

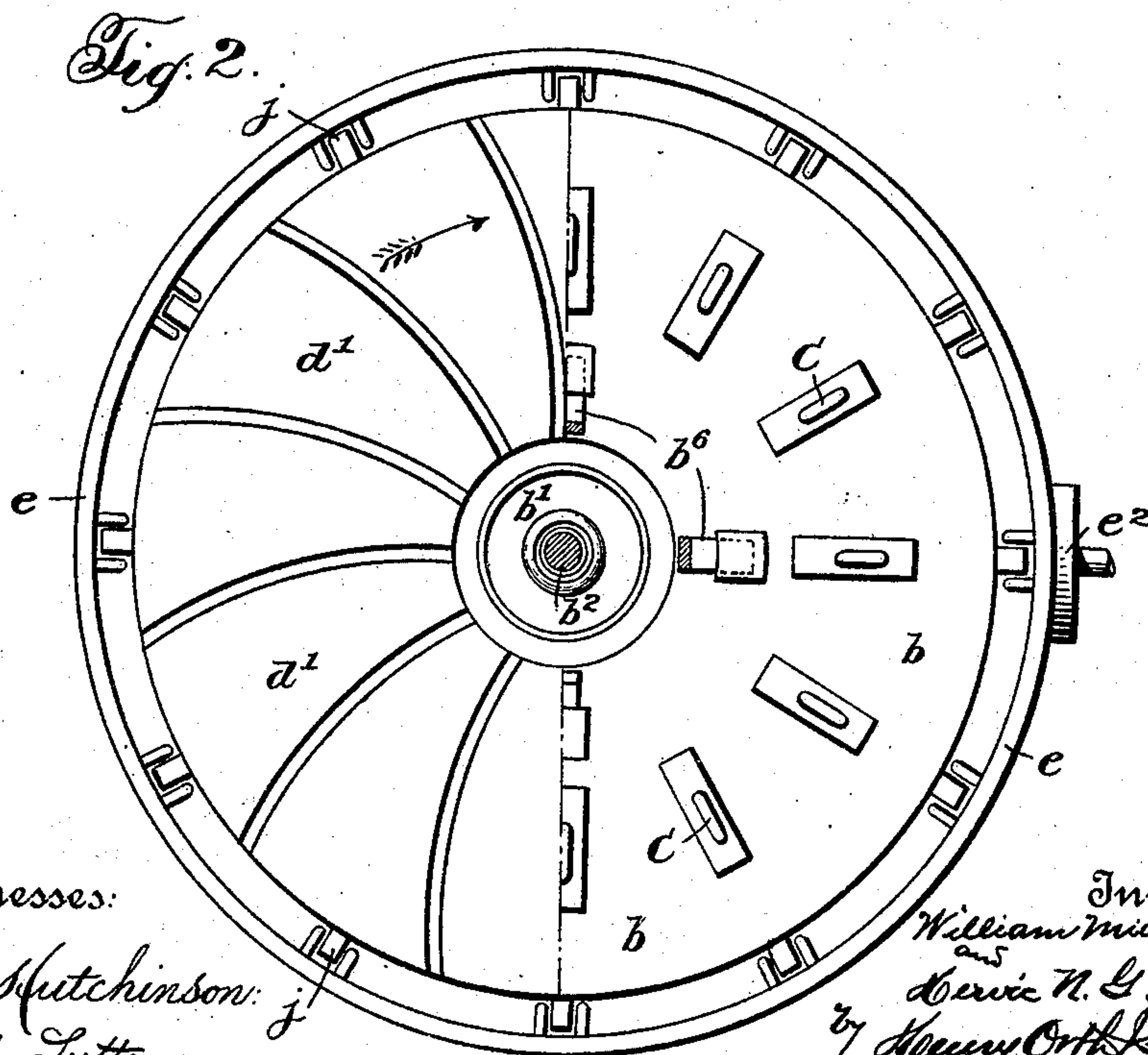
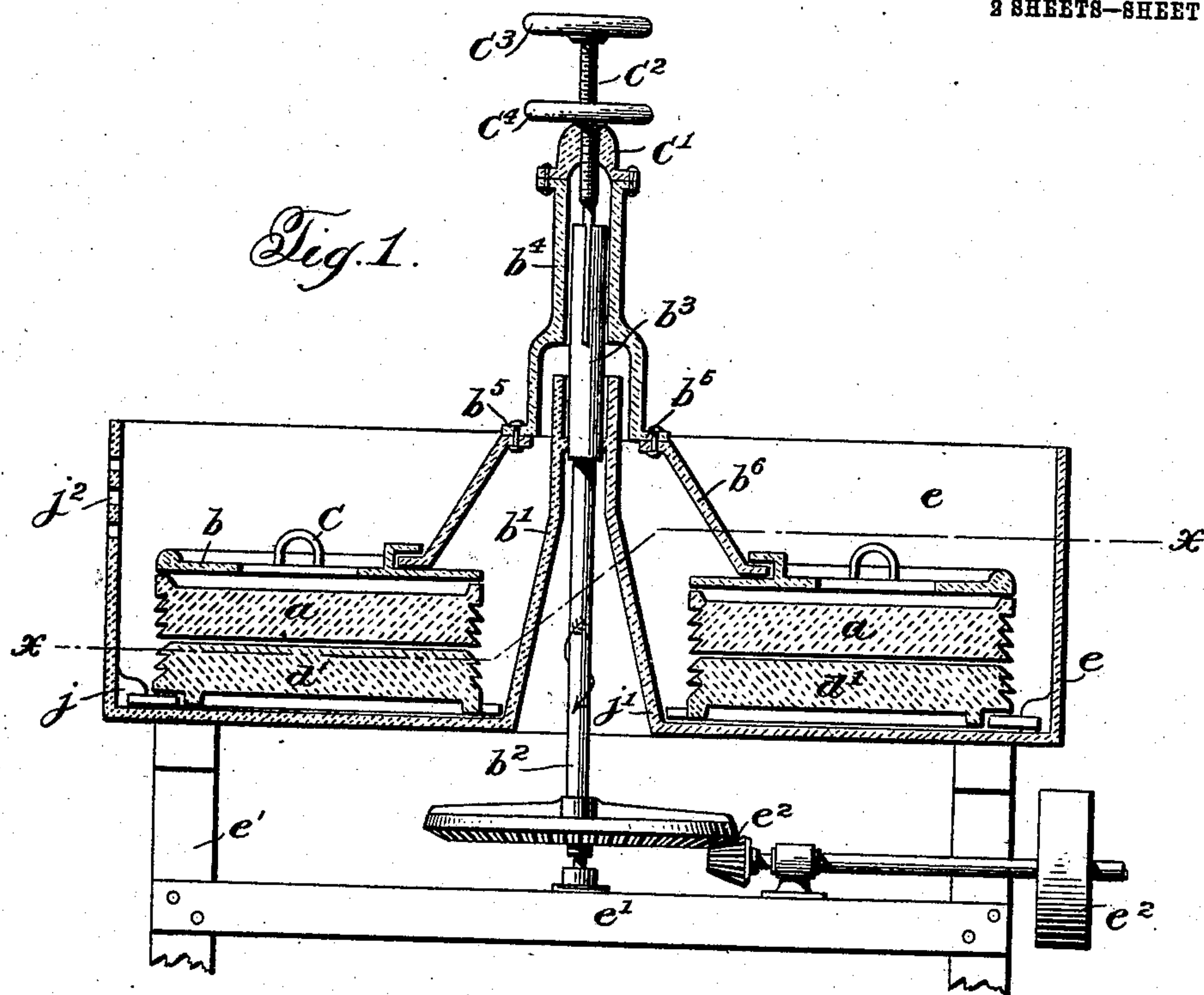
No. 867,989.

PATENTED OCT. 15, 1907.

W. MIDDLETON & H. N. G. COBBE.
SHOE AND DIE OF GRINDING PANS.

APPLICATION FILED NOV. 14, 1905.

2 SHEETS—SHEET 1.



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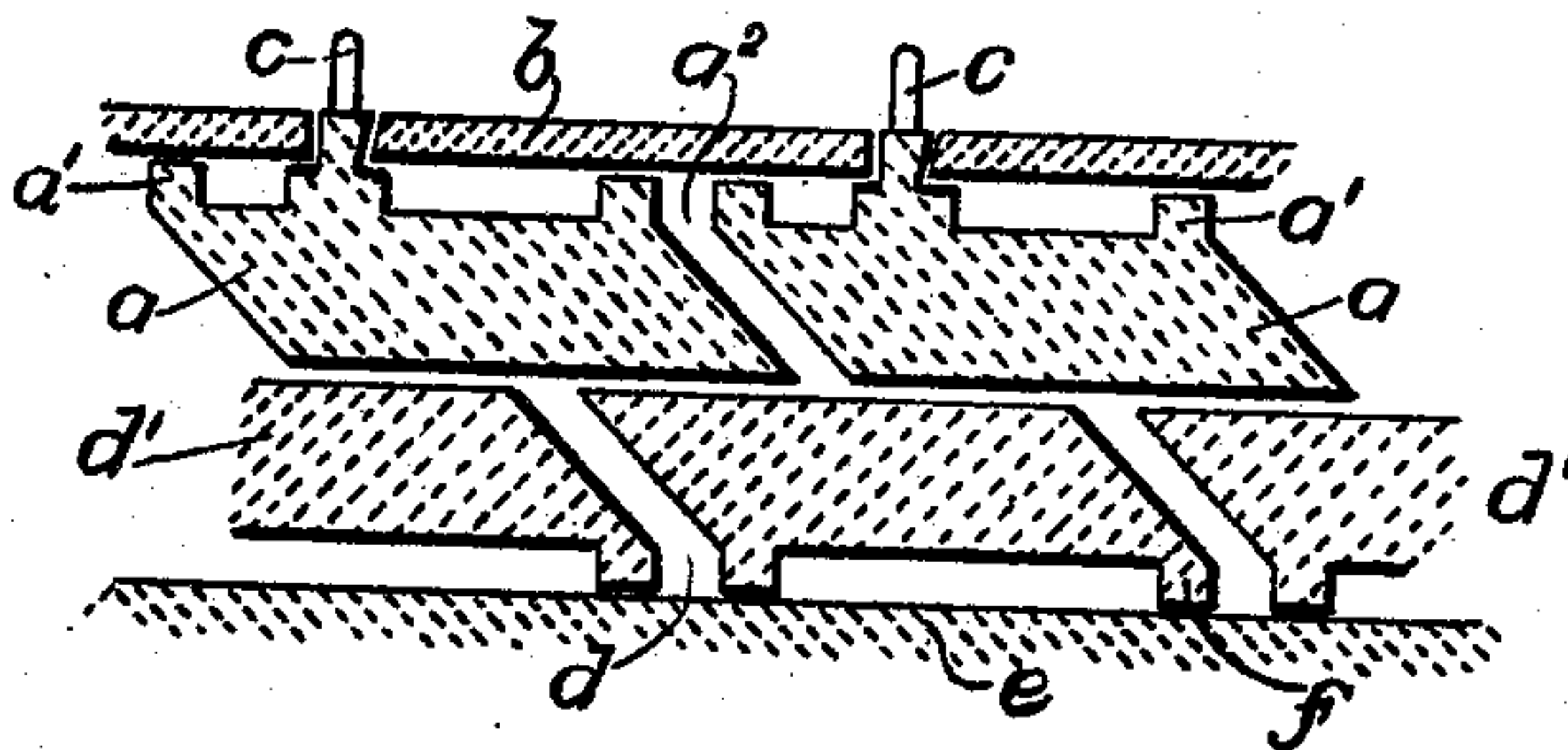


Fig: 3

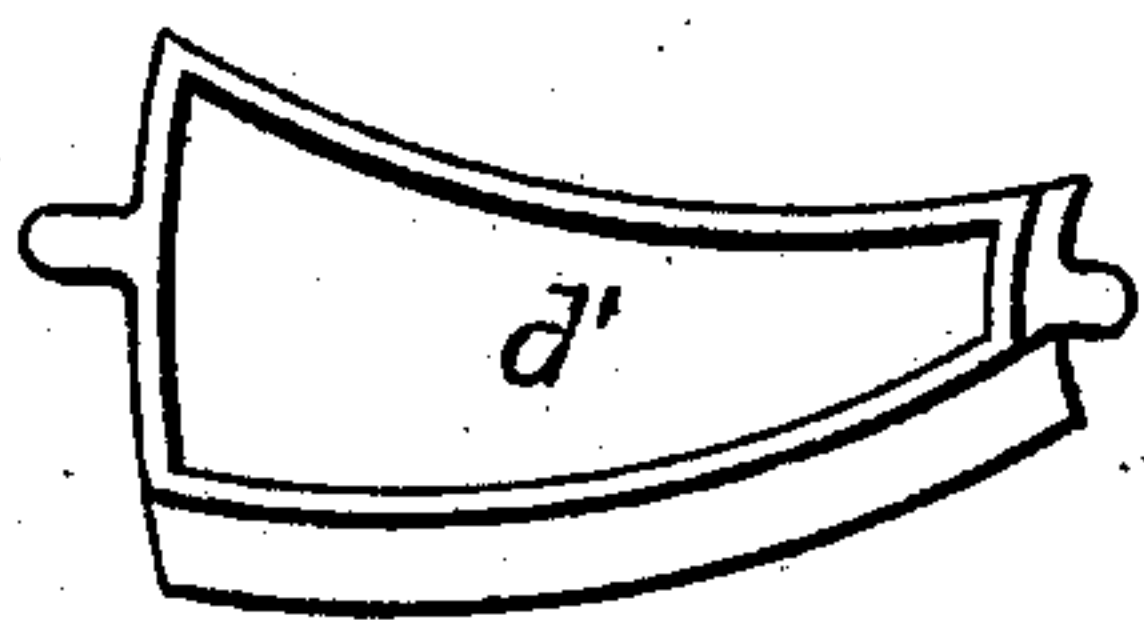


Fig: 4.

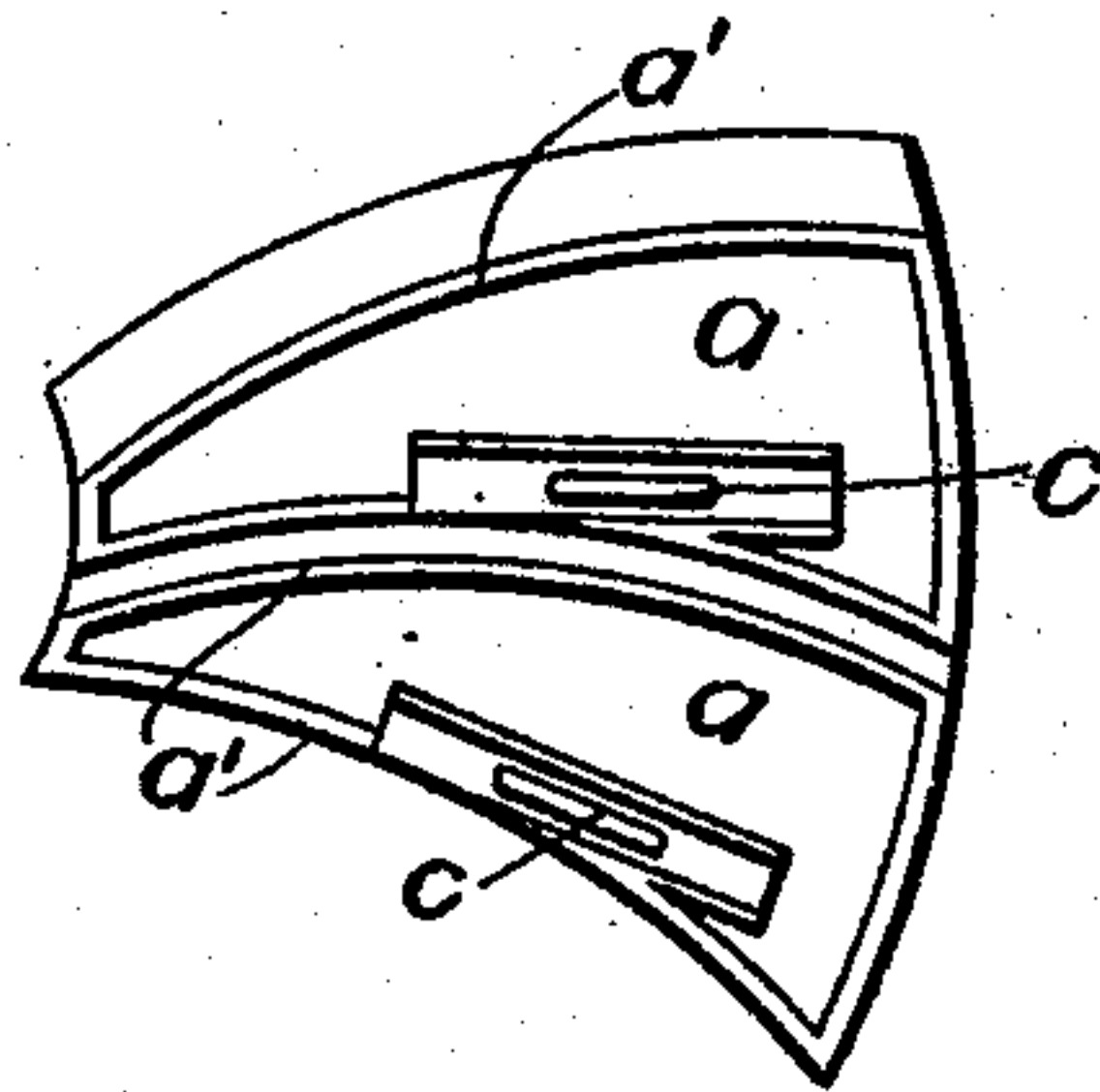


Fig: 5.

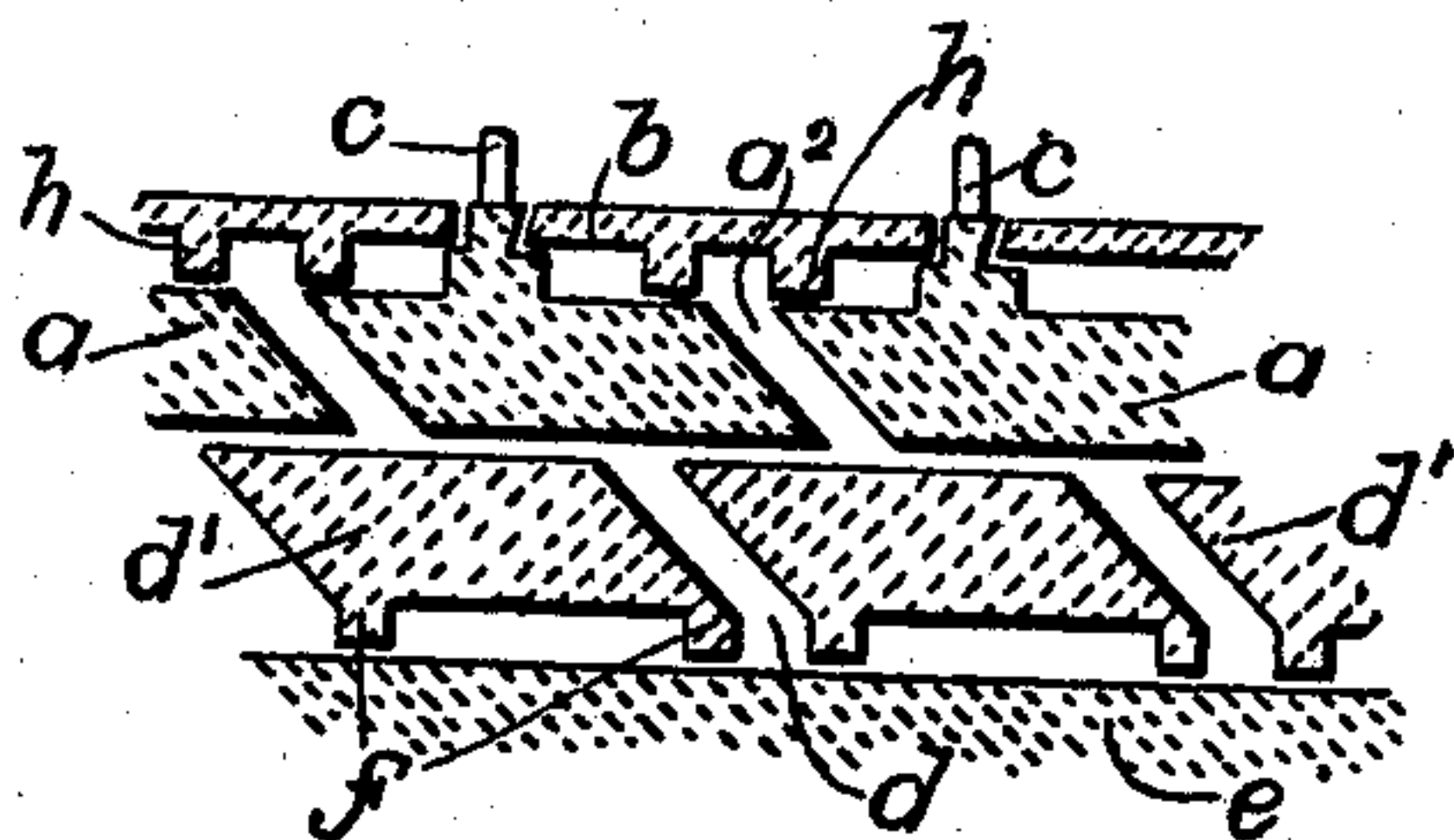


Fig: 6.

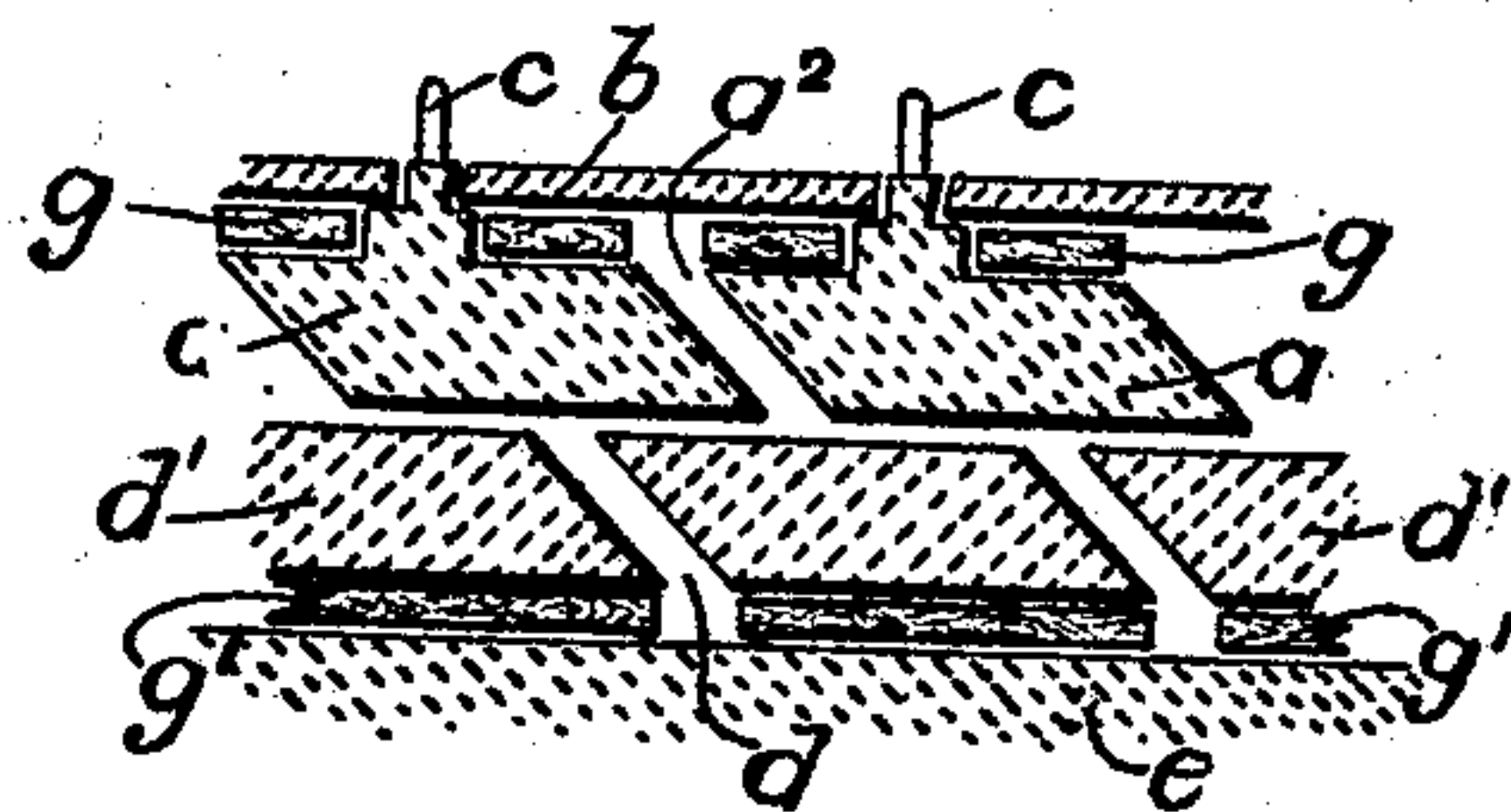


Fig: 7.

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UNITED STATES PATENT OFFICE.

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SHOE AND DIE OF GRINDING-PANS.

No. 867,989.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed November 14, 1905. Serial No. 287,358.

To all whom it may concern:

Be it known that we, WILLIAM MIDDLETON and HERVIC NUGENT GRAHAME COBBE, both citizens of the Commonwealth of Australia, and residing at Kalgoorlie, Western Australia, Australia, have invented certain new and useful Improvements in Shoes and Dies of Grinding-Pans; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

These improvements relate to the shoes and dies of pans which are employed for the grinding of earth sands and pulp and slimes and such like material, and said improvements consist in forming permanent radial side passage ways as between the companion dies and shoes for the flow of the matter under treatment and which passages are permanently maintained independent and irrespective of the downward and upward wear of the rotary shoes and fixed dies respectively. Such passages are obtained by forming walls or rims on the upper face of the shoe or alternately on the under side of the muller plate and by forming similar foot walls on the underside of the die.

In order that the improvements may be clearly understood reference will be made to the accompanying drawings in which like parts are similarly designated.

Figure 1 is a sectional elevation of a grinding pan provided with the rotating shoes and the fixed dies constructed according to our invention. Fig. 2 is a plan partly in section on line $x-x$ Fig. 1 and showing the positions of the muller plates and the fixed dies as in the pan and exposing the top faces of such plates and dies. Fig. 3 is a vertical transverse sectional view of the muller plates shoe, die and floor of pan and showing the permanent passage ways. Figs. 4 and 5 are views of the underside of the die and upper side of the shoe respectively. Fig. 6 is a vertical transverse section and shows the muller plate having lower projectional walls. Fig. 7 is a similar view and illustrates the alternative means for forming passages by the employment of loose distance pieces.

In these drawings and with particular reference to Fig. 1, the grinding pan e is suitably secured to the framing e' on which latter is also mounted the driving gear e^2 . The pan is formed with the central hollow pillar b' which acts as an upper bearing for the upright rotary shaft b^2 . This shaft at its upper end is provided with a vertically movable sleeve b^3 to which latter is secured the tubular crown piece b^4 having a foot flange b^5 for carrying the arms b^6 by which the revolving muller plates b are rotated, while such plates are connected to the shoes a by means of the usual staples and cotters as c or otherwise.

The crown piece b^4 is provided with a cap c' having an internal screw thread in which works the correspondingly screwed spindle c^2 by means of the hand wheel c^3 for raising or lowering the shoes a said spindle also has the locking wheel c^4 for setting or adjusting the distance between the grinding faces of the rotary shoes a and fixed dies d' . The fixed dies are secured to the pan by the usual dowels which latter snug or fit into pockets formed in the wall j of the pan and in the base or foot j' of the central hollow pillar b' above referred to.

The foregoing mechanism is well known and forms no part of our invention but is described and illustrated in order to show the relationship of our improvements thereto, which improvements will now be particularly described so that same may be easily distinguished from the above described parts.

Referring now to Figs. 3 to 7 illustrating our improvements:—The shoes a suitably distanced from one another, are formed with upstanding rims a' which act as permanent walls so forming the resultant radially curved passages a^2 for the flow of the matter under treatment, said passages communicate with the lower radially curved passages d existing between the companion dies d' and communicating with the floor of the pan e and discharge at a level below the lowest wearable surface of the die d' by reason of the foot wall f formed on the underside of the die d' . As an equivalent construction for such walls to form the passages d and a^2 of the dies and shoes respectively, we may employ loose blocks as g and g' of any material as shown in Fig. 7. These blocks act as distance pieces and are interposed as g between the die d' and the floor of the pan e . In lieu of forming the walls as a' on the upper side of the shoes a we may form the muller plates b with foot walls as h and as shown in Fig. 6.

The operation of the pan with our improved shoes and dies is as follows:—The necessary motion being imparted to the gearing e^2 and shaft b^2 and which shaft is united by the sleeve b^3 and crown b^4 and arms b^6 to the muller plates b and shoes a so that such shoes and plates rotate in unison with the operative gearing while the pan e and its dies d' are fixed and stationary. The slimes or material to be treated is fed into the pan and by the action of the rotating muller plates b and shoes a , it is ground to the necessary degree of fineness and is discharged at high level exits as j^2 . During the grinding action the material passes between the shoes and dies by means of the inter-communicative passage ways a^2 and d and which passage ways for the flow of the material, are rendered permanent irrespective of the depth of the worn or partly worn away shoes or dies as when same have arrived at their minimum wearable depth the foot walls f of the dies or equivalent distance blocks g' in conjunction with the companion constructions a' of the shoes or foot pieces h of

the muller plates *b* or blocks *g*, will constitute means for the existence of the needful space to maintain such permanent passage ways *a*² and *d* until and after the shoes and dies become completely unwearable and
5 useless.

We claim:

1. The combination with the muller plate having slots therein; of shoes having lugs thereon fitting into said slots, and having peripheral flanges that engage the under face
10 of the muller plate and hold the shoes distanced therefrom, said shoes having spaces between them for the circulation of the material, the spaces between the flanges of adjacent shoes at all times being sufficient for the circulation of material to be ground, independent of the wear of the shoes.
- 15 2. The combination with a pan and the muller plate having slots therein; of shoes having lugs thereon taking into the slots and thereby held distanced from one another,

spaced means to distance the shoes from the muller plate, the spaces between said means forming a continuation of the space between the shoes and interspaced dies in said pan, and means to distance the dies from the pan, said spaces between the pan and means forming a continuation of the space between the dies, said spaces forming passages for the circulation of the slimes to be ground. 20

3. The combination with the muller plate, of shoes having means to space them from the muller plate the shoes being secured to said plate to form spaces between adjacent shoes. 25

In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses. 30

WILLIAM MIDDLETON.

HERVIC NUGENT GRAHAME COBBE.

Witnesses:

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