and distribute the products of combustion.

2. In combination with a steam boiler and a blow-off pipe, a protector for said blow-off pipe constructed as a casing inclosing the pipe and having wings extending outwardly in such directions as to distribute the products of combustion toward the sides of the boiler.

3. In combination with a steam boiler, a setting therefor, and a blow-off pipe extending downward from the bottom of the boiler and rearward through the rear wall of said setting, a protector for said blow-off pipe comprising a section resting upon the rearward portion of said blow-off pipe and surrounding the upper part thereof, having lips at its edges, a bottom section having cooperating lips supported by the lips of said upper section, two sections inclosing the angle of said pipe, and upright sections inclosing the downwardly extending portion of said pipe, the last-named sections being provided with diverging wings or plates to spread the products of combustion.

4. In combination with a steam boiler and a blow-off pipe, a protector for said blow-off pipe including vertical plates meeting in front of said pipe and extending from their junction toward the rear and sides of the boiler, and a rear piece connected to said plates and cooperating therewith to inclose the pipe.

5. A protector for blow-off pipes of boilers, comprising two flat plates arranged to meet at one edge and form an angle, a cylindrically curved piece extending across the angle formed by said plates cooperating to surround and inclose the upright part of

such pipe, two similarly formed pieces to inclose the elbow or angle of the pipe, each having a laterally and longitudinally curved part and a plane wing, and two approximately semi-cylindrical pieces having interlocking flanges or lips at their edges, inclosing the rearwardly extending part of the blow-off pipe.

6. A protector for blow-off pipes of boilers, comprising two flat plates arranged to meet at one edge and form an angle, a cylindrically curved piece extending across the angle formed by said plates cooperating to surround and inclose the upright part of such pipe, two similarly formed pieces to inclose the elbow or angle of the pipe, each having a laterally and longitudinally curved part and a plane wing, and two approximately semi-cylindrical pieces having interlocking flanges or lips at their edges inclosing the rearwardly extending part of the blow-off pipe, said plates and pieces having inwardly directed studs or pins to locate the pipe centrally within the spaces inclosed thereby and to provide an air space around the pipe.

7. A protector for blow-off pipes of boilers, comprising two flat plates arranged to meet at one edge and form an angle, a cylindrically curved piece extending across the angle formed by said plates cooperating to surround and inclose the upright part of such pipe, two similarly formed pieces to inclose the elbow or angle of the pipe, each having a laterally and longitudinally curved part and a plane wing, and two approximately semi-cylindrical pieces having interlocking flanges or lips at their edges inclosing the rearwardly extending part of the blow-off pipe, said plates and pieces having external studs for holding securely thereon an external covering of heat-resisting material.

8. A protector for boiler blow-off pipes, comprising two plates and a semi-cylindrical piece connected with said plates between the longitudinal edges of the latter, and the latter extending across the open side of said piece and meeting intermediate the edges thereof on an oblique angle.

9. A protector for boiler blow-off pipes, comprising a semi-cylindrical casting, a plate permanently connected with one of the longitudinal edges of said casting at such an angle as to pass outside of the axis thereof, and a second plate detachably connected to the other edge of said casting, making a similar and opposite angle therewith, and one of said plates having a rib inside its edge to position the edge of the other plate.

10. In combination with a protector for boiler blow-off pipes, including separable sections constructed and arranged to surround the blow-off pipe, a hand-hole protector shaped to surround the hand-hole and

inclose the cover-holding yoke, nut, and bolt, and supported in place by one of said sections.

11. In combination with a protector for
5 boiler blow-off pipes, including sections constructed and arranged to surround such pipe, a bar extending rearwardly from one of said sections, and a hand-hole protector supported removably by said bar, said hand-
10 hole protector having a spheroidal shape

suitable to surround the hand-hole and inclose the means for holding the handhole cover in place.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ALDEN R. CHAMBERS.

Witnesses:

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P. W. PEZZETTI.