

No. 881,164.

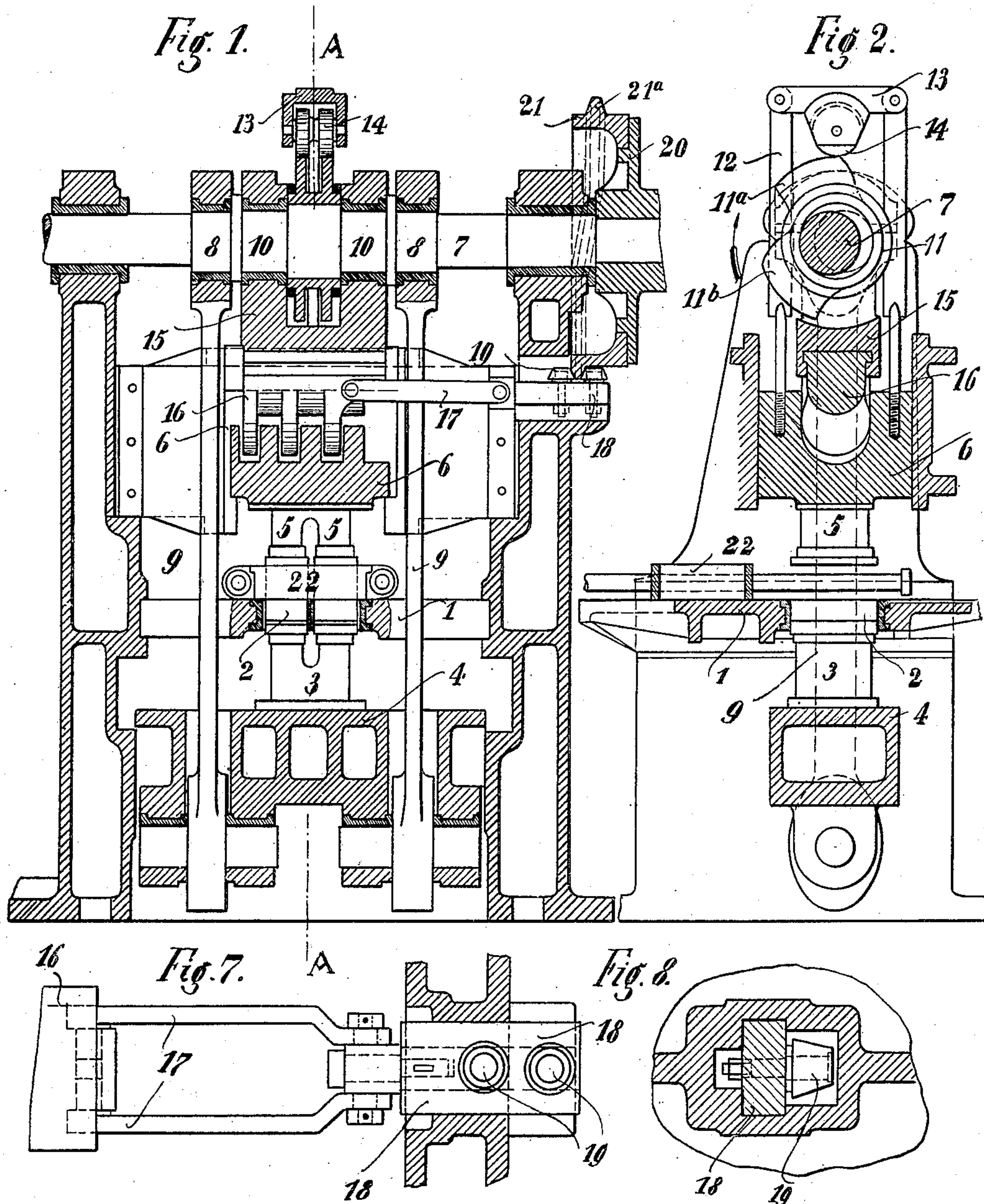
PATENTED MAR. 10, 1908.

W. SURMANN.

PRESS FOR MANUFACTURING BRIQUETS, BLOCKS, ARTIFICIAL STONE,  
AND THE LIKE.

APPLICATION FILED APR. 28, 1906.

2 SHEETS—SHEET 1.



Witnesses:

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Wilhelm Surmann



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2 SHEETS—SHEET 2.

Fig. 3.

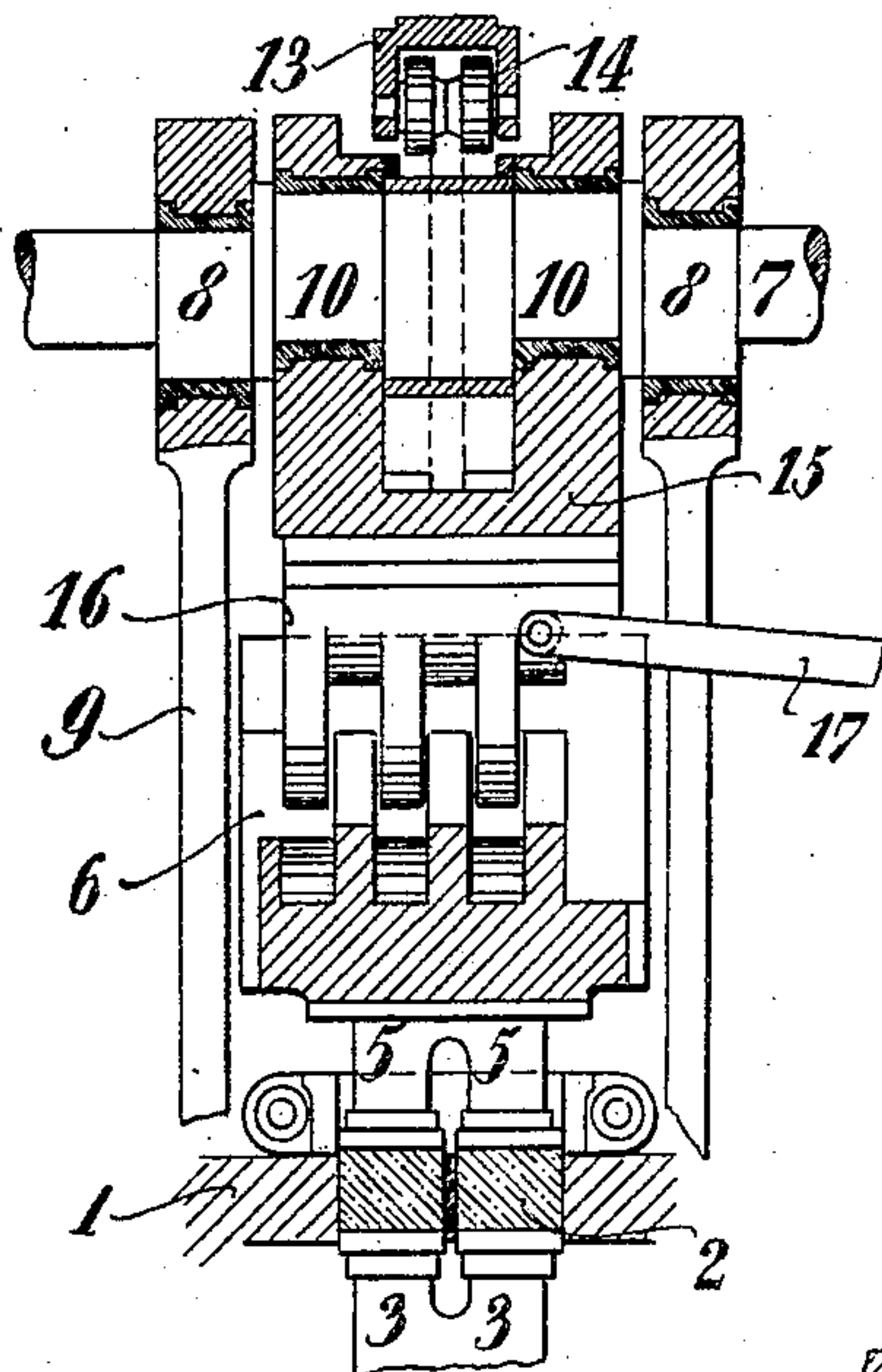


Fig. 4.

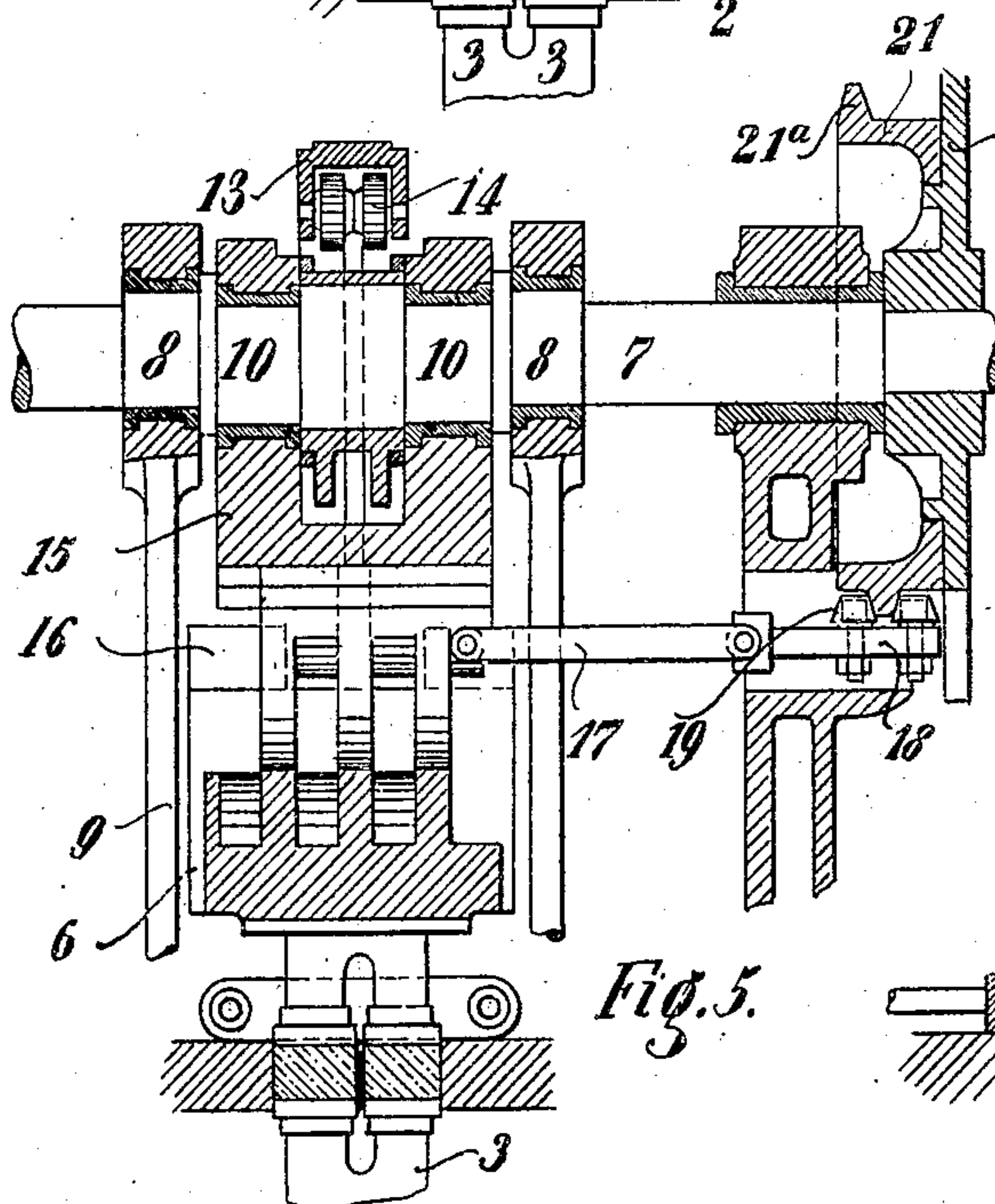
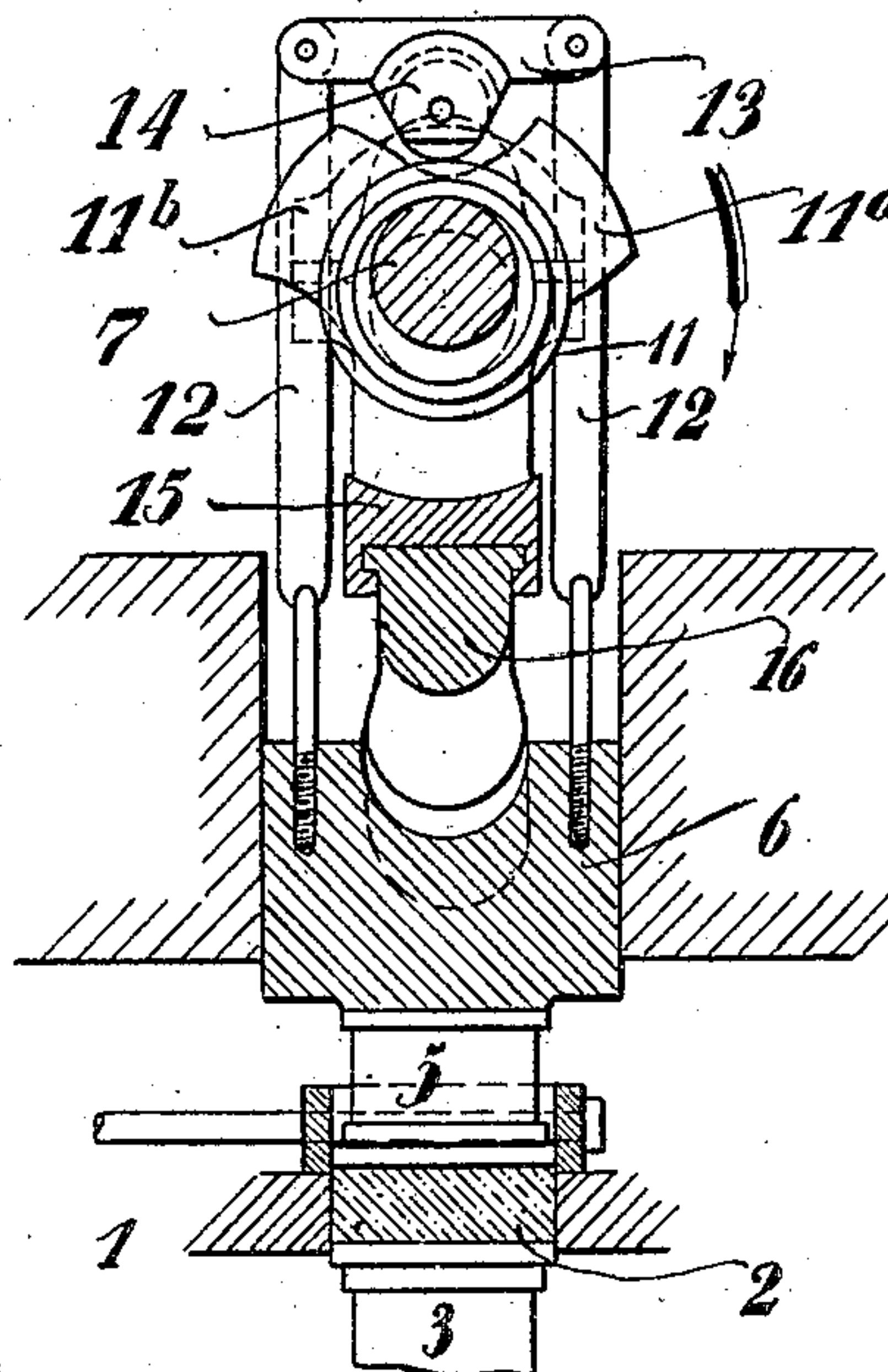


Fig. 5.

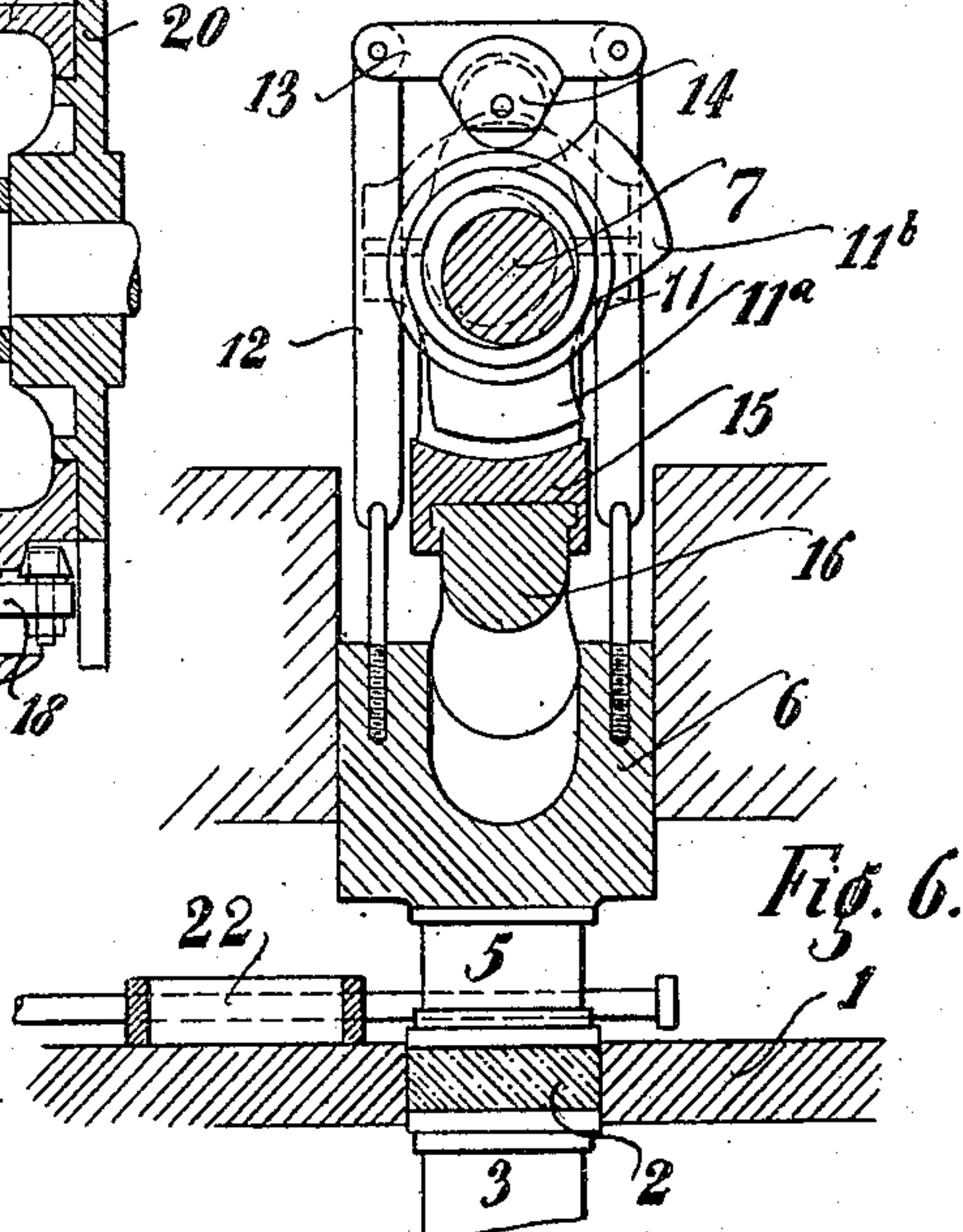


Fig. 6.

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# UNITED STATES PATENT OFFICE.

WILHELM SURMANN, OF COLOGNE, GERMANY.

PRESS FOR MANUFACTURING BRIQUETS, BLOCKS, ARTIFICIAL STONE, AND THE LIKE.

No. 881,164.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed April 28, 1906. Serial No. 314,290.

*To all whom it may concern:*

Be it known that I, WILHELM SURMANN, a citizen of the German Empire, residing at Cologne-on-the-Rhine, in the Province of Rhenisch Prussia and Kingdom of Prussia, Germany, have invented certain new and useful Improvements in and Relating to Presses for Manufacturing Briquets, Blocks, Artificial Stone, and the Like, of which the following is a specification.

The present invention relates to a press for manufacturing mineral coal briquets, lime-sand blocks as well as blocks and the like of other materials, in which the material to be pressed, which has been preferably preliminarily prepared, is brought by means of a slide—the so-called charging mold-box—to the mold-forms and is transferred to the latter by an additional downwardly directed pushing movement being given to the press-stamp in addition to the pressing movement, said press-stamp penetrating the slide situated over the press-molds.

Now presses which work after the manner of a stamp are well known and in their case the above-mentioned effect is obtained by the stamp giving several blows to the material the first blow coming upon the loose material situated in the slide. In the case of another press in which the pressure is effected by a toggle joint-mechanism the pressing stamp in order that the said penetrating or through-pushing motion may be obtained, is arranged together with its gear so as to be capable of reciprocating up and down. Finally, a double toggle joint press for uniform pressure on two sides is also well known in which the upper stamp carrier is arranged so as to be capable of up and down motion in a guide slide connected with the toggle joint-mechanism, and between the two a plate or flap mounted by means of a joint on the slide is provided, so that when the latter is turned aside the upper stamp carrier moves alone and consequently the penetrating movement of the stamp itself can be effected.

The subject matter of the present application is a press in which the upper and lower stamps receive their pressing-movement from a multiple-crank shaft and which is distinguished from presses of this kind which are already known by the upper stamp carrier, which is guided in the press-frame so as to be capable of moving up and down, being not positively connected with the driving shaft through a connecting rod, but,

between the upper stamp carrier and a pushing-head mounted on the shaft, there is arranged an intermediate member which is mounted on the pushing-head. The lower end of this intermediate member is shaped like a comb and the member is mounted so as to be displaceable transversely to the spaces between the teeth of the comb-like under portions of the head. This intermediate member is so adjusted with regard to the upper stamp carrier, which is correspondingly shaped like a comb at its upper end, that for the pressing operation the tooth-like projections of both parts stand one upon another and cause the motion of the pushing-head to be transmitted to the upper stamp, whereas after the pressing operation has been completed the comb-projections of the intermediate member are set opposite the spaces between the teeth on the upper stamp carrier the consequence being that the latter can be moved independently of the pushing head by means of a cam provided on the shaft for the purpose of causing the upper stamp to execute a quick stroke and to obtain the penetrating movement of said stamp.

The new press is illustrated by way of example on the accompanying drawing, all parts of the description which are not necessary for a clear comprehension of the invention being omitted.

In said drawing: Figure 1 shows the press in perpendicular section, the upper stamps being raised for the slide-motion. Fig. 2 is a perpendicular section on the line A—A of Fig. 1. Figs. 3 and 4 are views corresponding to Figs. 1 and 2, the upper stamps, however, being lowered after having penetrated through the slide. Figs. 5 and 6 are similar views showing the pressing operation of the stamps. Figs. 7 and 8 illustrate details hereinafter described.

1 is the press-table with the press-molds situated therein. The lower stamps project from below upwards into said press-mold in the ordinary manner, said lower stamps standing on a cross head 4 arranged below on the press, while the upper stamps are arranged on a carrier 6 above the table 1, which carrier is guided so as to be capable of reciprocating up and down on the machine.

The pressing-devices or press-stamps are actuated from the shaft 7 which is suitably driven and which is supported in the upper



part of the frame. Said shaft is provided with a plurality of cranks, eccentrics, or their equivalent, and in the example shown the eccentrics 8 are connected through connecting rods 9 with the lower cross-head 4 so that the latter and consequently also the under stamps 3 are positively reciprocated up and down. The upper press stamps 5 are actuated on the one hand from similar eccentrics 10 which are staggered or displaced with regard to the aforesaid eccentrics 8 through  $180^\circ$  or approximately  $180^\circ$ , and on the other hand from the cam-disks 11 which are provided with two cam-tappets 11<sup>a</sup>, 11<sup>b</sup> and which are secured on the shaft 7 between the eccentrics 10. For this purpose two perpendicular upwardly directed connecting-rods 12 are screwed into the upper stamp-carrier 6, said connecting-rods passing on opposite sides of the shaft 7 and being connected above the same by means of a cross-bar 13. In said cross-bar 13 rollers 14 are mounted upon which the cam-disks 11 act so that, on the shaft 7 rotating, the upper stamp carrier 6 together with the stamps 5 is raised by means of the tappets on said cams, whereas after the tappets have ceased to engage with the rollers the upper stamp carrier 6 falls down again like a stamp on account of the influence of its own weight. In order to prevent the connecting-rods 12 from bending they are preferably guided in the press-frame above the cross-bar 13 although for the sake of simplicity no such additional guidance is illustrated on the drawing.

Upon the eccentric 10 of the shaft 7 a pushing-head 15 is movably mounted and between the same and the upper stamp-carrier 6 an intermediate member 16 is inserted said intermediate member being arranged so as to be capable of being displaced to and fro on the pushing-head transversely to the stroke of said head. Said member is formed at its lower end like a comb. The upper end of the upper stamp-carrier 6 is correspondingly shaped like a comb and these parts are designed to have such a height that, when the comb-teeth of both parts are situated upon one another end to end, the downwardly directed pushing movement of the head 15 is transmitted to the upper stamp carrier 6, whereas after the intermediate member has been displaced by an amount equivalent to half the pitch of the teeth the upper stamp-carrier can be moved to and fro independently of the pushing-head, in which case the teeth of the one part enter into the spaces between the teeth of the other part. In order that the lateral movements of the pushing-head conditioned by the eccentricity of the eccentrics 10 may not be obstructed the teeth of the intermediate member 16 as well as the latter itself are cylindrically rounded off at the

bottom of the tooth-spaces whereas the corresponding surfaces of the upper stamp-carrier 6 are formed correspondingly cylindrical and concave.

In order to bring about the displacements of the intermediate member 16 the same is connected through connecting-rods 17 with a slide-piece 18 suitably mounted so as to be capable of moving to and fro on the frame, two running-rollers being arranged close to one another on said slide-piece. Between said rollers there engages a ring-shaped projection 21<sup>a</sup> provided on the rim of a disk 21 connected with the driving-wheel 20 mounted on the shaft 7, said projection following such a course that it gives the required movements to the slide 18 and consequently also to the intermediate member 16. In order that these driving members may not obstruct the movements of the intermediate piece 16 caused by the pushing-head 15, the connecting-rods 17 are connected through a universal joint with the slide 18.

Upon the press-table 1 the charging slide 22 is finally arranged in a well known manner so as to be capable of being pushed to and fro, said slide being charged from a suitable holder at the proper time with material to be pressed and said material is then brought to the press-mold, the slide being pushed forward until it is over the latter.

The manner in which this press operates is as follows: After the pressure is over, the intermediate member 16 is so set that the teeth of the same stand over the tooth-spaces of the upper stamp-carrier 6. After this has been effected, on the shaft 7 rotating further in the direction of the arrow shown on the drawing, the upper stamp carrier 6 with its stamp 5 is quickly raised by means of the cam-tappet 11<sup>a</sup> and is held in its raised position until the briquet prepared during the previous pressing operation is lifted out of the press-mold 2 and until the charging-slide 22 charged with fresh material is pushed forward until it comes over the press-mold 2 (Figs. 1 and 2). The tappet 11<sup>a</sup> then releases the upper stamp-carrier 6 so that the latter now falls down freely as in the case of a stamp and the stamp 5 consequently penetrates or passes through the charging-slide 22, and consequently forces the material contained therein into the press-mold 2 (Figs. 3 and 4). After this the upper stamp carrier 6 is raised again by the tappet 11<sup>b</sup> so that the charging slide 22 can then be pushed away from the press-mold. If now the tappet 11<sup>b</sup> has ceased to engage with the running rollers 11 the upper stamp-carrier 6 falls again downwards until the stamps 5 fall upon the material in the press-form 2. The intermediate member 16 is now adjusted once more so that its teeth now come over the teeth of the upper stamp-carrier and consequently the intermediate member 16 transmits to the upper



stamp-carrier 6 and the stamps 5 the motion of the pushing-head 15 which at this moment is directed downwards whereby the pressure stroke is obtained, the lower stamps 3 being simultaneously raised. The cam-disk 11 is of course so designed that after the fall of the upper stamp-carrier it permits its downward movement caused by the pushing-head 15 and likewise the falling movement is such as the described displacements of the intermediate member can be effected without obstruction. After the pressure is at an end the above described cycle begins once more.

As can be readily seen in the case of this new press the upper stamps exercise on the material a three-fold action in which, during the first two actions, they work like a stamp, whereas during the third action they are positively pressed down upon the material to be pressed. Consequently an absolutely firm and perfectly uniform product is obtained. At the same time all the movements can be executed very quickly so that the press can be run at a great velocity and consequently the press, with regard to its quantitative output, excels all other presses which have hitherto been known.

I am aware that brick presses of various constructions have been made and I do not claim broadly such presses but what I do claim is:

1. In a press, the combination of a stamp and a stamp carrier with a driving shaft, a pushing head driven thereby and a laterally movable intermediate part, through which the said shaft and pushing head operate the said stamp, and means for laterally shifting the said part, the proximate faces of said stamp and intermediate part being provided with alternating recessed portions and projecting portions, the projecting portions of these two faces being in contact during the pressure, but the projections being opposite the recesses, to permit the independent rising and falling of said stamp, when a sudden stroke of said stamp is desired.

2. In a press, the combination of a stamp and a stamp carrier with a driving shaft and pushing head, an intermediate part through which the said head pushes said stamp; means for moving said intermediate part laterally, and means for causing the independent movement of said stamp for a sudden blow, the opposed faces of said stamp carrier and intermediate part being such that this independent movement is permitted when the said intermediate part is in one lateral position, but not permitted when it is in another lateral position substantially as set forth.

3. In a press, the combination of a stamp with means for pressing the same, an intermediate laterally movable part for transmitting such pressure, means for laterally moving said part, and means for temporarily lifting and then releasing the said stamp, in order that it may fall and give a sudden stroke, the said intermediate part being shaped to permit in one of its lateral positions this independent action of the stamp.

4. In a press, the combination of a stamp, with a driving shaft and means whereby said shaft in its rotations presses down said stamp, said means including a shifting element which in one position allows the independent movement of said stamp, a tappet carried by said shaft, and intermediate means acted on by said tappet to lift said stamp, the said means being released by the continued turning of said shaft and tappet and then permitting said stamp to fall with a sudden blow.

5. A pair of stamps acting on material between them, in combination with means for applying pressure to the lower part of said stamps, a carrier for the upper stamp provided with a comb-like upper face, a part above said carrier having a corresponding comb-like lower face, means for shifting laterally said part to bring the projections of said faces opposite the recesses above or below them and thereby permit independent vertical play of said upper stamp, a driving shaft provided with a pressure head for pressing said upper stamp and with a tappet for lifting the said upper stamp and means engaging said stamp and temporarily engaged by said tappet, but adapted and arranged to slip from said tappet at a certain point of its rotation, thus permitting the stamp to fall by gravity with a sudden blow.

6. In a press, the combination of a stamp, means for applying pressure thereto, means for causing independent movement of said stamp from and toward the work, an intermediate part adapted in one of its lateral positions to permit such movement of said stamp and a rotary disk and reciprocating slide for moving said intermediate part into this position at will, the said disk and slide being provided with engaging parts, in order that the rotation of the former may actuate the latter substantially as set forth.

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

WILHELM SURMANN

Witnesses:

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LOUIS VANDORY.