

No. 835,298.

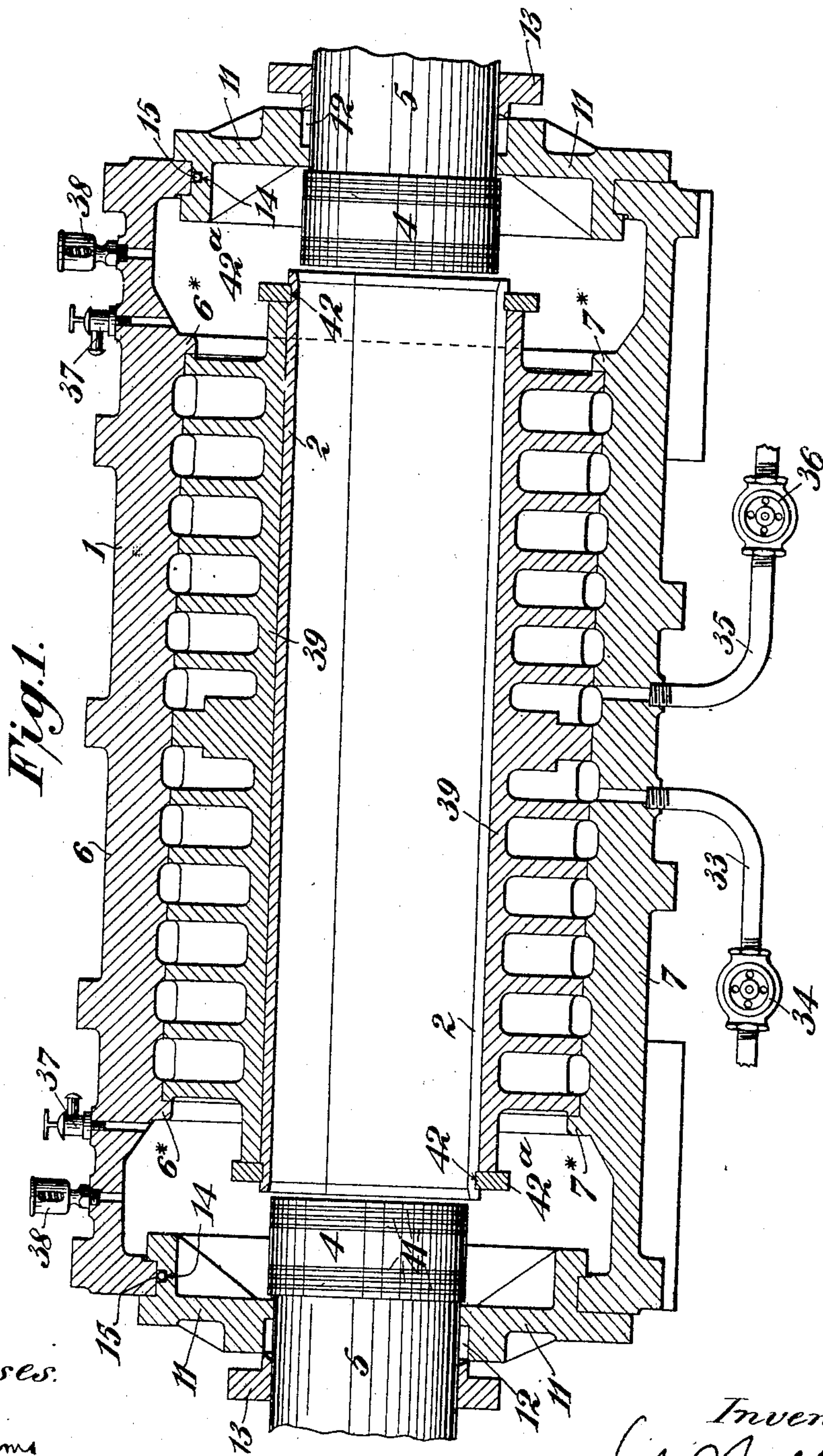
PATENTED NOV. 6, 1906.

G. W. BELL.

PRESSING OF GUNCOTTON BLOCKS.

APPLICATION FILED APR. 8, 1904. RENEWED OCT. 5, 1906.

12 SHEETS—SHEET 1.



Witnesses.

W. H. Simmons

H. Pillow

Inventor.

G. W. Bell
Per W. H. Simmons
Attorney.

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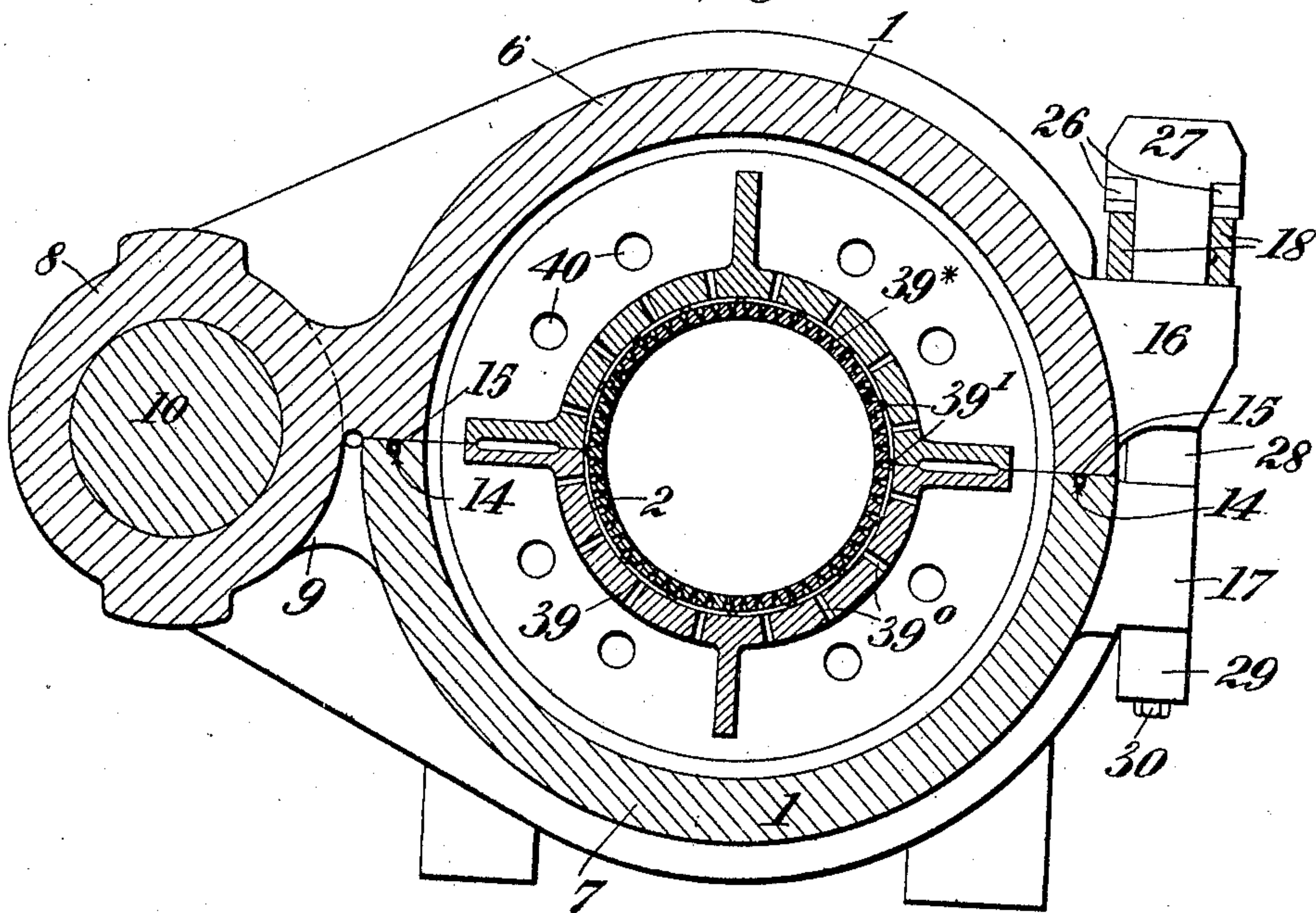
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12 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

W. H. Simmons
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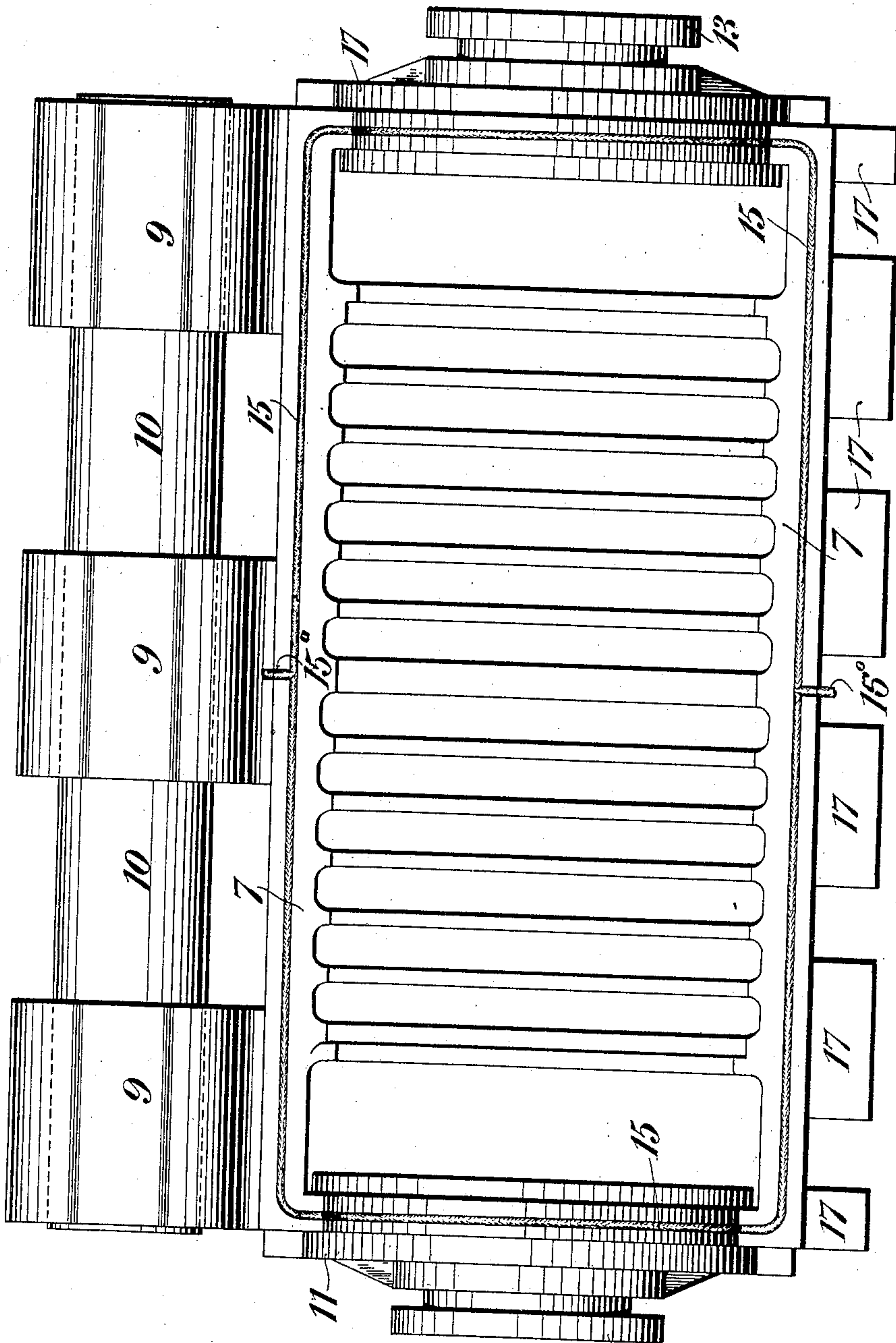
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12 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

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12 SHEETS—SHEET 4.

Fig. 5.

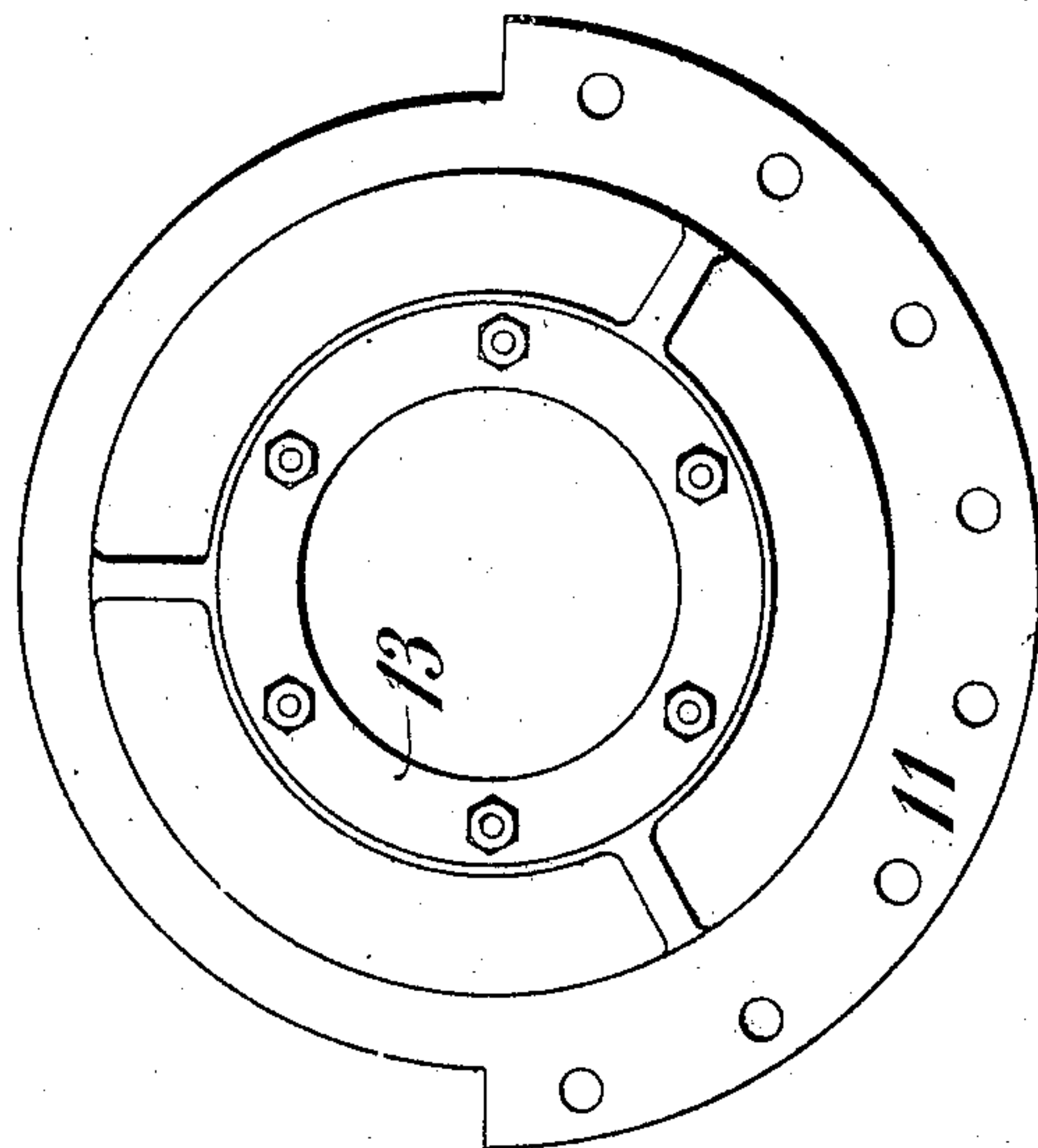
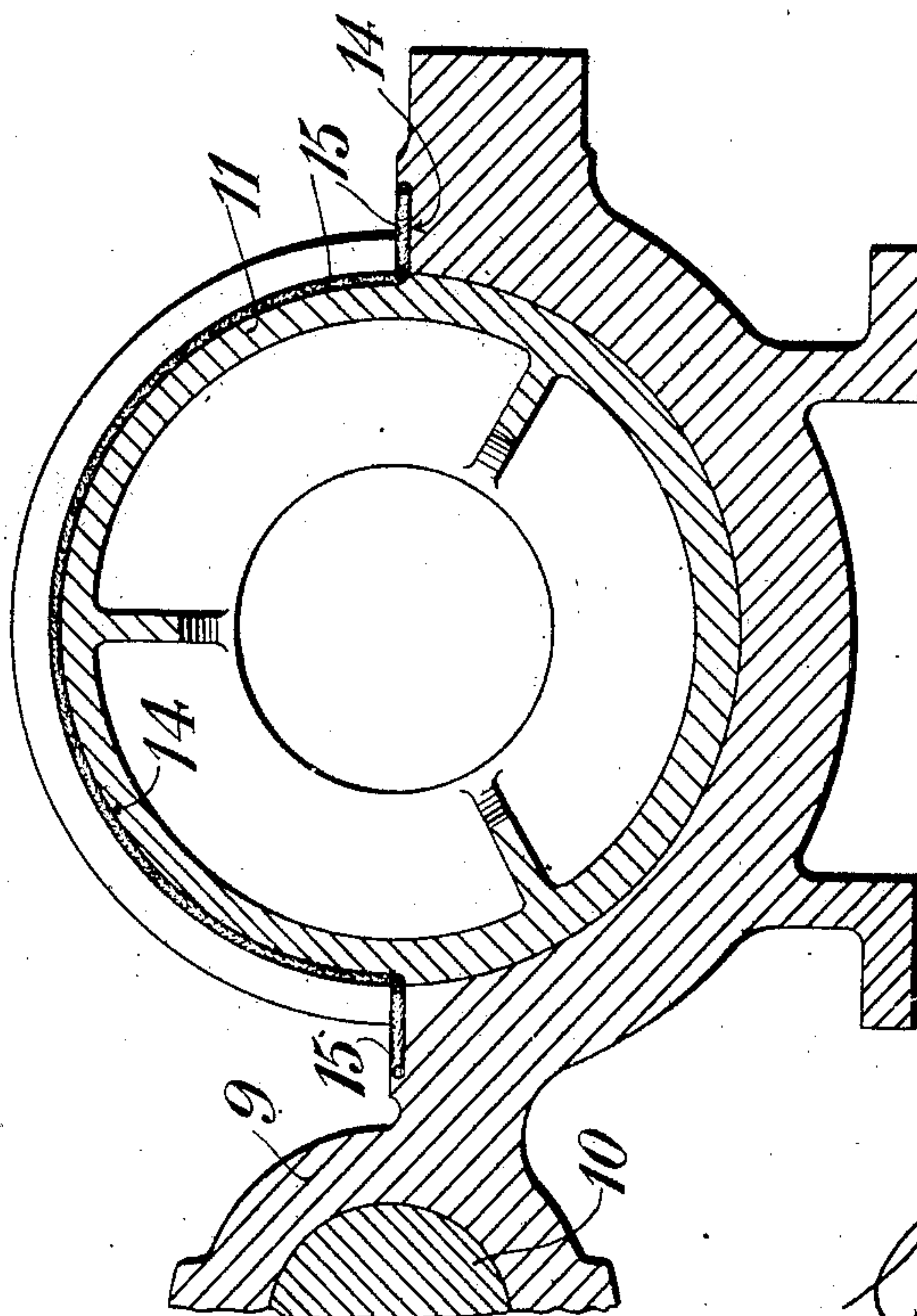


Fig. 4.



Witnesses.

W. H. Simmons

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No. 835,298.

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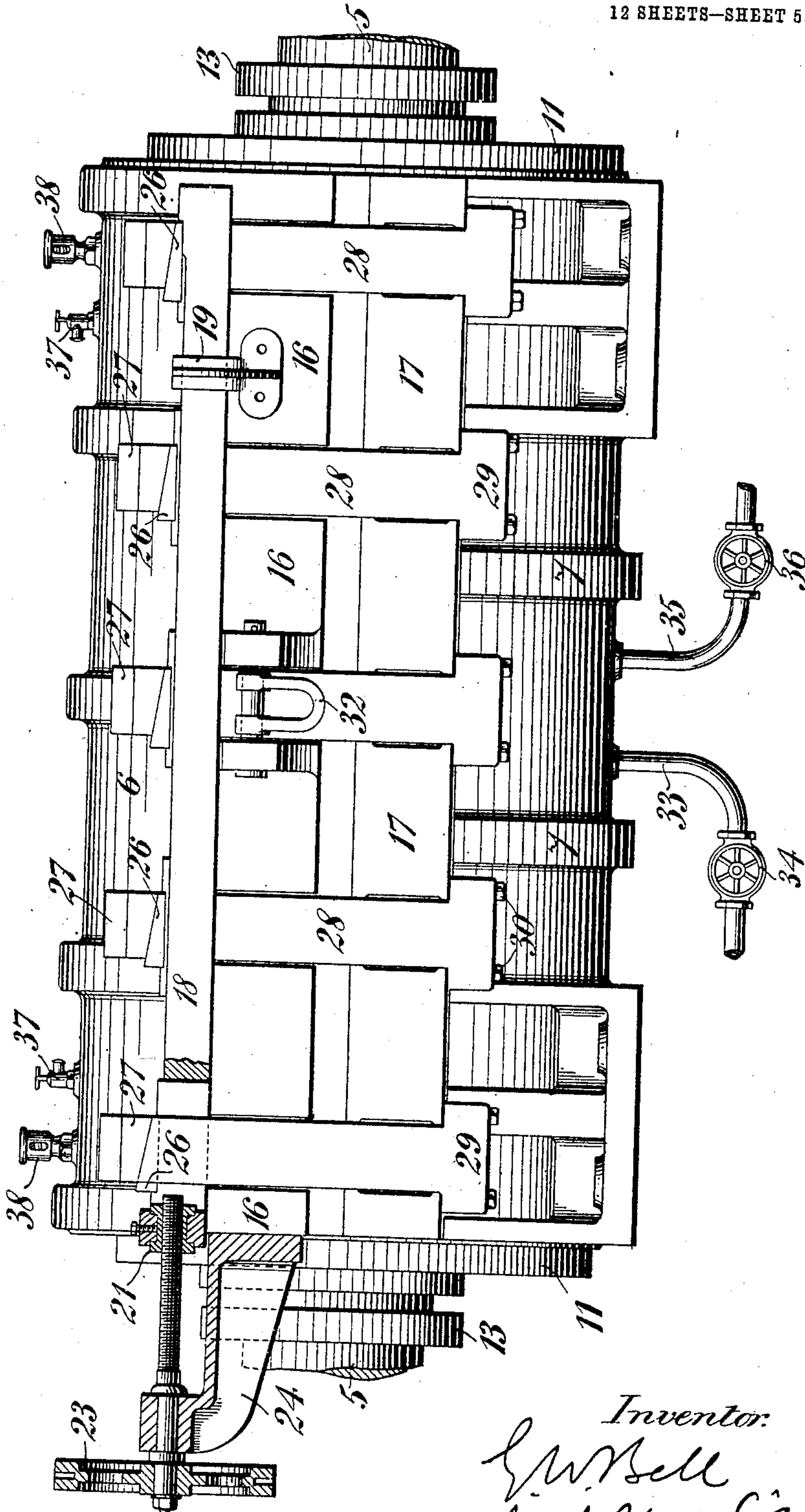
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12 SHEETS—SHEET 5.

Fig. 6.



Witnesses
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12 SHEETS—SHEET 6.

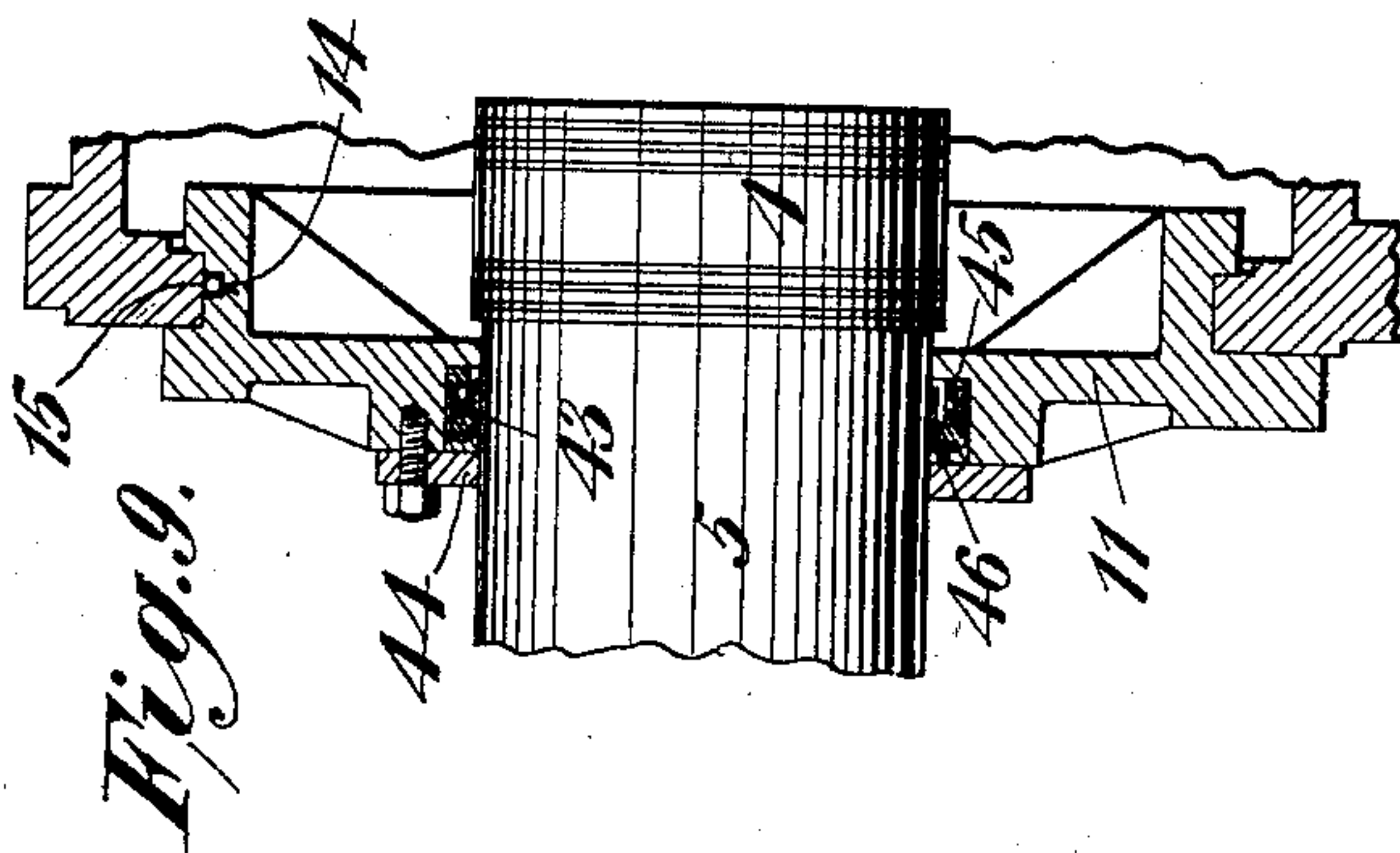


Fig. 9.

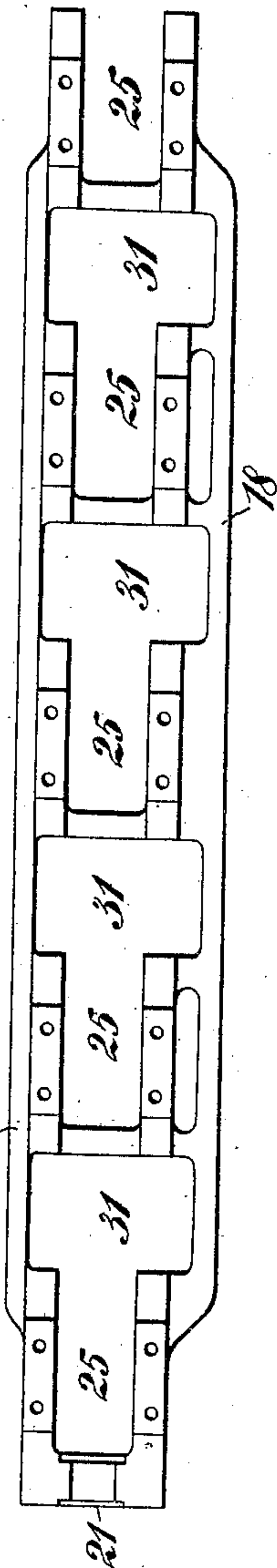


Fig. 7.

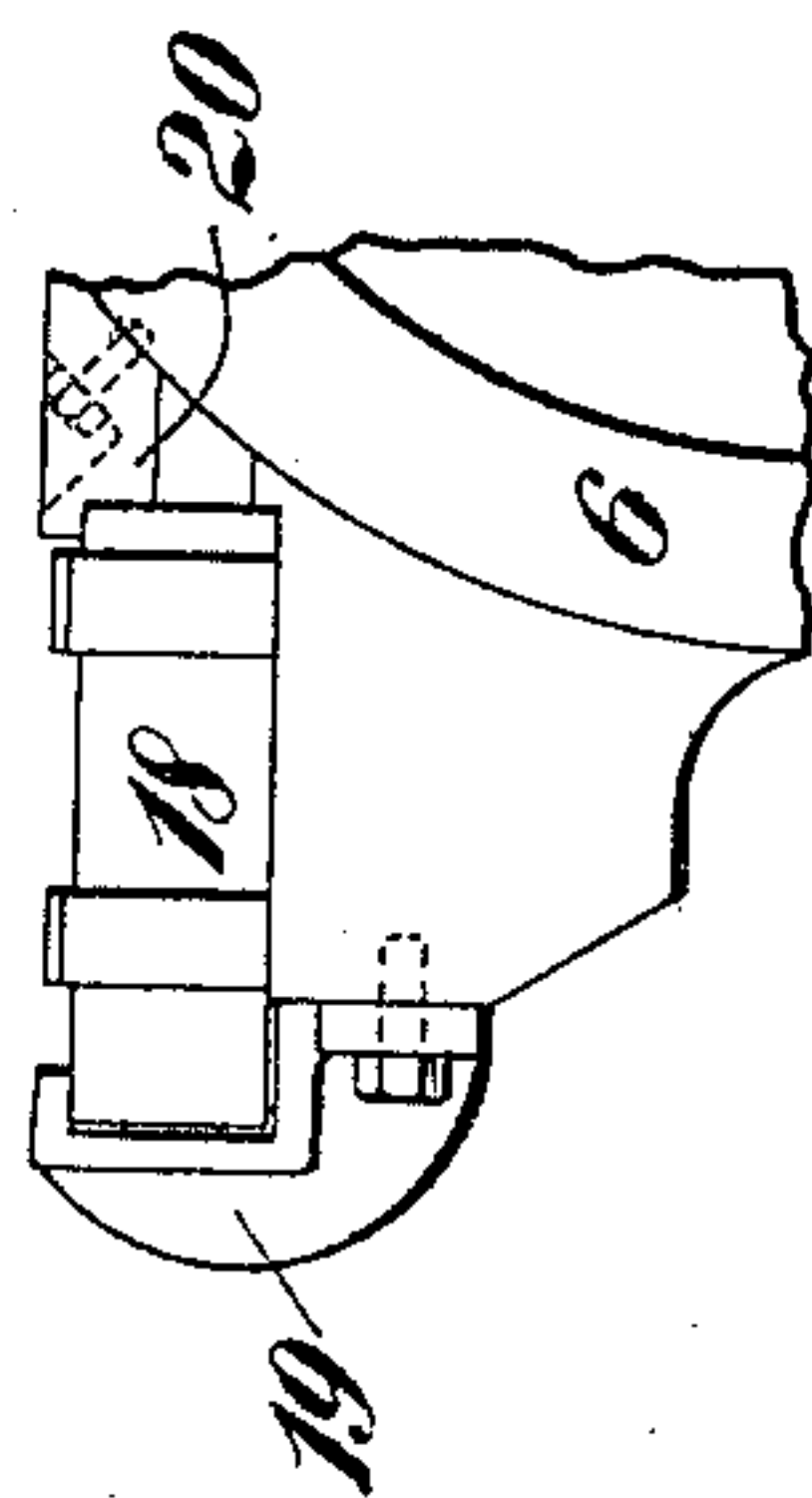


Fig. 8.

Witnesses:

W. H. Simmons

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Inventor:

G. W. Bell

per W. H. d. W. H.

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No. 835,298.

PATENTED NOV. 6, 1906.

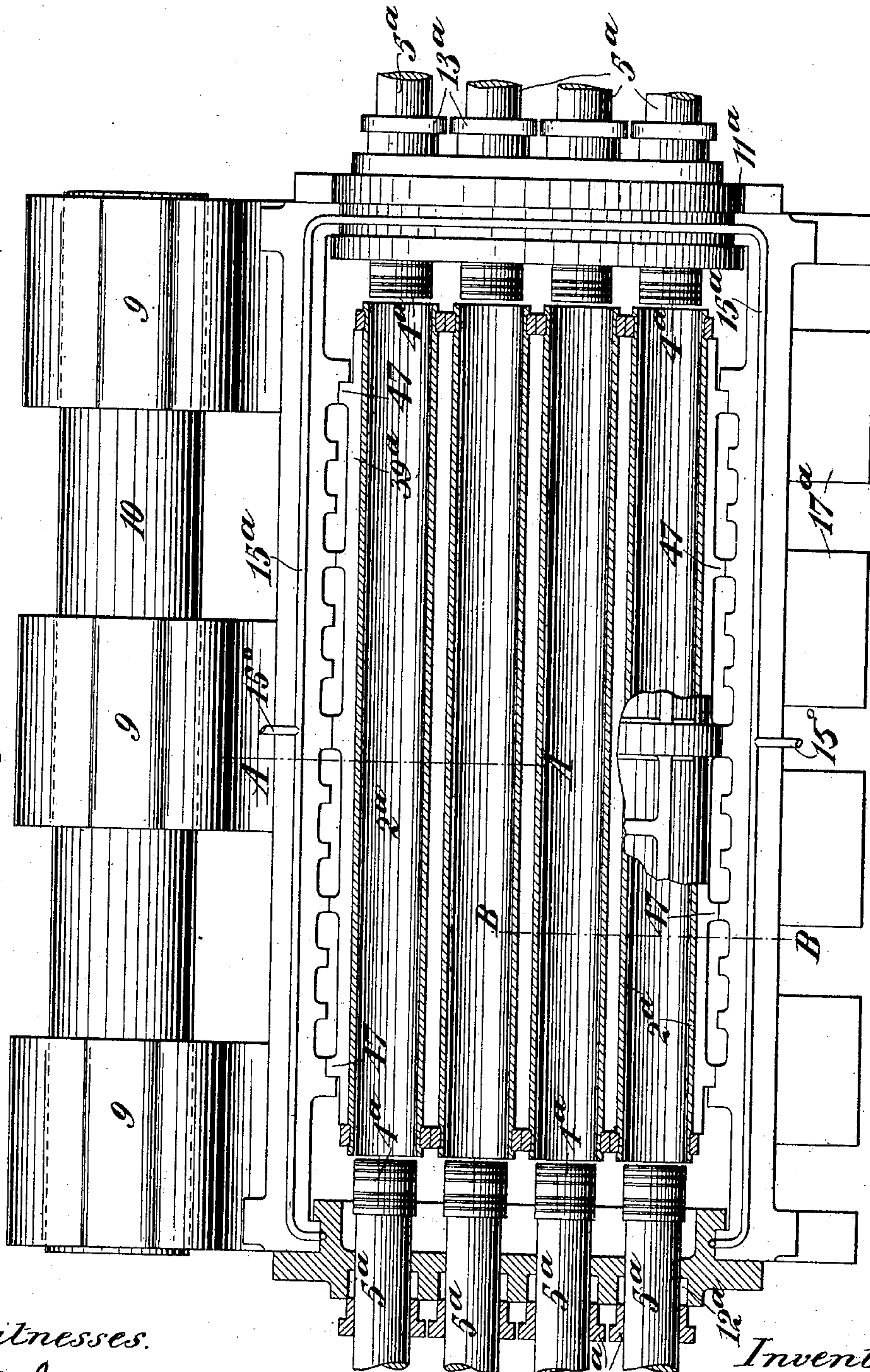
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12 SHEETS—SHEET 7.

Fig. 10.



Witnesses.

W. H. Symms

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12 SHEETS—SHEET 8.

Fig. 12.

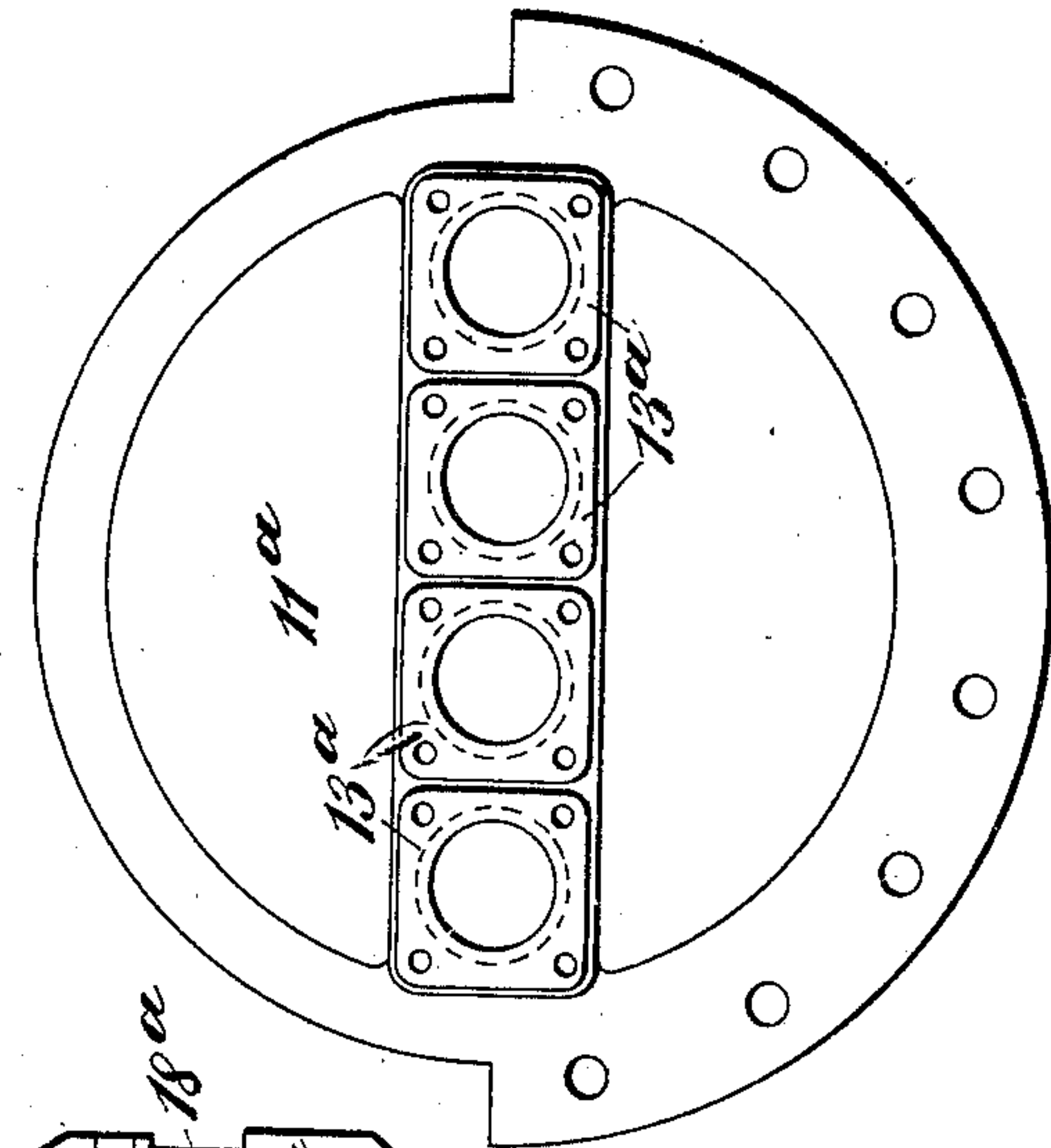
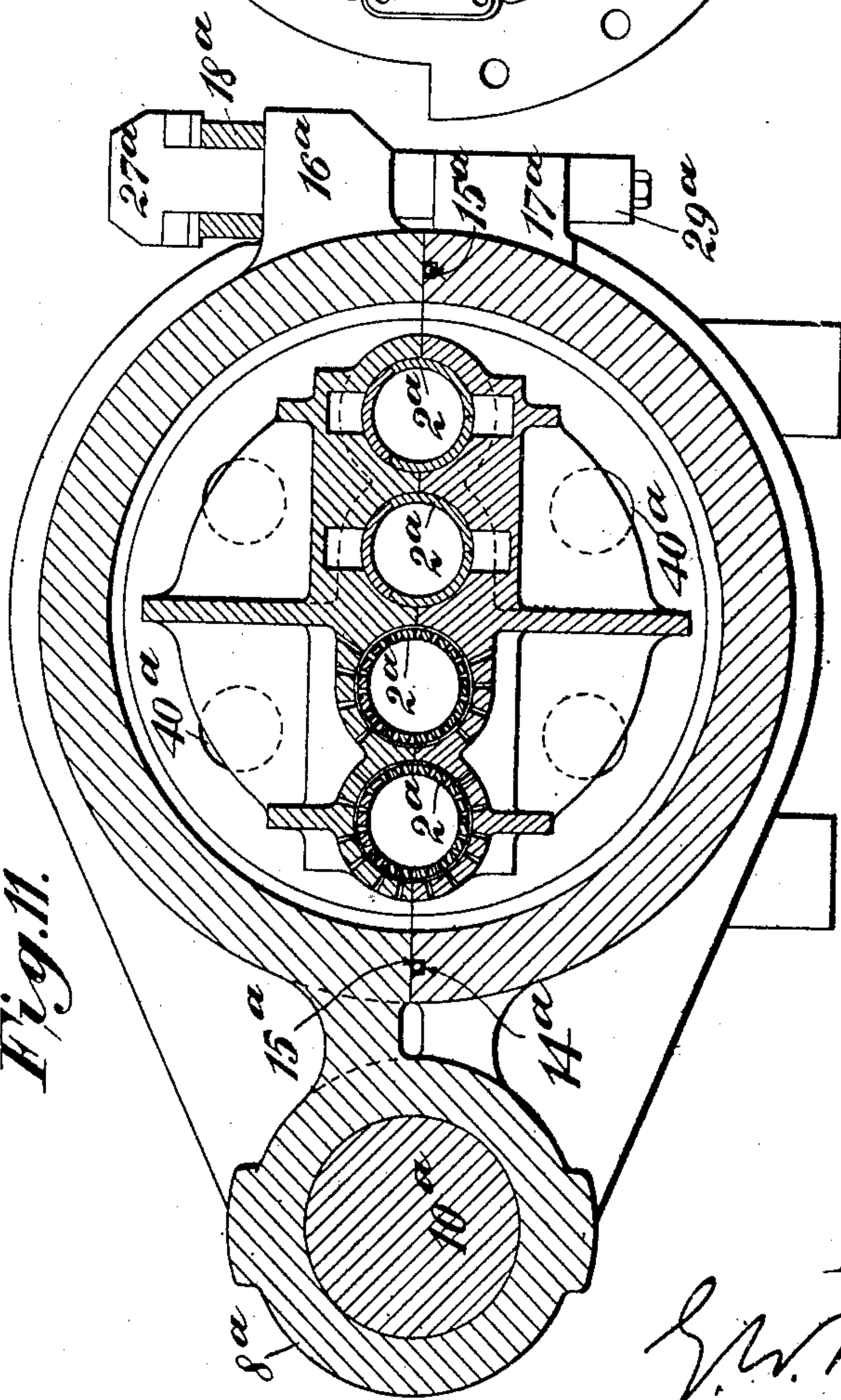


Fig. 11.



Witnesses.

W. H. Simmons
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12 SHEETS—SHEET 9.

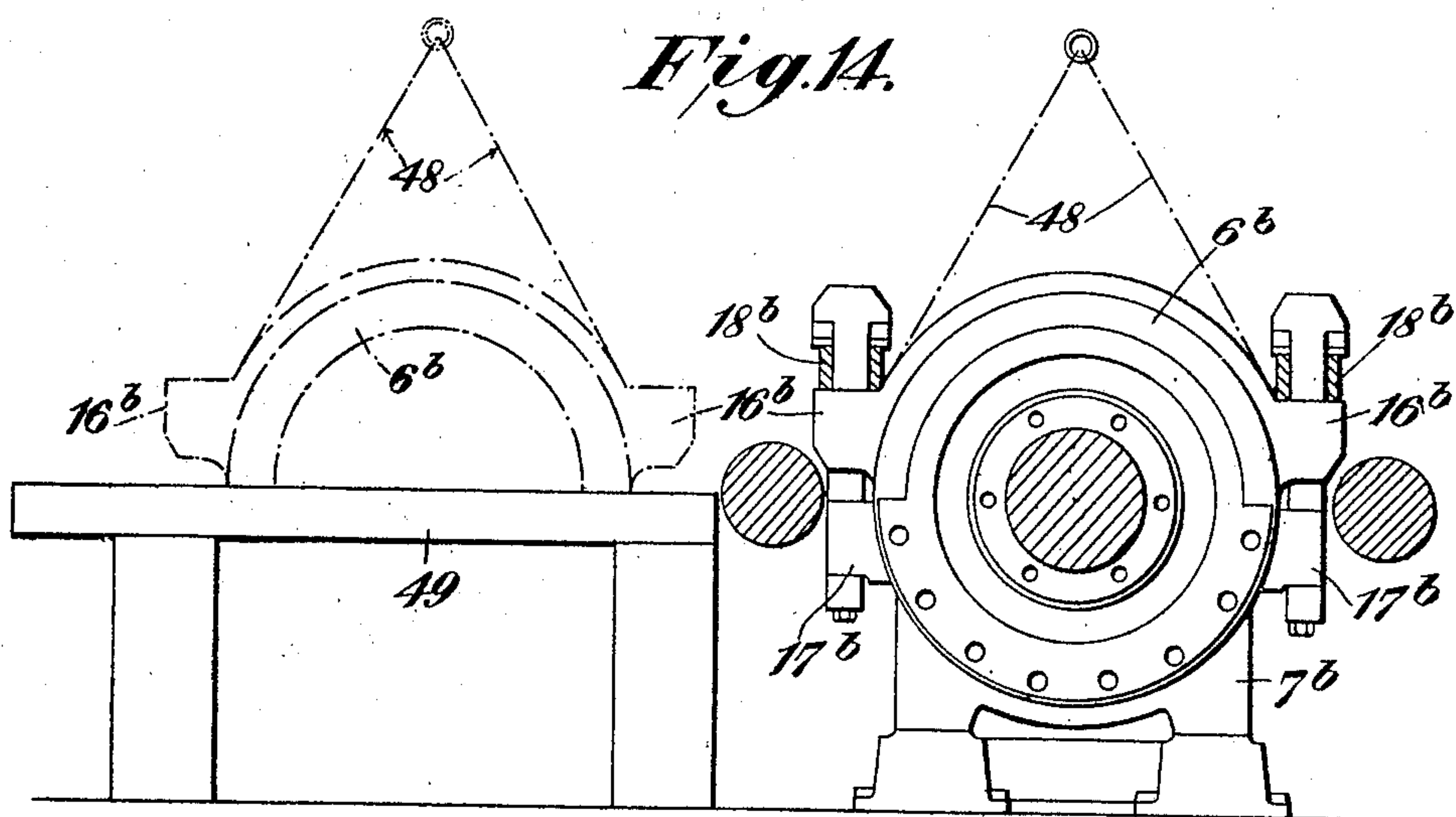
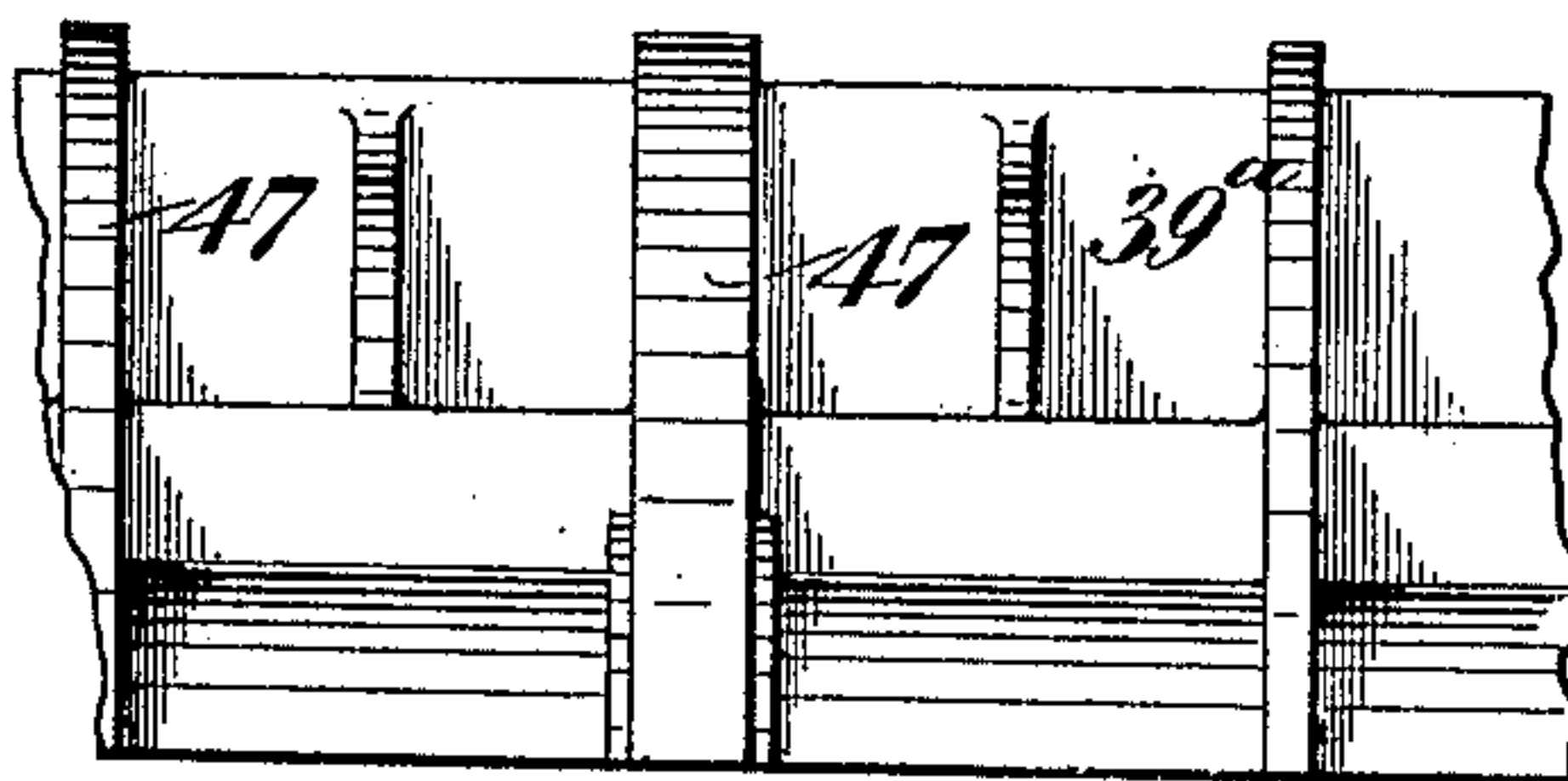


Fig. 13.



Witnesses.

W. H. L. Linn

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12 SHEETS—SHEET 10.

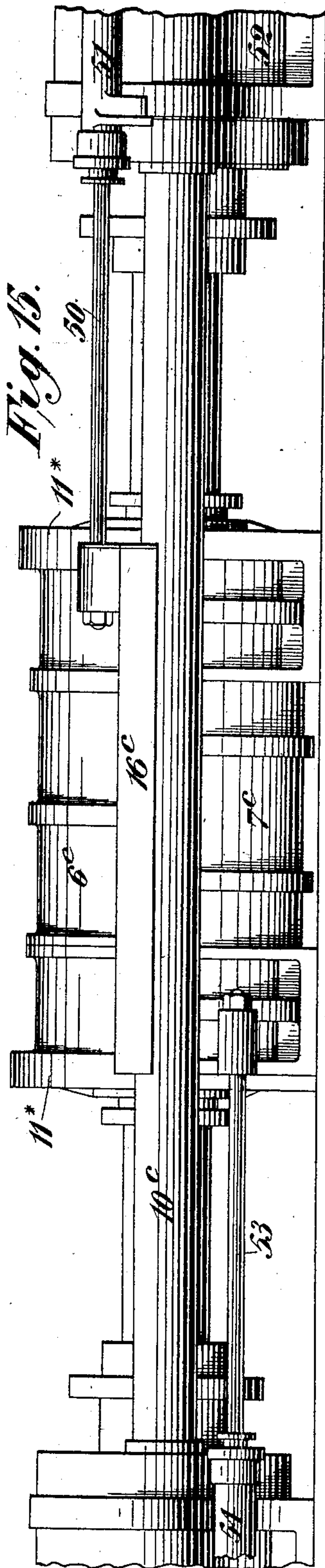


Fig. 15.

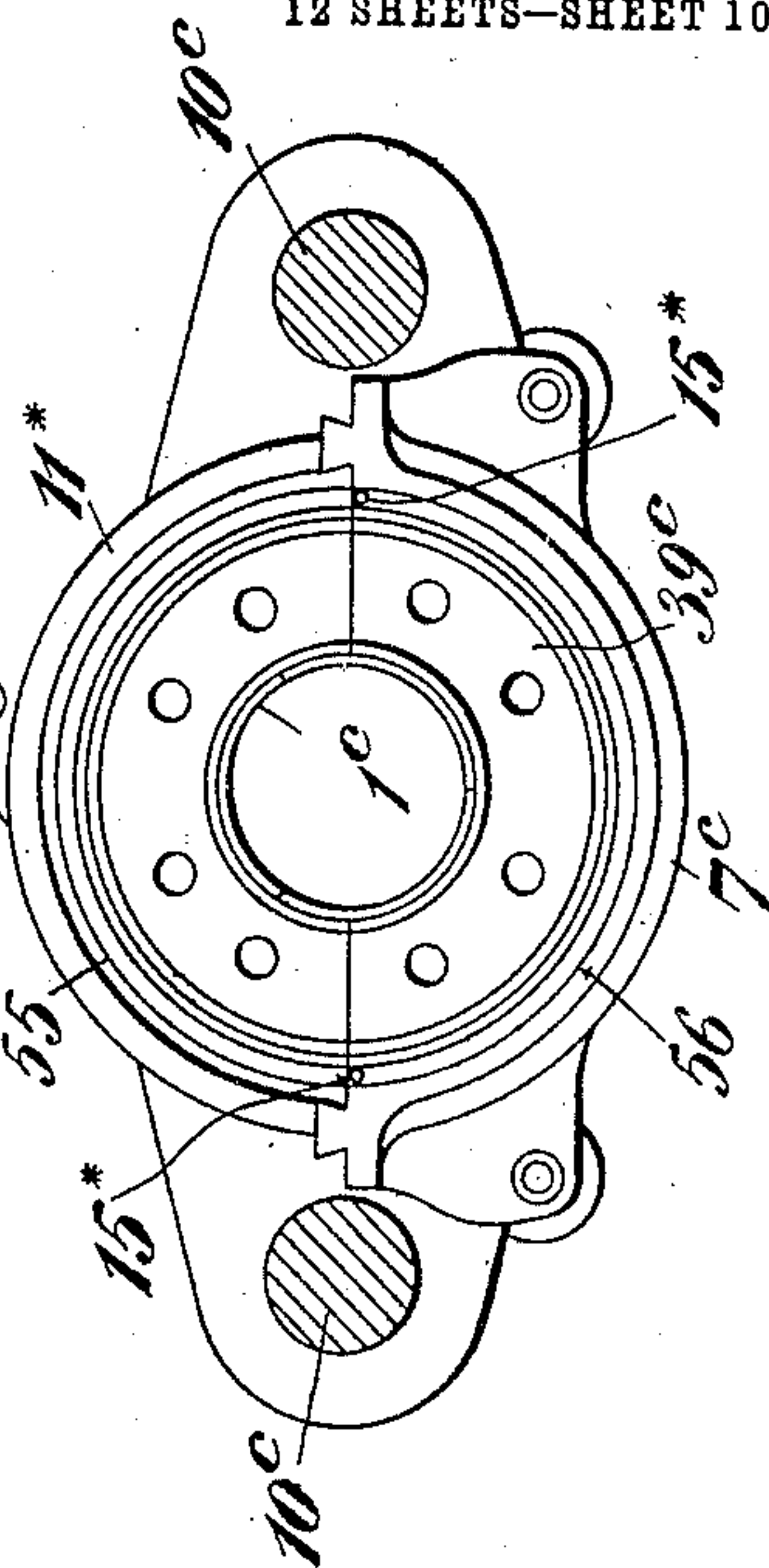


Fig. 17.

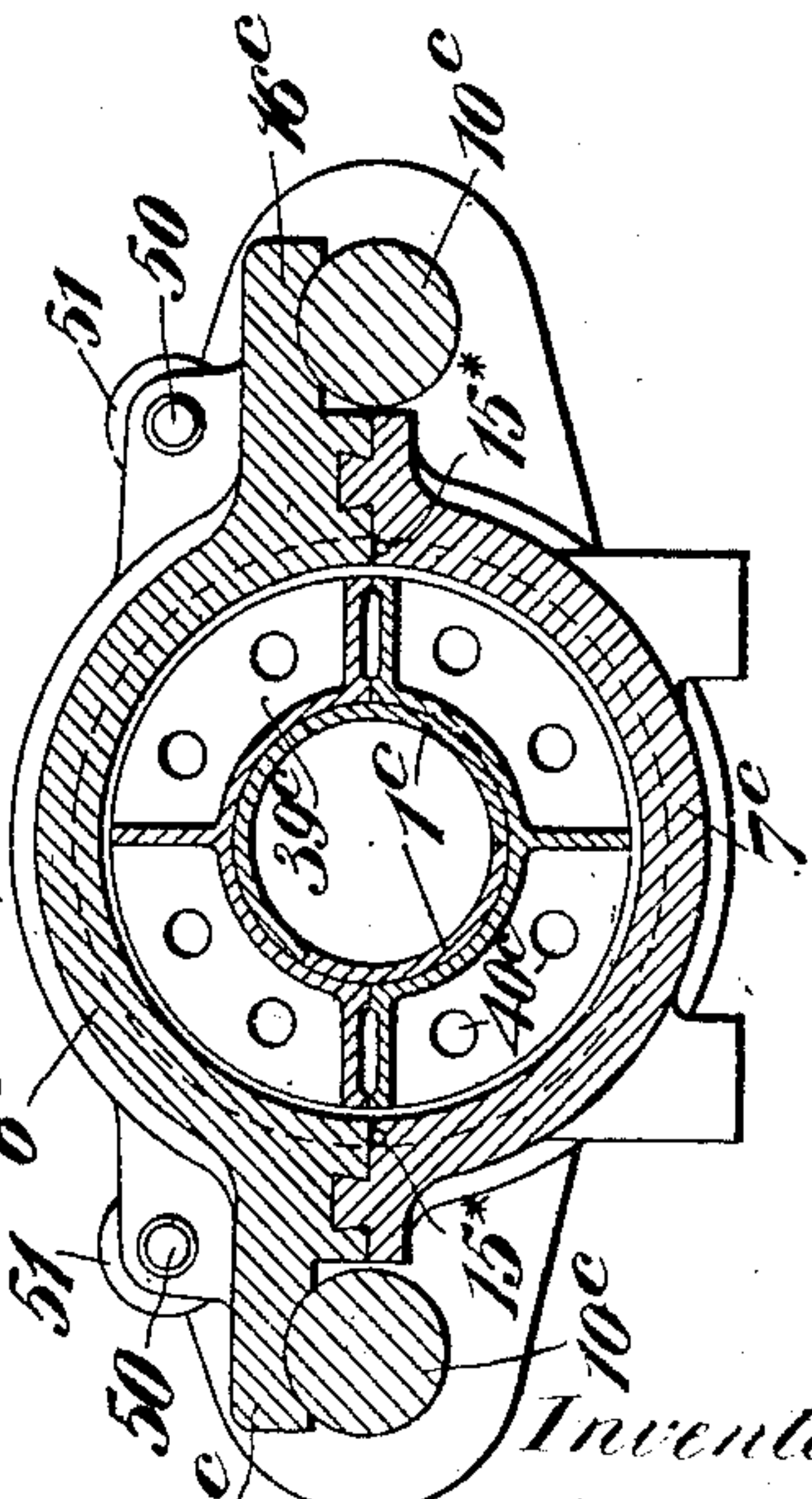


Fig. 16.

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APPLICATION FILED APR. 8, 1904. RENEWED OCT. 5, 1906.

12 SHEETS—SHEET 11.

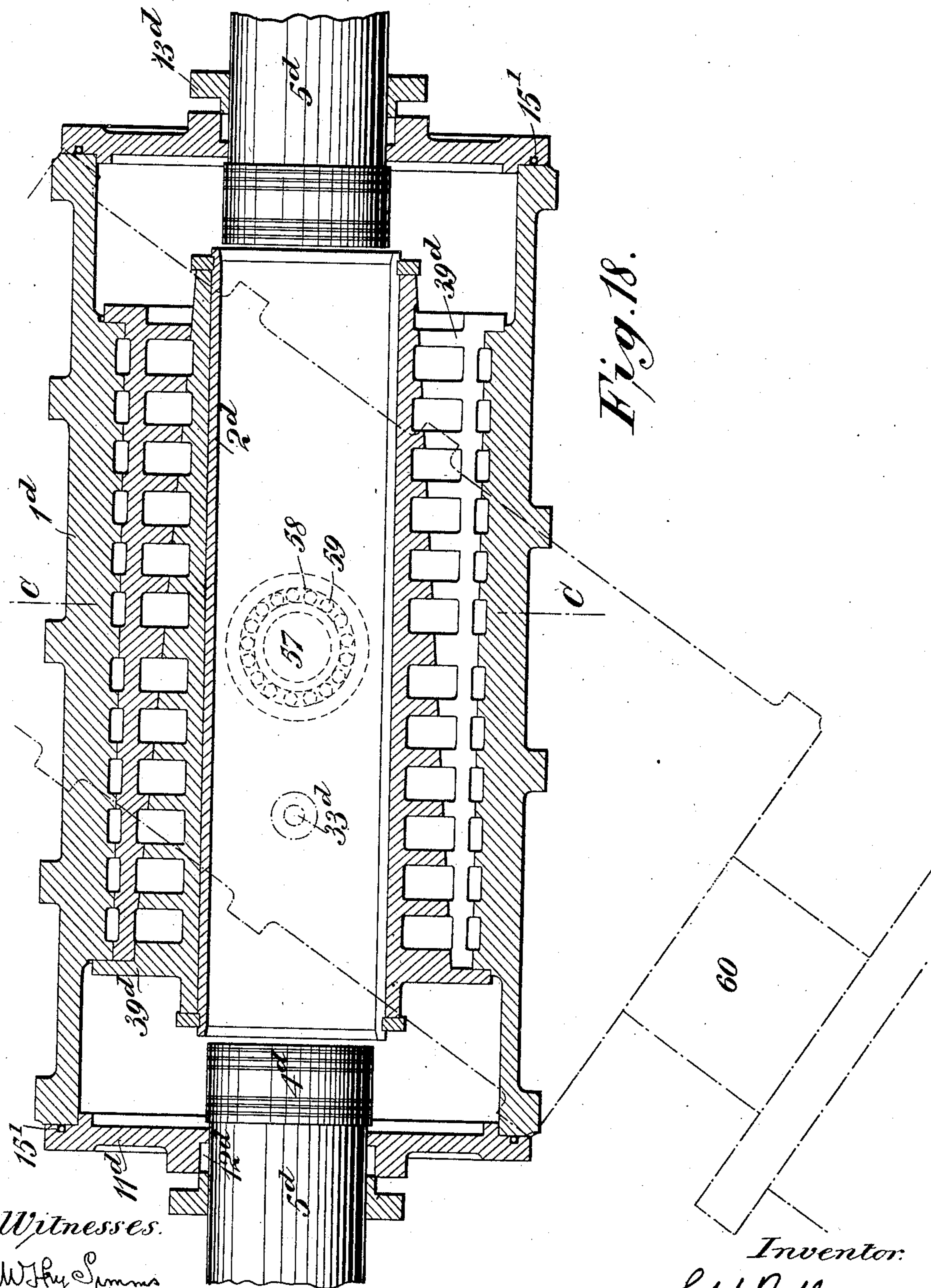


Fig. 18.

Witnesses.
W. H. Spence
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PATENTED NOV. 6, 1906.

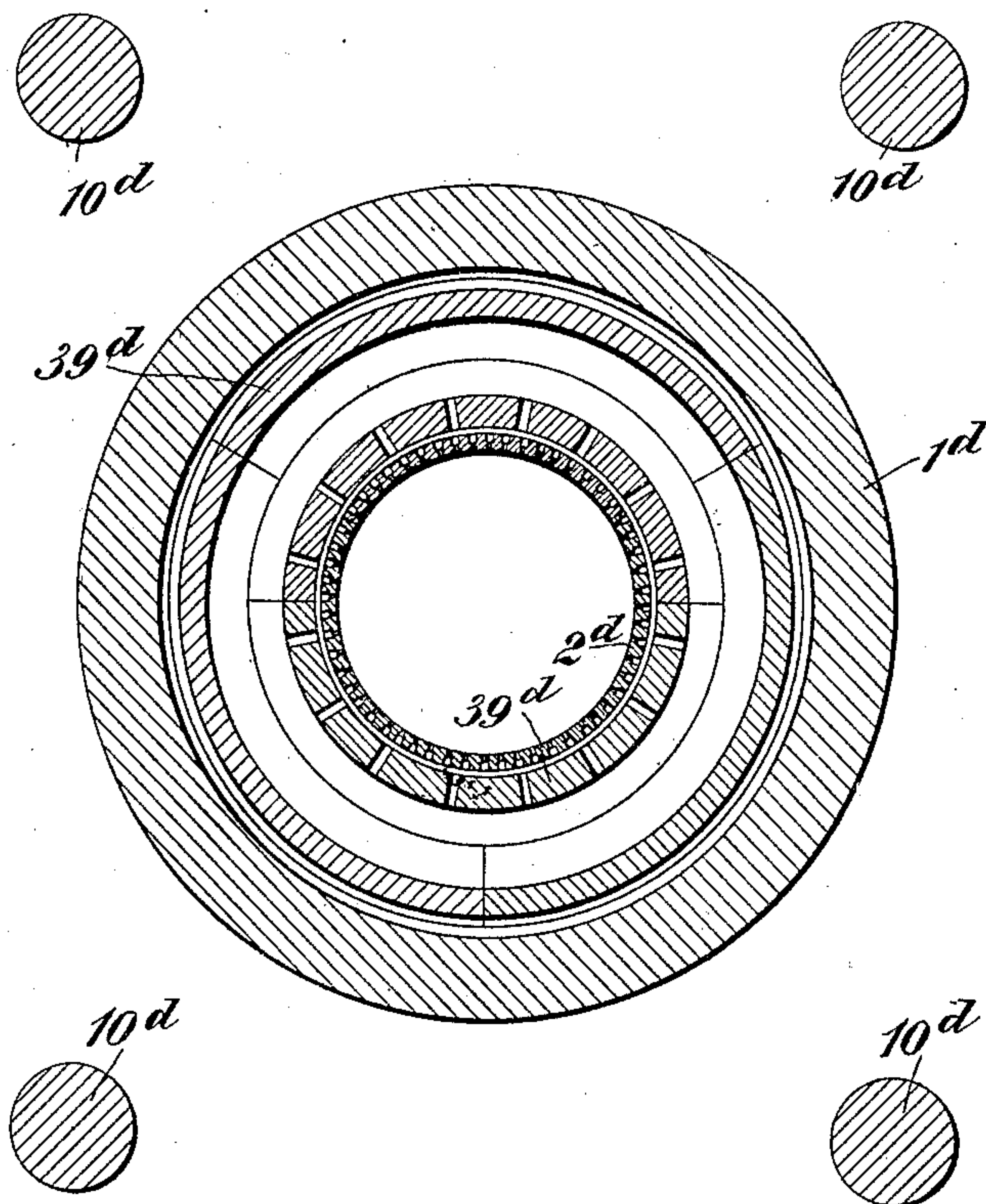
G. W. BELL.

PRESSING OF GUNCOTTON BLOCKS.

APPLICATION FILED APR. 8, 1904. RENEWED OCT. 5, 1906.

12 SHEETS—SHEET 12.

Fig. 19.



Witnesses.

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H. Pillow

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Attorney.

UNITED STATES PATENT OFFICE.

GEORGE WILSON BELL, OF IPSWICH, ENGLAND.

PRESSING OF GUNCOTTON BLOCKS.

No. 835,298.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed April 8, 1904. Renewed October 5, 1906. Serial No. 337,625.

To all whom it may concern:

Be it known that I, GEORGE WILSON BELL, a subject of the King of Great Britain and Ireland, residing at Ipswich, in the county of Suffolk, England, have invented Improvements Relating to the Pressing of Guncotton Blocks, of which the following is a specification.

This invention relates to the pressing of guncotton blocks and apparatus therefor.

In a guncotton-press according to this invention means are provided for making a water-tight joint between the cylinder or other casing containing the mold and the ram, or each of the rams when there are more than one, that is or are provided for acting upon a block of guncotton within the mold, and means are also provided for having water, preferably under considerable pressure, within the casing and in contact with and surrounding the charge, so that the water will be available for the purpose of safety, for reducing and keeping down the temperature of the charge, and for obviating the absorption of air by the charge on its expansion, due to the release of the pressure of the ram or rams.

In the case of a ram or rams which or each of which has a pressing-head of greater diameter than the main portion or stem of the ram the casing is made sufficiently long to extend beyond the end or each end of the mold and to contain the head of the ram or of each ram and is provided at one or each end, as the case may be, with means for making a water-tight joint with the stem of the ram or of each ram. The casing may be hinged at one side and provided with means for making it water-tight thereat and also with means for fastening it water-tight at the opposite side when closed. One or each end of the casing may then have a suitable device for securing thereto in a water-tight manner a U-shaped ring surrounding the stem of the ram in question, or the stem or each stem may be provided with a stuffing-box adapted to form a water-tight joint with the casing.

U-shaped rings or stuffing-boxes may be similarly employed for rams having heads or ends equal in diameter to their stems.

For the purpose of increasing the amount of water that will by the means described surround the end or head of the ram or each ram the end or head or each end or head of a ram is or may be made with a groove or grooves

around it to insure the submersion of all particles of guncotton between the head or end and the wall of the mold.

Guncotton-presses having casings for containing one or more molds each may be constructed according to this invention.

In order that the mode of carrying out the invention may be well understood, illustrative drawings are annexed hereto.

Figures 1 to 8, inclusive, illustrate the construction according to this invention of a press the casing of which is provided with two rams arranged to act on a single charge from opposite ends. Fig. 1 is a longitudinal vertical section of the casing, the mold, the liners of the mold, and the means for securing the water-tight joints between the rams and the casing. Fig. 2 is a cross-section corresponding to Fig. 1. Fig. 3 is a plan of the casing, taken after the removal of the upper part thereof and showing the device for making a water-tight joint between the upper and lower parts of the casing. Fig. 4 is a cross-section corresponding to Fig. 3. Fig. 5 is a face view of one cover of the casing and its gland. Fig. 6 is a sectional broken side view of the casing and the device for fastening the two parts of the casing at the side opposite to its hinge. Fig. 7 is a plan of a bolt employed in the fastening device and Fig. 8 is an end view of the fastening device. Fig. 9 illustrates a detail in vertical section. Figs. 10, 11, 12, and 13 illustrate the construction according to this invention of a press the casing of which contains several molds each provided with a pair of rams arranged to act upon the opposite ends of a charge contained therein. Fig. 10 shows the lower part of the casing, the lower liner, and parts of the stems of the rams in plan, the molds and the covers of the casing in section, and a portion of the upper liner in plan. Fig. 11 is as to the right-hand half a section corresponding to the line A A of Fig. 10 and as to the left-hand half a section corresponding to the line B B of Fig. 10. Fig. 12 is a face view of one cover of the casing and the glands thereof, and Fig. 13 is a side elevation of a portion of the upper liner. Fig. 14 illustrates the construction and use of a casing which is provided with means according to this invention for making water-tight joints with its rams and the upper part of which is adapted to be lifted entirely away from the lower part. Fig. 15 is a broken side elevation, and Fig. 16 is a cross-section to illustrate the construc-

tion and use of a casing which is provided with means according to this invention for making water-tight joints with its rams and the upper and lower parts of which are adapted to be slid longitudinally apart. Fig. 17 represents the press shown in Figs. 15 and 16 in cross-section after the upper and lower parts of the casing have been slid apart. Figs. 18 and 19 are respectively a horizontal section and a cross-section corresponding to the line C C of Fig. 18 to illustrate the employment of wedge-shaped liners in casings provided with means for making water-tight joints between them and their rams.

In the example of apparatus shown in Figs. 1 to 8, inclusive, the casing 1 is made sufficiently long to extend beyond each end of the mold 2 and to contain the head 4 of each ram and to surround the stem 5 of the ram. The casing 1 comprises upper and lower internally-semi-cylindrical parts 6 and 7, which are hinged together, as shown in Fig. 2, by means of lugs 8 and 9, respectively, and a rod 10, and to each end of the lower part 7 there is secured a cover 11, Figs. 1 and 5, forming a stuffing-box 12 and provided with a gland 13, that fits around the corresponding stem 5 of the corresponding ram. To enable a water-tight joint to be made between the upper part 6 of the casing and the lower part 7 and the covers 11 thereof, the lower part 7 and the covers 11 are provided with grooves 14, as shown in Figs. 1, 2, 3, and 4, and into these grooves there is inserted a continuous flexible tube 15, which is adapted to withstand considerable pressure exerted from within by water which is supplied thereto through one of two branches 15', Fig. 3. To prevent the tube 15 from being injured when the upper part 6 is pressed down thereon, the grooves are made so deep that only a small portion of the tube projects beyond the adjacent surface of the parts 7 and 11. To enable the upper part 6 to be fastened to the lower part 7 so as to form water-tight joints therewith and with the parts 11, the upper and lower parts are formed with lugs 16 and 17, respectively, on the sides thereof opposite to their hinge. On the upper set of lugs 16 there is mounted a bolt 18, Figs. 6, 7, and 8, which is provided at one end with guides 19 and 20, secured to the upper part 6, and at the other end with a nut 21, which engages a screw 22, provided with a handle 23 and mounted in a bracket 24, secured to the upper part 6. In the bolt 18, Fig. 7, there are formed openings 25, and to the bolt at opposite sides of each opening 25 there are secured two wedges 26, Fig. 6, which bear against the similarly-inclined under surfaces of the upper head 27 of a vertical bolt 28, whose lower head 29 is secured to the adjacent lugs 17 by set-screws 30. Each of the bolts 28 is T-shaped at both ends and has its heads arranged at right angles to each other, so that its lower head projects under

the two adjacent lugs 17 and its upper head projects over the two adjacent wedges 26.

In Fig. 6 the bolt 18 is shown in its extreme right-hand position, so that the wedges 26, acting upon the heads 27, are forcing the upper part 6 toward the lower part 7, so as to make water-tight joints with the lower part and the covers 11. By turning the wheel 23, and thereby the screw 22, the bolt 18 can be drawn into its extreme left-hand position, so that the head 27 of each bolt 28 (except the extreme right-hand bolt) will be clear of the corresponding wedges 26 and will be over an opening 31, into which the opening 25 leads, while the head 27 of the extreme right-hand bolt 28 will be clear of the right-hand end of the bolt 18, so that the upper part 6 of the casing can be turned upward about its hinge by means of a shackle 32, carrying with it the bolt 18 and leaving the bolts 28 attached to the lower part 7. Water, preferably under pressure, is supplied through an inlet 33, provided with a cock 34.

35 is an outlet provided with a cock 36, by means of which the water can be drained away from the casing as far as required. A cock 37 and a valve 38 are provided at each end of the casing for the purposes, respectively, of allowing of the escape of air on the filling of the casing with water and of allowing of the escape of water should the pressure becomes excessive. The mold 2 is divided longitudinally into three parts which fit within two semicylindrical ribbed liners 39, Figs. 1 and 2, which fit together, the upper one fitting within the upper part 6 of the casing and the lower one fitting within the lower part 7 of the casing.

In the peripheral wall of the mold there are five perforations in about every nine square centimeters, each perforation having an inner portion of about one millimeter in diameter and an outer portion of about four millimeters in diameter, and the cylindrical wall of the liners 39 is provided with perforations 39°, extending radially therethrough, which are about four millimeters in diameter and about three centimeters apart and are connected together by annular grooves 39* and longitudinal grooves 39', while the ribs of the liners 39 are provided with large perforations 40, as shown in Fig. 2, so that water supplied through the inlet 33 will have access to the peripheral portion of the charge within the mold and also by way of the stems and heads of the rams to the ends of the charge, as it will, through the perforations 40, fill the cavities at the ends of the casing, being prevented from escaping therefrom by the stuffing-boxes and glands 12 and 13 and the water-tight joints between the upper part 6 and the lower part 7 and covers 11. The head 4 of each ram is provided with peripheral grooves 41, so that the amount of water that by the means described surrounds the head

of the ram will be increased for the purpose of insuring the submersion of all particles of guncotton between the head and the wall of the mold. Around the three parts which make up the mold 2 there are placed in grooves 42, near their ends, clips 42^a, by means of which the parts are held together during their insertion into the casing and their removal therefrom and which are adapted to abut against the ends of the liners 39 to prevent longitudinal movement of the mold in the liners, which engage with projections 6* and 7* on the parts 6 and 7 to prevent longitudinal movement of the liners in the casing 1.

It will be obvious that instead of providing each stuffing-box 12 with a gland 13, as shown in Fig. 1, it may, as shown in Fig. 9, be provided with a U-shaped ring 43, kept in place by a flange 44, secured to the stuffing-box 12, a ring 45 arranged between the concentric portions of the ring 43, so as to keep it open and in contact with the ram, and a packing-piece 46 between the ring 43 and the flange 44.

The construction of a guncotton-press having a casing containing several molds is illustrated in Figs. 10 to 13, inclusive. In these figures parts corresponding to parts numbered in Figs. 1 to 8, inclusive, are similarly numbered with the affix "a" added, so that, for example, the stuffing-boxes of the apparatus shown in Figs. 10 to 13, inclusive, are marked 12^a and their glands 13^a. As will be seen, the construction is very similar to that shown in Figs. 1 to 8, inclusive, except that as it is unnecessary on account of the smallness of the molds in the example that the ribs of the liners 39^a should all bear against corresponding ribs of the casing 1^a, which is adapted to hold liners, such as those of the apparatus shown in Figs. 1 to 8, inclusive, only five of the ribs are so arranged, and consequently only these five—namely, those marked 47—are provided with perforations 40^a for the passage of water.

Obviously a guncotton-press casing adapted to be made water-tight, as hereinbefore described, can be adapted to have its upper part entirely removed from its lower half instead of being hinged thereto. The removal may be effected either by lifting the upper half or by sliding it away from the lower half or by sliding them apart. Fig. 14 shows in end view and in full lines a guncotton-press casing adapted to have its upper part lifted away from its lower part. For this purpose instead of being hinged at one side, as in the example shown in Figs. 1 to 8, inclusive, the casing is provided at each side with lugs 16^b and 17^b, projecting, respectively, from its upper part 6^b and its lower part 7^b and with a fastening device comprising a bolt 18^b, provided with wedges, such as that in the example shown in Figs. 1 to 8, inclusive. When it is

desired to obtain access to the interior of the casing, the upper part is lifted by means of a crane and chains 48 and transferred to a support 49, on which it occupies the position indicated by dotted lines. Figs. 15, 16, and 17 illustrate the construction and use of a casing the upper and lower parts 6^c and 7^c of which are adapted to be slid longitudinally apart. The upper part 6^c is for this purpose secured to the rams 50 of small hydraulic cylinders 51 and is provided with projections 16^c, that serve to guide it in conjunction with two rods 10^c, which serve to connect the hydraulic cylinder 52 with a corresponding one at the opposite end of the apparatus and also to support the upper part 6^c when it has been removed. Rams and cylinders 53 and 54, corresponding, respectively, to the rams and cylinders 50 and 51, are provided at the other end of the press to draw the lower part of the casing from under the upper part in the direction opposite to the movement of the upper part in order to reduce the length of the press. In this case, as shown in Fig. 17, the water-pipe 15* for making the joint between the upper and lower parts of the casing is arranged at the end of the casing remote from the cylinders 51 in a groove 55 in the adjacent cylinder-cover 11*, which is fixed to the lower part 7^c and at the end of the casing adjacent to the cylinders 51 in a groove 56 in the end of the lower part 7^c of the casing, the adjacent cover 11* being fixed to the upper part 6^c.

As illustrated by Figs. 18 and 19, liners 39^d that are wedge-shaped in longitudinal section, may be used in a casing provided with joint-making means according to this invention. In this case, as illustrated, the body of the casing 1^d may be made in a single piece instead of two pieces hinged together. The casing 1^d may then, as shown, be provided with a pivot 57, an annular bearing 58, and bearing-balls 59 to enable it to be turned about a vertical axis after the withdrawal to a short distance of the covers 11^d, which during pressing are bolted to the ends of the casing 1^d, with interposed annular water-pipes 15' arranged in grooves in the covers and supplied with water after the manner of the joint-making pipes hereinbefore described. After turning the casing as described the liners can be slackened and the mold pushed out by means of a suitable auxiliary ram 60, as indicated by dotted lines. As shown in Fig. 19, four rods are employed for connecting the hydraulic cylinders instead of two in order to enable the casing to be turned.

By subjecting the guncotton, as set forth, to the action of cold water while the guncotton is being compressed in the mold it is possible to prevent to a great extent the expansion of the block of guncotton and the entry of air thereinto on the release of the block from the pressure of the ram or rams and

also to reduce considerably the time during which the block is kept under pressure without thereby running the risk of undue expansion, which frequently results in the breaking or dividing in one or more places of a block of large dimensions, such as those of torpedo charges and the like, for which this invention is particularly applicable. Moreover, water under considerable pressure in the mold will prevent or mitigate explosions due to any sticking of a ram against the wall of the mold, the action of the ram on the block on its release from the wall being lessened by the interposed water, and in the case of an explosion the water within the mold would reduce the force with which the parts of the broken mold would be projected outward.

The right is reserved to vary according to requirements the forms, proportions, and other details of the carrying out of the invention; also, one or more features of the invention may be employed without another or others.

What I claim is—

1. A guncotton-press comprising a mold adapted to admit water peripherally to the charge, a ram, a casing, and means for making a water-tight joint between said ram and said casing, which is otherwise adapted to retain water in contact with and surrounding said charge.

2. A guncotton-press comprising a mold adapted to admit water peripherally to the charge, a ram, a casing projecting endwise beyond said mold and surrounding said ram, and means for making a water-tight joint between said ram and said casing, which is otherwise adapted to retain water in contact with and surrounding said charge.

3. A guncotton-press comprising a mold adapted to admit water peripherally to the charge, a ram, a casing having a body portion

in two longitudinal parts adapted to be moved apart so as to allow said mold to be lifted out of said casing, means for fastening said two parts together, means for water-tightly jointing between said two parts when they are so fastened together, and means for making a water-tight joint between said ram and said body portion of said casing, which is otherwise adapted to retain water in contact with and surrounding said charge.

4. A guncotton-press comprising a mold adapted to admit water peripherally to the charge, a ram, a casing having a body portion in two longitudinal parts adapted to be moved apart so as to allow said mold to be lifted out of said casing, means for fastening said two parts together, means for water-tightly jointing between said two parts when they are so fastened together, a ring surrounding said ram and adapted to make a water-tight joint therewith, and means for making a water-tight joint between said ring and said body portion of said casing, which is otherwise adapted to retain water in contact with and surrounding said charge.

5. A guncotton-press comprising a mold adapted to admit water peripherally to the charge, a ram, a casing having a body portion in two longitudinal parts hinged together at one side of the casing, means for fastening said two parts together, means for water-tightly jointing between said parts when they are so fastened together, and means for making a water-tight joint between said ram and said body portion of said casing, which is otherwise adapted to retain water in contact with and surrounding said charge.

Signed at Liverpool, England, this 4th day of March, 1904.

GEORGE WILSON BELL.

Witnesses:

WILLIAM JAMES SULIS,
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