

No. 772,670.

PATENTED OCT. 18, 1904.

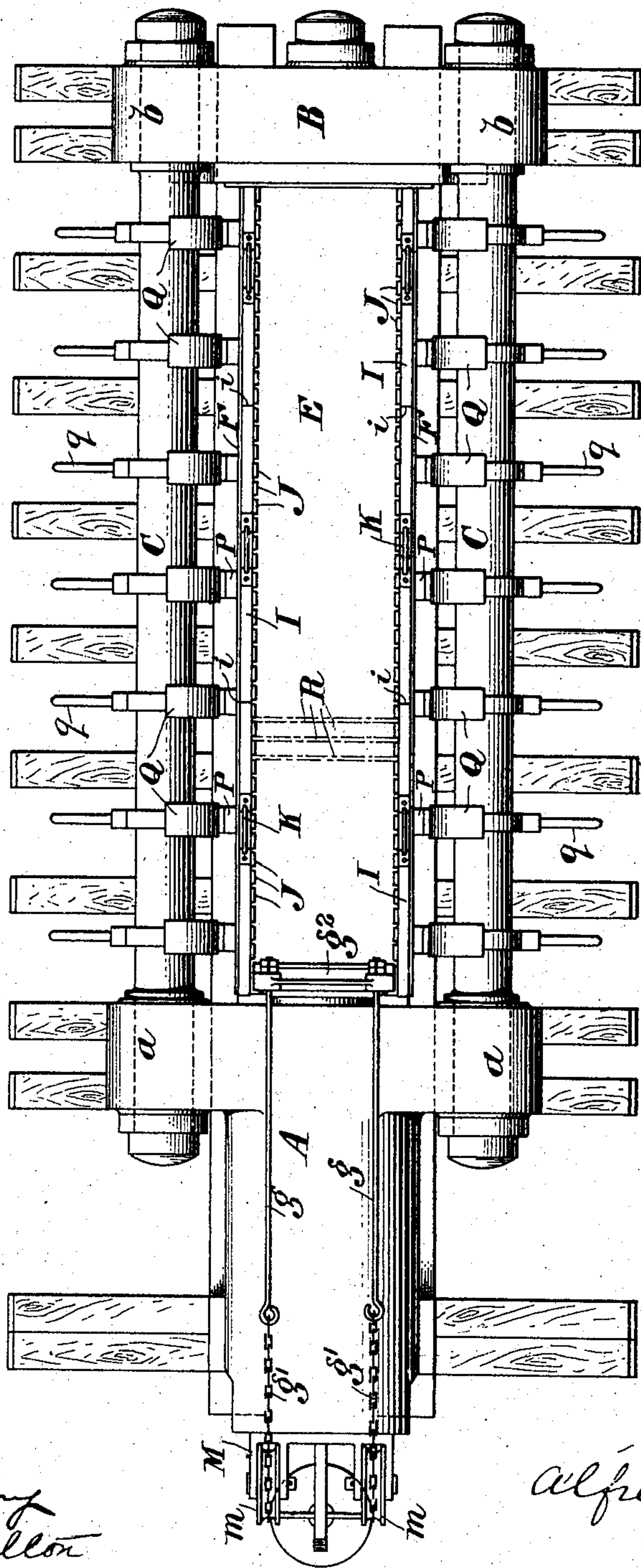
A. I. DU PONT.
POWDER PRESS.

APPLICATION FILED JUNE 11, 1904.

NO MODEL.

4 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

Henry Drury
M. M. Hamilton

INVENTOR

Alfred I. du Pont

BY

Handley & Handley
ATTORNEYS

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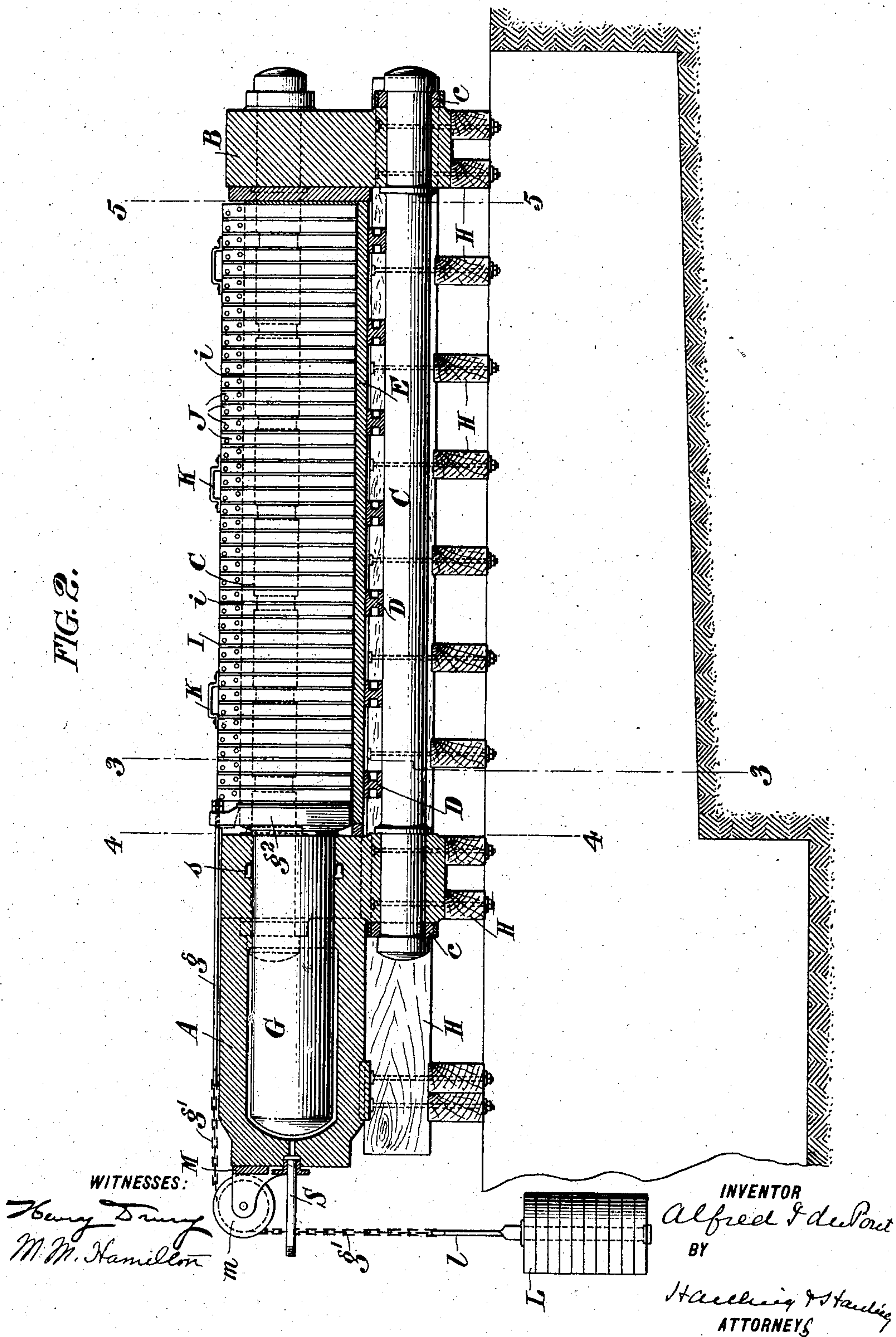
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4 SHEETS—SHEET 2.

FIG. 2.



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4 SHEETS—SHEET 3.

FIG. 4.

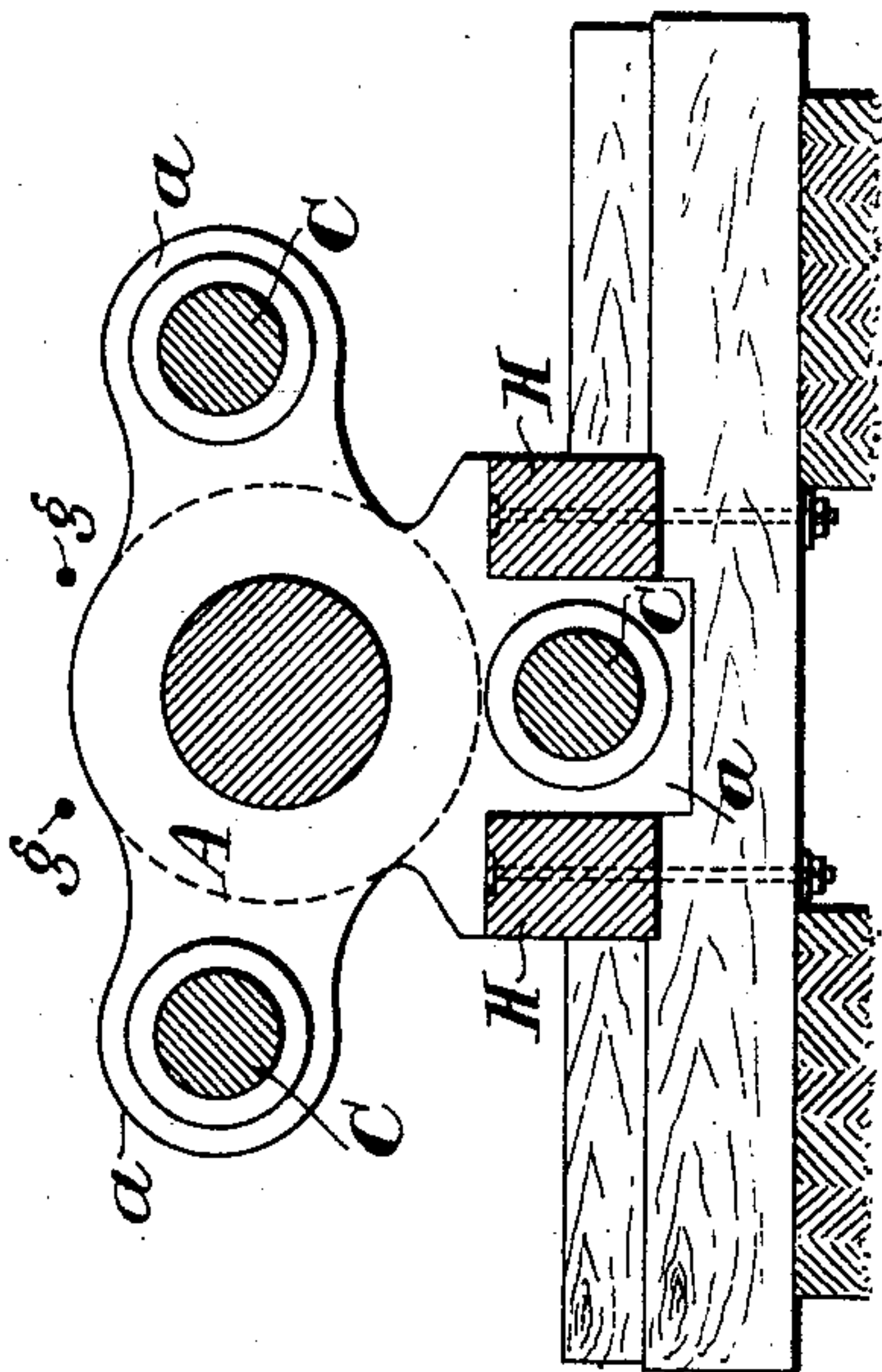


FIG. 5.

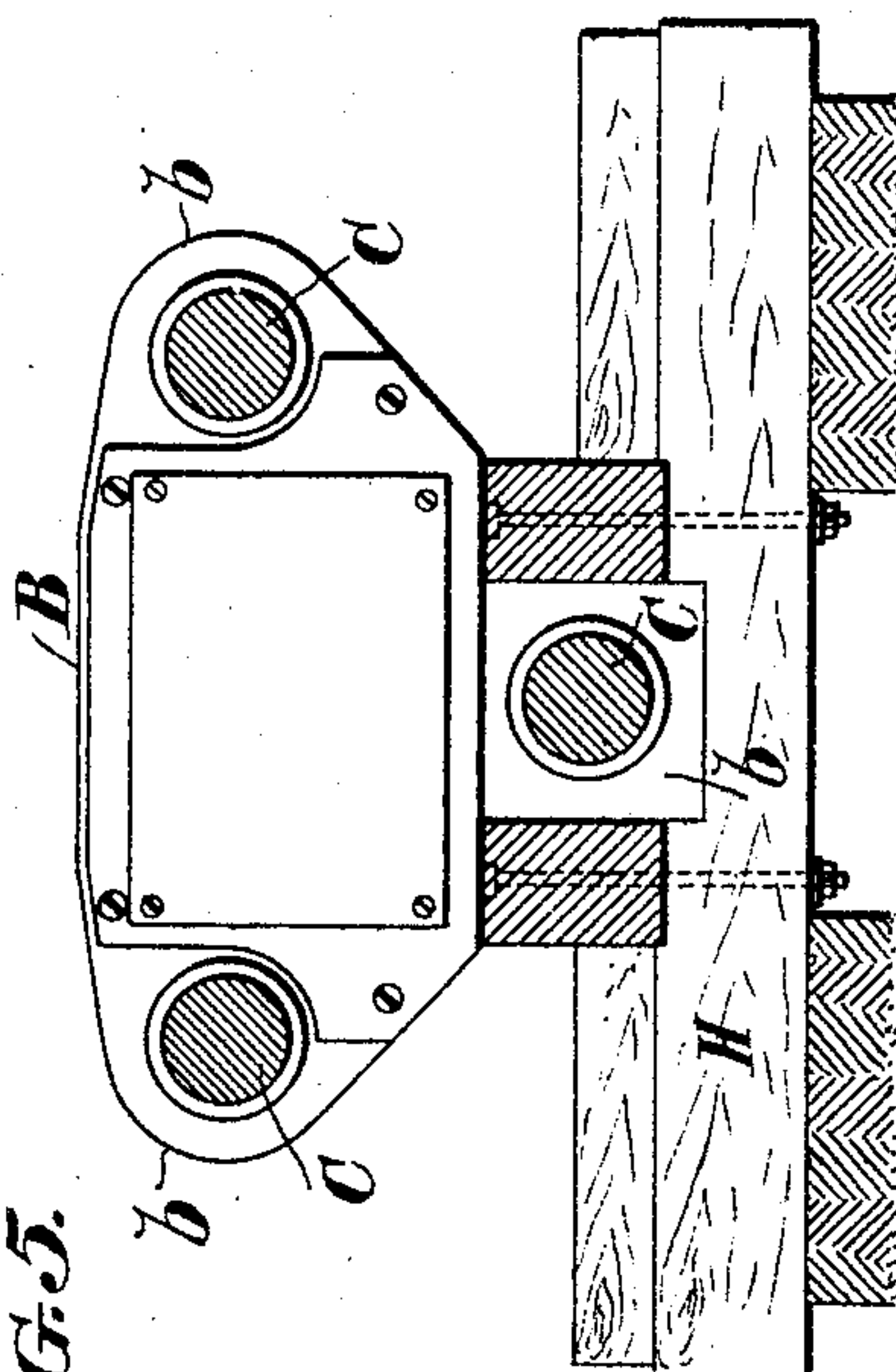
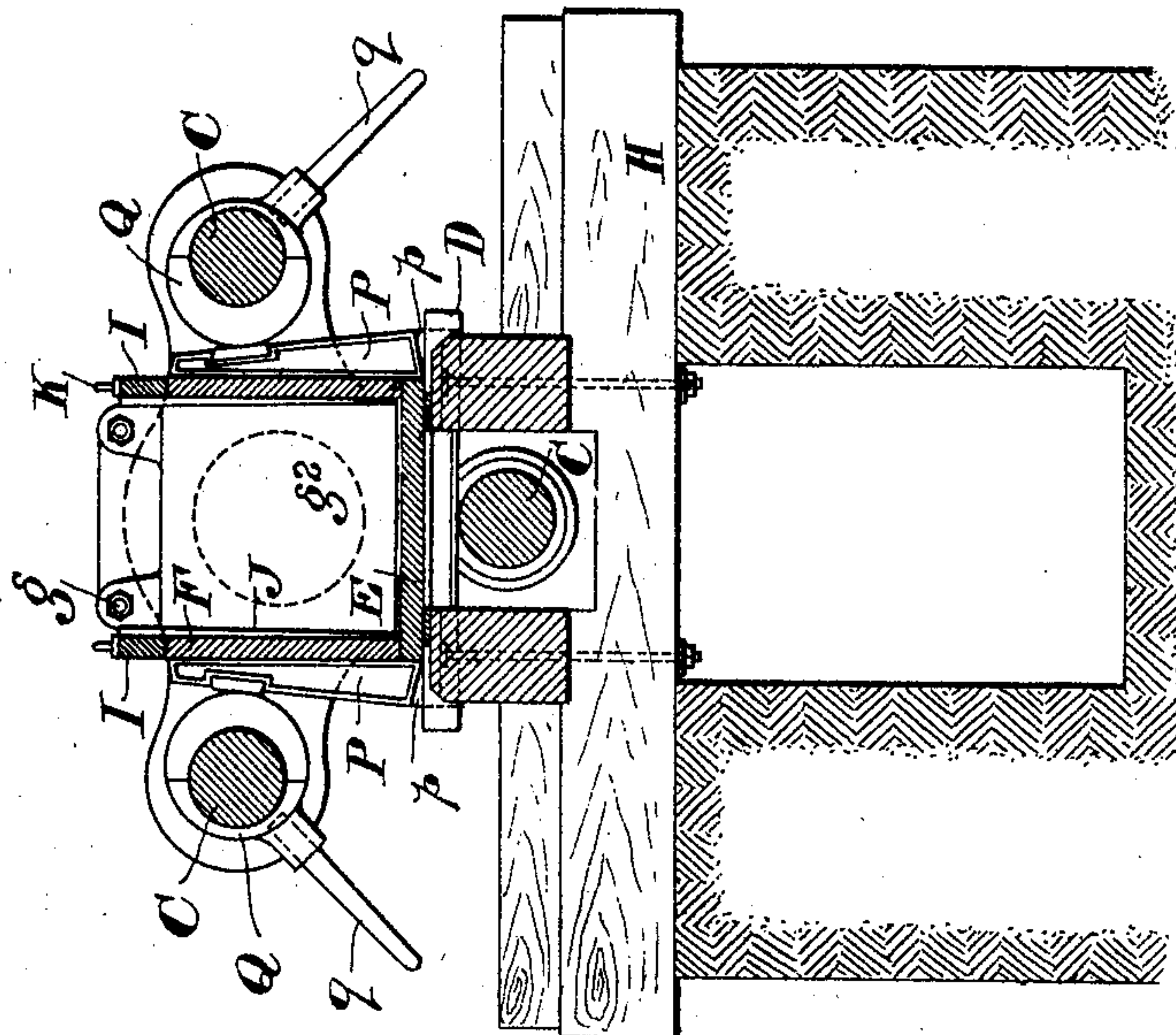


FIG. 3.



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4 SHEETS—SHEET 4.

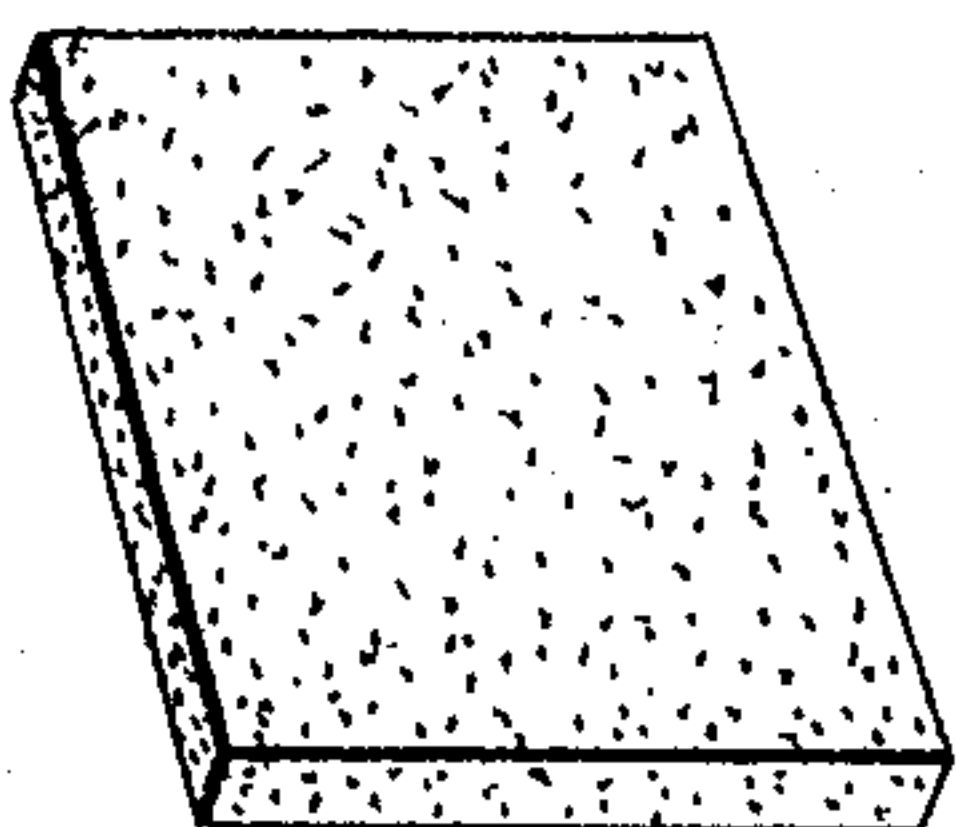
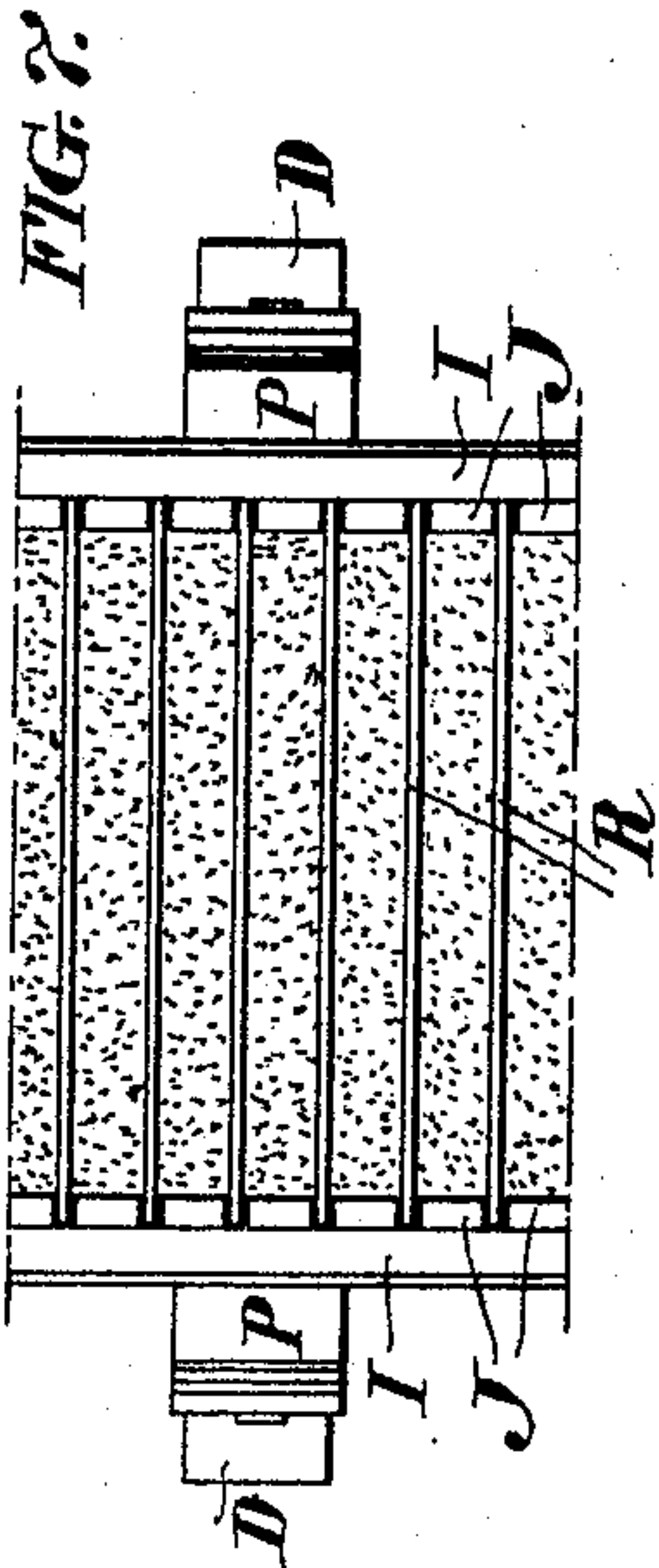


FIG. 10.

WITNESSES:

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M. M. Hamilton

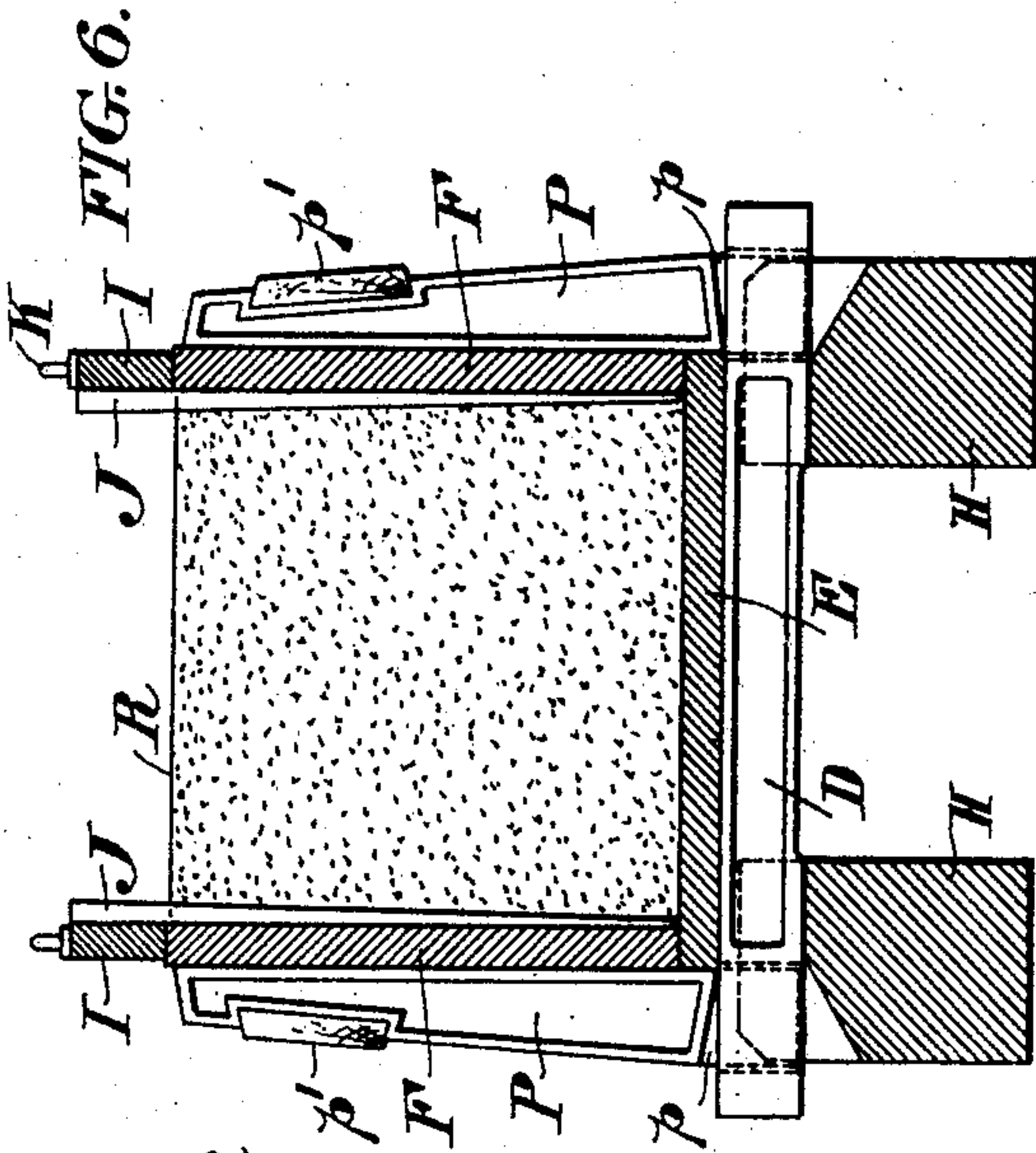


FIG. 6.

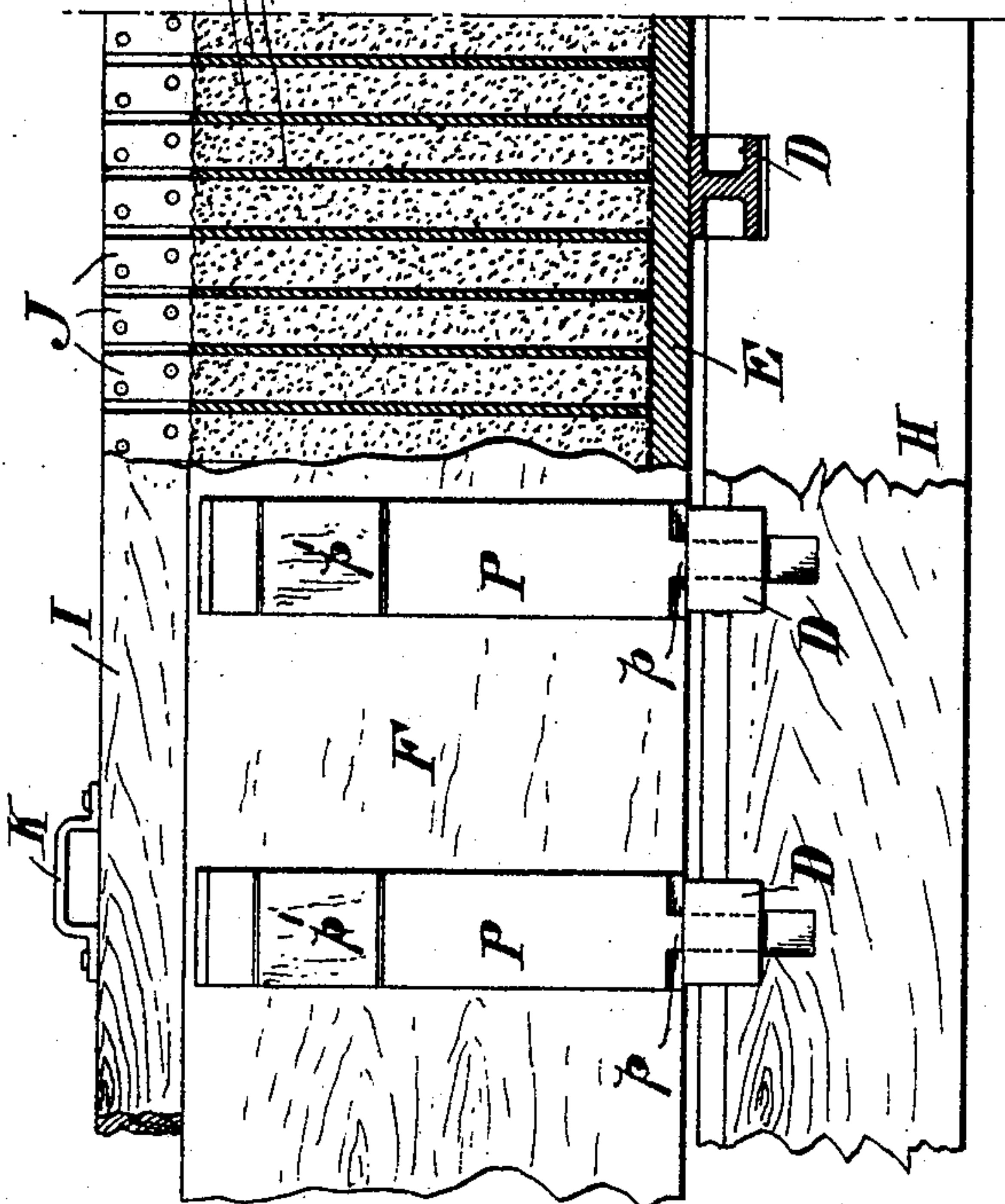


FIG. 8.



FIG. 9.

INVENTOR

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UNITED STATES PATENT OFFICE.

ALFRED I. DU PONT, OF WILMINGTON, DELAWARE.

POWDER-PRESS.

SPECIFICATION forming part of Letters Patent No. 772,670, dated October 18, 1904.

Application filed June 11, 1904. Serial No. 212,130. (No model.)

To all whom it may concern:

Be it known that I, ALFRED I. DU PONT, a citizen of the United States, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Powder-Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain improvements in powder-presses used to compress the previously-formed powder into cakes or briquets, after which the powder is broken into grains of different sizes. Speaking generally, such presses comprise a chamber open at one end, having a fixed bottom and a fixed end or tail block, forming the closed end of said chamber. The sides of said chamber are movable for the purpose of inserting the powder and removing the same after compression. The powder is compressed in the chamber by means of a plunger at the open end of the chamber moving into the chamber and compressing the powder held between the plates in front of it. In these machines the side walls of the chamber have ordinarily been supported in position and against the pressure of the powder under the action of the plunger by means of wedges or wedge-blocks. The difficulty with such method is that to release the sides to remove the powder the wedges have to be driven out by mallets, which as the pressure of the compressed powder against the sides is great is very difficult and quite liable to cause accidents or explosions.

My improvement specifically has for its object to avoid this difficulty. To accomplish this result, I move the sides into proper position and maintain them in that position and release them by means of devices carried by the press and which positively move and hold the sides. The devices I have used are cams, which in the following specification are shown as eccentrics. I can also insert between the devices and the sides blocks of non-sparkable material which prevent such friction as will cause the production of sparks, with the consequent danger of explosions, and also enable

the wear to be taken on these blocks, which may be replaced when worn. Preferably the sides rest against or are secured to movable uprights having a limited movement, against which the devices above described—the eccentrics—act.

I will now describe the embodiment of my invention illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the press. Fig. 2 is a central longitudinal section of Fig. 1. Fig. 3 is a cross-section taken on the line 3 3, Fig. 2. Fig. 4 is a cross-section taken on the line 4 4, Fig. 2. Fig. 5 is a cross-section taken on the line 5 5, Fig. 2. Fig. 6 is an enlarged cross-section of the trough and appliances connected therewith. Fig. 7 is a plan view of Fig. 6. Fig. 8 is a side elevation of Fig. 6 with a portion of the trough broken away to show the interior arrangement. Fig. 9 is a plan view of one of the cross-bars on which the trough rests. Fig. 10 is a perspective view of one of the briquets formed by the press.

The press is preferably supported on a built-up timber foundation H, made to suit the requirements.

A is the pressure-cylinder, bolted to this timber foundation, receiving its pressure medium, preferably water, through the inlet S, and s is a cup-leather placed suitably within the cylinder to prevent leakage.

G is a plunger, suitably placed within the cylinder A, having the enlarged head g^2 . This head g^2 has connected to it the rods g g , to which are connected the pull-back chains g' , leading over the pulleys m to weight-rod l , carrying weights L.

M is a bracket projecting from cylinder A and which carries the pulleys m .

The chamber in which the powder is compressed consists of the tail-block B, forming one end of the pressing-chamber, the bottom portion E, and the side portions F, all preferably formed of wood. The tail-block B has the lugs or extensions b . The cylinder A has the lugs or extensions a .

C represents stay-rods connecting the tail-block extensions b and the cylinder extensions

a. These stay-rods have suitable shoulders and collars *c* for distancing the cylinder and tail-block and also securing the rods thereto.

D represents cross-bars, as shown in the form of I-bars, which are placed at suitable distances beneath the bottom portion E of the chamber and extend from side to side thereof. These cross-bars are carried by the timber foundation H.

The sides F are loose, not being fixedly connected. They are maintained in position in the following manner: P represents a number of vertical standards which have the reduced end portions *p*. These standards with respect to each of the sides are equal in number to the cross-bars D, and the reduced end portions *p* thereof fit into recesses *d* in the cross-bars D, forming a loose connection, whereby the standards may be moved against the sides F or withdrawn therefrom. If desired, the standards P might be secured to the sides F, in which case the standards P and sides would move together. The standards P are recessed, as shown, and in said recesses are placed blocks *p'*, preferably of wood. Instead of wood any other material which under friction will not produce a spark may be used.

Suitably mounted on said rods C are the eccentric cams Q, one of such eccentric cams being placed opposite each standard P, the eccentric cams acting against the blocks *p'*. Resting upon the top edges of the sides F are rails I, having the handles K connected therewith. Connected to each of these rails I are the tapering pieces or gage-boards J, which are set at a suitable distance apart, and when the rails rest upon the top edges of the sides F these tapering pieces or gage-boards J project downward into the pressing-chamber, supported at suitable distances apart. In the spaces between successive pieces or gage-boards J and extending across the chamber are placed the plates R. The pieces J thus act as gage-boards to properly space apart the plates R. A sufficient number of pieces or gage-boards J are used so as to extend the full length of the pressing-chamber, which in practice is about ten feet and for the purpose of easily handling each rail is made into a plurality of sections, three being shown, the joints being indicated at *i*, and each section is provided with a handle K.

The press thus described is particularly designed for compression of black powder into briquets, which are subsequently broken up into grains of different sizes for making the various powders of different grades. In practice, the machine being in the condition described, powder is loaded into the pressing-chamber between the plates. The eccentrics are operated so as to act upon the blocks *p'*, carried by the standards P, so as to hold the sides F. Then by means of the handles K the rails, with the gage-boards J, are removed from

the pressing-chamber. The pressure medium is then admitted to the cylinder A, which forces the plunger G forward. The head *g'* of said plunger G, forming one end of the pressing-chamber in the forward movement of the plunger G, compresses the powder between the plates R. In practice the pressure is about thirty-five hundred pounds per square inch. The plunger moves forward a distance equal to that of the first section of the rail I and is maintained in that position a short time sufficient to give the desired "set" to the powder briquets or cakes. The pressure is then released and the plunger is moved back, due to the action of the weights L, to its initial position. The first section of the rail I, with its pieces or gage-boards J and additional division-plates R, are put in position, more powder being added between these additional plates R. After the insertion of this powder between the new plates the rail and pieces or gage-boards J are removed. Power is again admitted to the cylinder A and the piston moved forward again until the whole charge of powder is sufficiently compressed. The pressure is then released and plunger again moves back, due to the action of the weights L. The cams Q are then turned so as to release the sides F, and the plates and powder cakes or briquets are taken out from the pressing-chamber.

As may be seen, with my improved mechanism the sides may be put in proper position and after the insertion of the powder held there during the compression action. It may also be seen that the desired power is exerted upon the sides to resist the pressure due to pressing action of the plunger. It may also be seen that after the powder has been pressed into briquets or cakes by turning the eccentric the sides may be released and the powder removed without the use of mallets and without the slightest danger of sparking.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a powder-press, in combination, a pressing-chamber provided with a loose side, a cam adapted to support said side and an interposed removable block of non-sparkable material.

2. In a powder-press, in combination, a pressing-chamber, provided with a loose side, a movable upright against which said side rests, one or more cams carried by the machine, acting on said upright.

3. In a powder-press, in combination, a pressing-chamber provided with a loose side, a movable upright against which said side rests, one or more cams carried by the machine, acting on said upright and interposed removable block or blocks of non-sparkable material.

4. In a powder-press, in combination, a

pressing-chamber, provided with a tail-block and loose side or sides, stay-rods for the tail-block, devices movably carried by the stay-rods and adapted in their movement to support and resist pressure upon the side or sides.

5 5. In a powder - press, in combination, a pressing-chamber, provided with a tail-block and loose side or sides, stay-rods for the tail-block, devices movably carried by the stay-
10 rods and adapted in their movement to support and resist pressure upon the side or sides and interposed non - sparkable removable blocks.

15 6. In a powder - press, in combination, a pressing-chamber provided with a tail-block and loose side or sides, uprights carried by the machine so as to have a limited movement, against which uprights said side or sides rest, devices movably carried by the stay-rods and
20 adapted in their movement to move the uprights.

7. In a powder - press, in combination, a pressing-chamber provided with a tail-block and loose side or sides, uprights carried by the
25 machine so as to have a limited movement against which uprights said side or sides rest, devices movably carried by the stay-rods and adapted in their movement to move the uprights, removable blocks of non-sparkable material interposed between said devices and up-
30 rights.

8. In a powder - press, in combination, a pressing-chamber, provided with a tail-block and loose side or sides, stay-rods for the tail-
35 block, eccentrics movably carried by the stay-rods and adapted in their movement to support and resist pressure upon the side or sides.

9. In a powder - press, in combination, a pressing-chamber, provided with a tail-block and loose side or sides, stay-rods for the tail-
40 block, eccentrics movably carried by the stay-rods and adapted in their movement to support and resist pressure upon the side or sides and interposed non - sparkable removable
45 blocks.

10. In a powder - press, in combination, a pressing-chamber provided with a tail-block and loose side or sides, uprights carried by the machine so as to have a limited movement

against which said side or sides rest, eccen- 50
trics movably carried by the stay-rods and adapted in their movement to move the up-
rights.

11. In a powder - press, in combination, a pressing-chamber provided with a tail-block 55
and loose side or sides, uprights carried by the machine so as to have a limited movement against which said side or sides rest, eccen-
trics movably carried by the stay-rods and adapted in their movement to move the up- 60
rights, movable blocks of non-sparkable material interposed between said eccentrics and uprights.

12. In a powder - press, in combination, a pressing-chamber provided with a loose side 65
or sides, uprights carried by the machine so as to have a limited movement against which uprights said side or sides rest, movable de-
vices carried by the machine adapted in their movement to move the uprights. 70

13. In a powder - press, in combination, a pressing-chamber provided with a loose side
or sides, uprights carried by the machine so as to have a limited movement against which
uprights said side or sides rest, cams carried 75
by the machine adapted in their movement to move the uprights.

14. In a powder - press, in combination, a pressing-chamber, provided with a loose side
or sides, cross-bars provided with recesses, 80
uprights loosely fitting in said recesses, against which uprights said side or sides rest, movable devices carried by the machine, adapt-
ed in their movement to move the uprights.

15. In a powder - press, in combination, a 85
pressing-chamber, provided with a loose side or sides, cross-bars provided with recesses, uprights loosely fitting in said recesses, against
which uprights said side or sides rest, cams carried by the machine, adapted in their 90
movement to move the uprights.

In testimony of which invention I have here-
unto set my hand at Wilmington on this 7th
day of June, 1904.

ALFRED I. DU PONT.

Witnesses:

G. A. MADDOX,
J. L. DASHIELL.