

(No Model.)

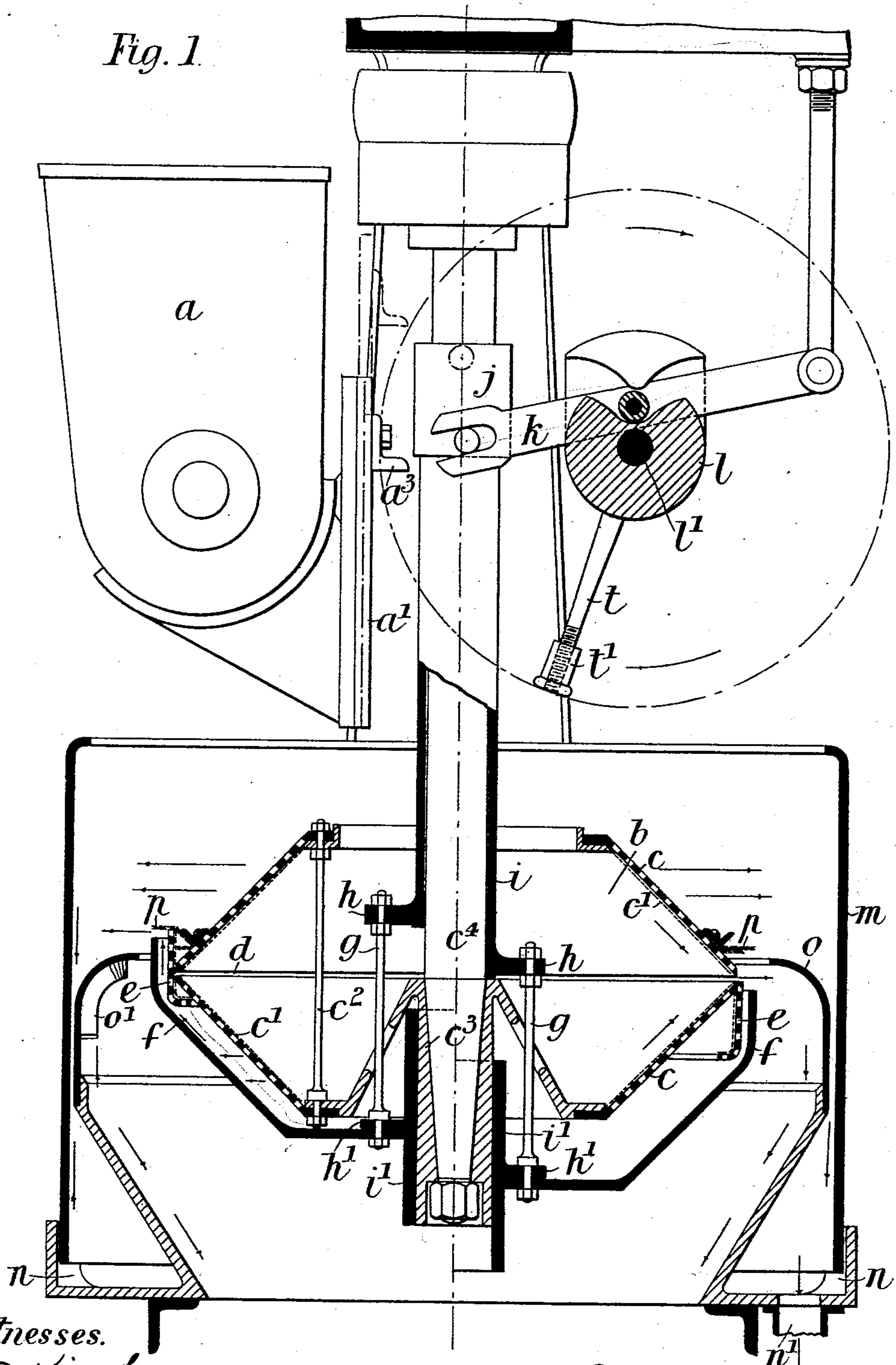
2 Sheets—Sheet 1.

W. P. ABELL.
CENTRIFUGAL MACHINE.

No. 571,912.

Patented Nov. 24, 1896.

Fig. 1.



Witnesses.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

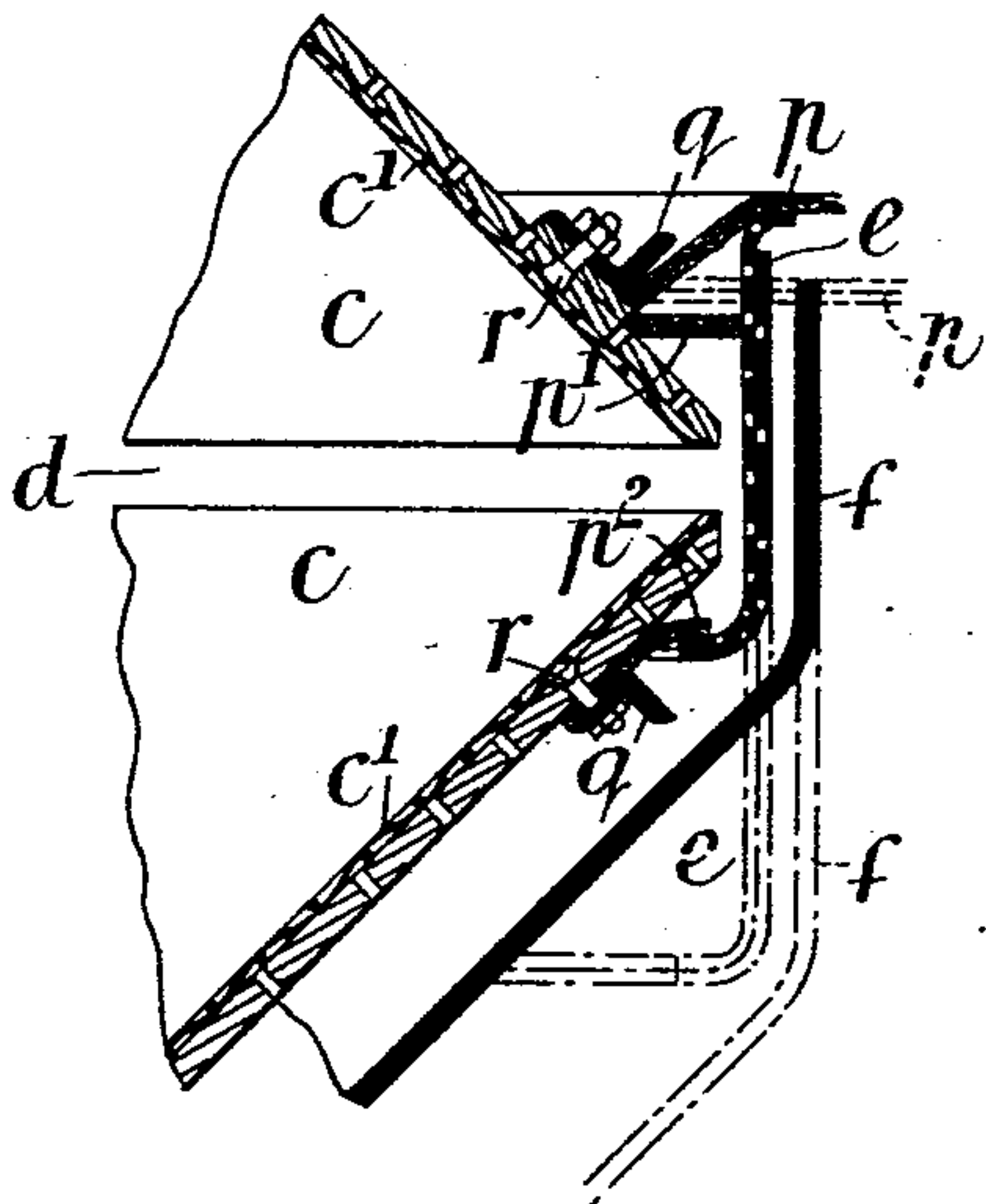


Fig. 3.

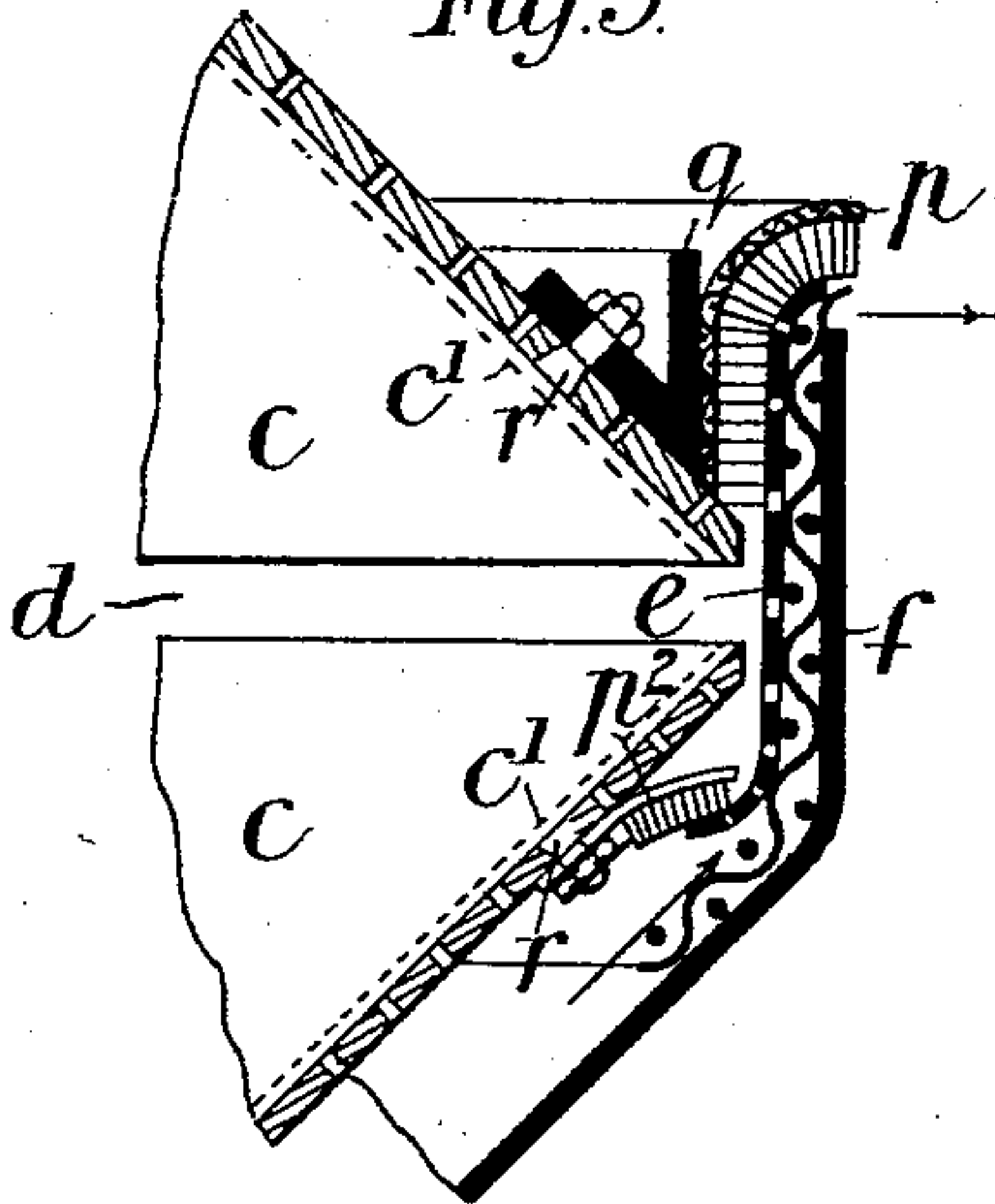


Fig. 5.

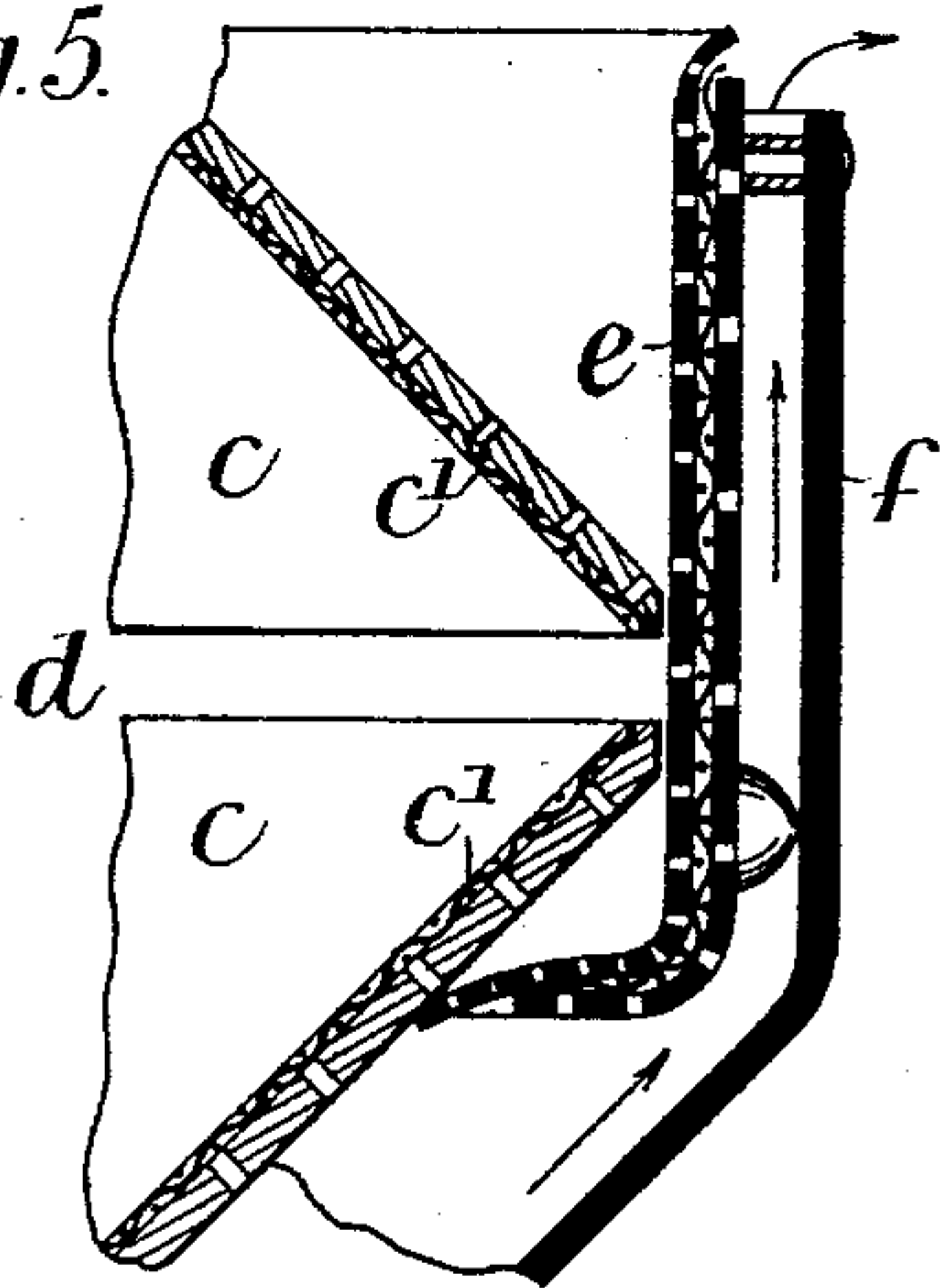


Fig. 4.

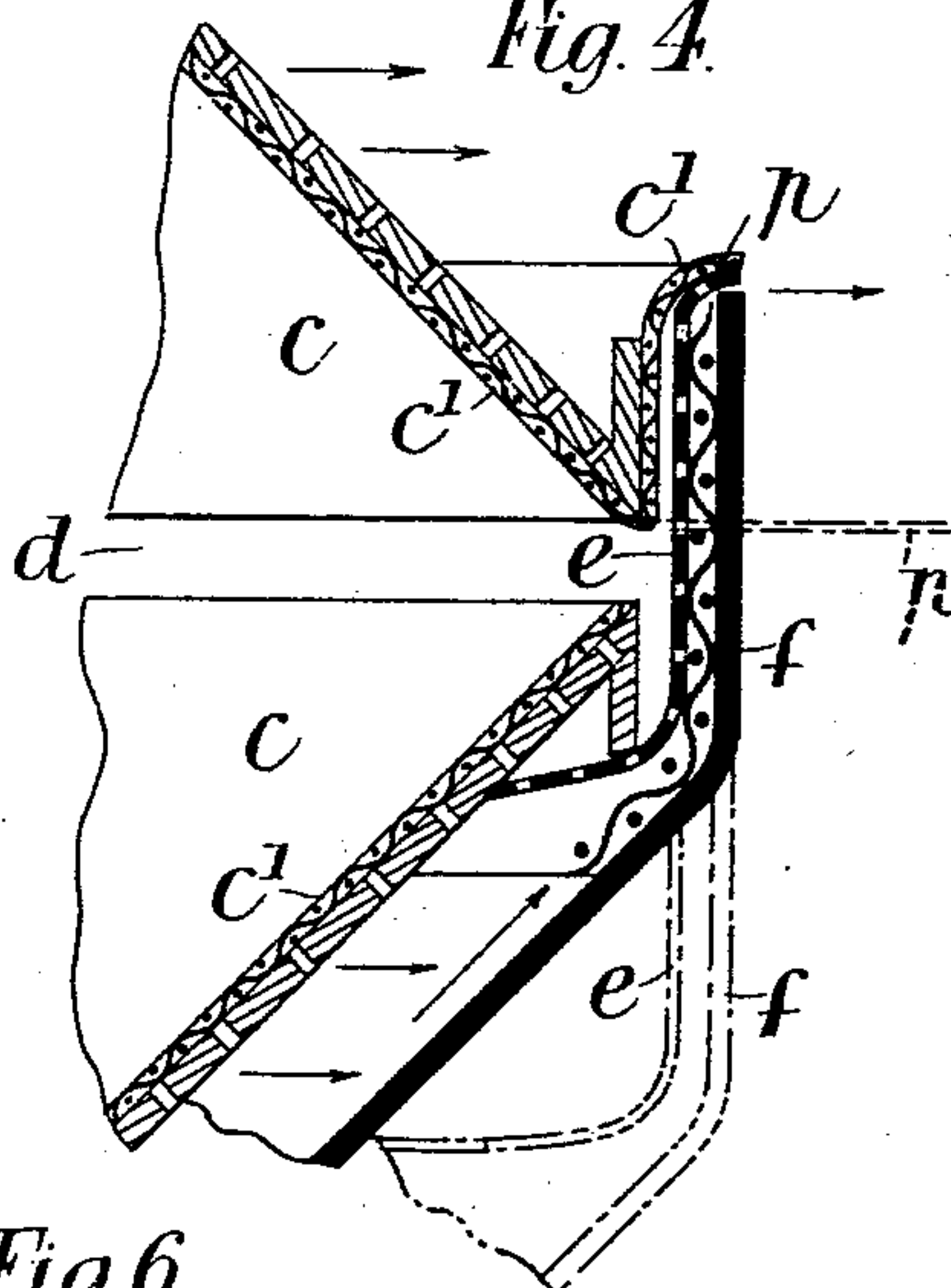
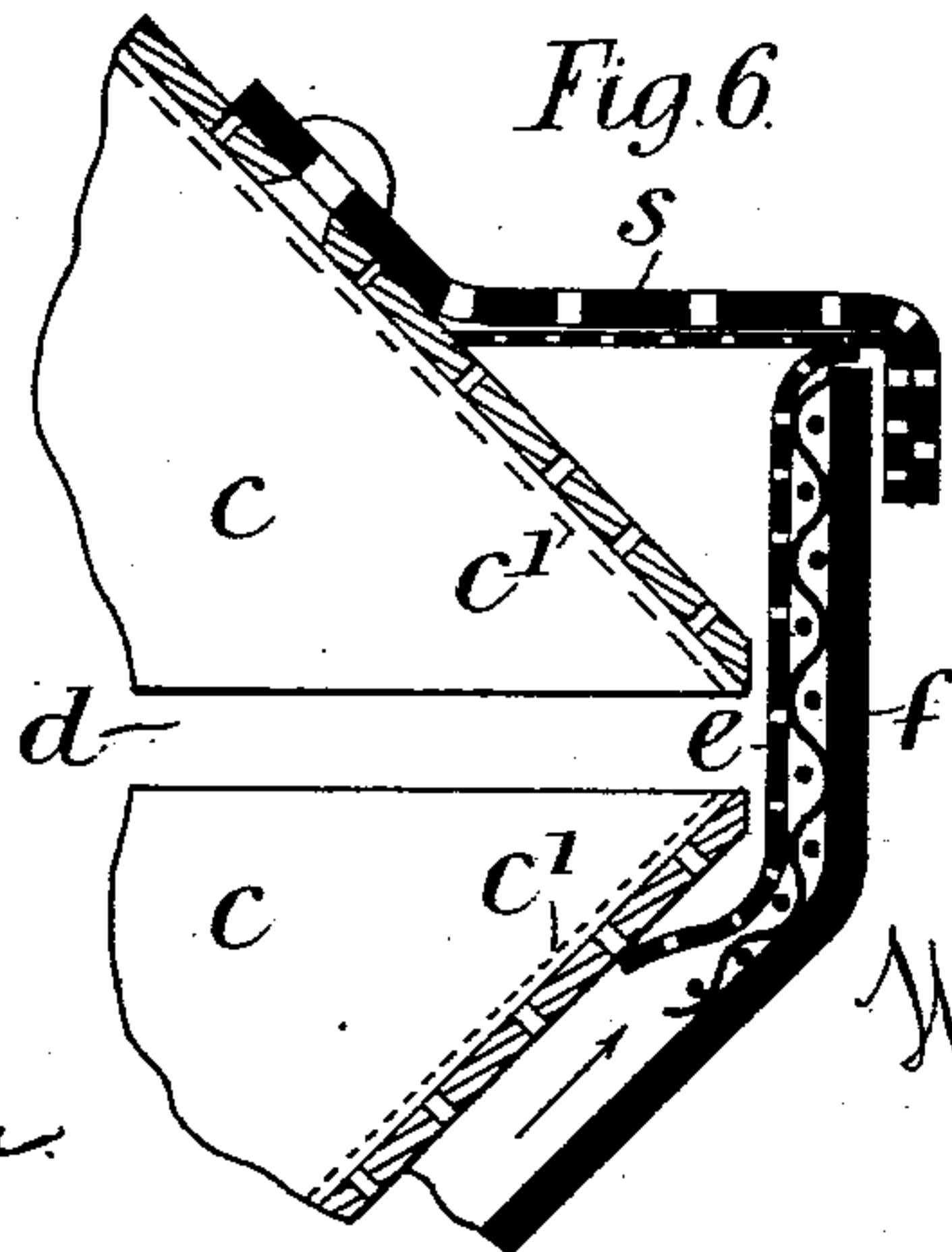


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM PRICE ABELL, OF ESSEQUEBO, BRITISH GUIANA.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,912, dated November 24, 1896

Application filed December 10, 1895. Serial No. 571,666. (No model.) Patented in France December 9, 1895, No. 252,287, and in Austria April 24, 1896, No. 46/1,637.

To all whom it may concern:

Be it known that I, WILLIAM PRICE ABELL, a subject of the Queen of Great Britain, residing at L'Union House, Essequibo, British Guiana, have invented new and useful Improvements in Centrifugal Machines for Drying Sugar and other Granular Substances, (which has been patented in France December 9, 1895, No. 252,287, and in Austria April 24, 1896, No. 46/1,637,) of which the following is a specification.

This invention relates to improvements in continuously-running centrifugal machines for drying sugar and other granular substances.

According to my invention I form the perforated basket, into which the masse-cuite or other substance is discharged from a pug-mill, of cones, preferably two in number, placed base to base and having an opening between the peripheries of their bases, which opening is closed by a perforated door revolving with the basket. When the said basket revolves, the liquid from the masse-cuite or other substance in the basket is all driven out by centrifugal force through the perforations in the basket and door and directed into a molasses-casing surrounding the basket, the solid constituents of the masse-cuite or other substance being retained in the basket. The dried grains are then discharged automatically into a suitable casing through the opening left between the peripheries of the cones by the withdrawal of the perforated door closing the said opening. The joints of this door with the basket are made grain-tight by the use of "fliers" or strips of gauze or the like held tight against the door by centrifugal force and by other means, as herein-after described.

In the accompanying drawings, Figure 1 is a vertical section of a machine constructed according to my invention, one half of the section showing the door in its closed position and the other half showing the door in its open position. Fig. 2 is a section showing the door and centrifugal fliers or grain-tight seals on an enlarged scale. Fig. 3 is a view similar to Fig. 2 of a slightly-modified arrangement. Fig. 4 is a view similar to Figs. 2 and 3 of a second slightly-modified arrange-

ment. Fig. 5 is a section similar to Figs. 2, 3, and 4 of a modification of the door and joint. Fig. 6 is a similar view of a further modification.

Similar reference-letters indicate similar or corresponding parts throughout the drawings.

a is a pug-mill, and *a'* the outlet-valve of the same.

b is the basket, shown as made of two perforated cones *c c*, (although more cones may be employed,) lined with gauze *c'* and secured by bolts *c²* or by other suitable means to one another and to the boss *c³*, rigidly attached to the usual vertical spindle *c⁴* in such a manner that there is a permanent opening *d* left between the peripheries of their bases. This opening *d* is alternately opened and covered by the perforated door *e*, which is rigidly secured to a molasses casing or director *f* and partakes of all its movements, the said molasses casing or director *f* being connected by bolts *g* or by other suitable means to the flange *h* of a sleeve *i* on the spindle *c⁴* and to the flange *h'* of the sleeve *i'* on the boss *c³*. The sleeves *i* and *i'* are free to move up and down on the spindle *c⁴* and boss *c³*, and the sleeve *i* is connected to a collar *j*, adapted to receive a reciprocating movement from the lever *k*, actuated by a cam *l*, mounted on the shaft *l'*, or by other well-known means. In Fig. 1 the sleeves *i* and *i'* are shown in their two extreme positions. The basket *b* is thus rigidly secured to and caused to revolve with the spindle *c⁴*, while the molasses-casing *f*, door *e*, and sleeves *i i'*, although also carried round and revolving with the said basket *b*, have an independent reciprocating movement on the spindle *c⁴*.

m is a fixed casing arranged to receive the molasses or liquids discharged from the basket *b* direct and from the revolving director *f*, and *n* is the molasses-gutter, having an outlet *n'*.

o is a fixed casing to receive the dried material after it leaves the basket *b*, the said casing being arranged so that its upper end, which is curved inward, is below the upper edge of the molasses-director *f* when the opening *d* between the cones *c c* of the basket *b* is closed or covered by the perforated door *e*. In the drawings this casing *o* is provided

with inclined vanes o' for deflecting the dry material and is made conical at the bottom to bring the discharged dry material to a central outlet.

5 p p' p^2 , Fig. 2, are the strips or fringes of gauze forming the fliers for making a grain-tight joint between the door e and the basket b , the said fringes being secured, preferably by means of the angle-iron rings q and bolts r ,
10 to the cones c c .

The perforated door e is curved inward at the bottom and when raised so as to cover the opening d between the cones c c presses against the gauze fringes p p^2 and raises them
15 above the plane of their centrifugal suspension, so that when the whole is revolving the centrifugal force acting on the gauze presses it tightly against the top and bottom of the door and thus forms grain-tight joints. The
20 upper and lower fringes p and p^2 are preferably made of sufficient length to overlap the edges of the door e , while the fringe p' is made of just sufficient length to impinge against the said door, which projects beyond
25 the molasses-director f , so that no dried sugar gets into the latter when discharge takes place and is fixed a sufficient distance away from the said director to allow of liquids passing between the door and the
30 director.

In Fig. 3 the fringes p and p^2 are shown replaced by brushes, while the fringe p' is dispensed with.

In the arrangement shown in Fig. 4 the
35 bases of the two cones c c are flanged to prevent low-graded masse-cuite banking at the outlet, and the gauze lining c' of the upper cone (or the lower one) is continued outside the said basket, so as to form the fringe or
40 flier p . In this case the bottom edge of the door is sealed grain-tight by the lower intumed edge of the same coming into contact with the lower cone of the basket.

Fig. 5 shows a similar arrangement to that
45 shown in Fig. 4, except that the joint is rendered grain-tight on the top side by causing the door to project sufficiently beyond the angle of repose of the wet masse-cuite to prevent the escape of the latter. The joint on
50 the bottom side is made as described with reference to Fig. 4.

In the arrangement shown in Fig. 6 the joint between the door and the basket is made at the bottom as described with reference to Fig. 4, but at the top by replacing
55 the centrifugal fringe with a perforated flanged ring or disk s , attached to the upper cone. When the door is in its closed position, the flange s projects over its top edge, while the joint is made by the said door forming its own bed on the light layer of sugar or other substance that in practice is left on the flange s .
60

The operation of the machine is as follows:
65 While the basket b is rapidly revolving, the masse-cuite is fed from the pug-mill a through the outlet-valve a' , which is opened by suit-

able means, such as the lever t , mounted on the shaft t' and revolving into contact with the projection a^3 on the valve a' . The amount
70 of opening and consequently the quantity of masse-cuite fed in at each charge can be regulated by lengthening or shortening the lever t by means of the thumb-nut t' . After the basket has received the regulated charge of
75 masse-cuite the pug-mill opening is shut and the basket b revolves for a length of time that has been previously decided upon as necessary to dry the quality of masse-cuite dealt with. During this revolution the granular
80 substances are retained in the basket b by the perforated cones c c and door e , while the liquids are driven by centrifugal force through the perforations of the same, either directly
85 into the fixed molasses-casing m or into the director or revolving molasses-casing f , which also delivers by centrifugal force the molasses into the said casing m and prevents the afore-said molasses or other liquid from passing
90 into the fixed dry-sugar casing o . The discharged liquids gravitate down the sides of the casing m and pass with the air into the lower half of the said casing m , there collecting in the gutter n and finally flowing out at the outlet n' . When the masse-cuite is suf-
95 ficiently dry, the sleeve i is lowered in the manner hereinbefore described and with it the molasses-director f and the door e , whereby the dry sugar is discharged by centrifugal force through the permanent opening d onto
100 the intumed edge of the fixed dry-sugar casing o , down which it is deflected by the inclined vanes o' and is discharged through the central outlet into a suitable receptacle.

Although I have described the basket as
105 composed of two perforated cones, it is obvious that it can be composed of four or more cones arranged in pairs, as above described, that is to say, having an opening left between the bases of adjacent cones, but being united
110 at their apices.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—
115

1. In a centrifugal drying-machine the combination with the basket formed of two perforated cones placed base to base and having a permanent opening between said bases, of an annular casing surrounding portions of
120 the basket adapted to revolve therewith and having an independent movement in respect thereto, and an annular closing device secured to said casing and adapted to close the opening between the edges of said cone, substantially as described.
125

2. In a centrifugal drying-machine the combination with the basket comprising two perforated cones, placed base to base and having a permanent opening between said bases, of
130 an annular casing surrounding portions of said basket adapted to revolve therewith and having an independent movement with respect thereto, an annular closing device se-

cured to said casing, adapted to close said permanent opening and forming a passage between said closing device and said casing, substantially as described.

5 3. In a centrifugal drying-machine the combination with the basket comprising the two perforated cones placed base to base and having a permanent opening between them, of a stationary casing surrounding said basket, an inner casing surrounding portions of said basket adapted to revolve therewith and having an independent movement in line with the axis of rotation of said basket, and a closing device secured to said inner casing, forming a passage between them, said closing device being adapted to close the said opening of the basket, substantially as described.

4. In a centrifugal drying-machine the combination with the basket comprising two revoluble perforated cones, placed base to base and having a permanent opening between said bases, of a casing surrounding portions of said basket adapted to revolve therewith but having an independent movement with respect thereto in line with its axis of rotation, a closing device for said permanent opening of the basket secured to said casing forming a passage between it and the casing, a stationary casing adapted to receive granular material, surrounding said revoluble casing, having its upper edge below the discharge of said passage when said revoluble casing is in operative position and a stationary casing adapted to receive fluid material surrounding said casing for granular material, substantially as described.

5. In a centrifugal drying-machine the combination with the revoluble basket comprising perforated cones placed base to base and having a permanent opening between them a movable closing device adapted to engage said permanent opening and automatic actuating devices operatively connected with said closing device, substantially as described.

6. In a centrifugal drying-machine the combination with the revoluble basket comprising perforated cones placed base to base and having a permanent opening between said bases, a movable closing device adapted to engage said permanent opening, devices for feeding material to the basket, and automatic actuating devices operatively connected with said feeding devices, and said closing device whereby the action of the machine is rendered continuous, substantially as described.

7. In a centrifugal drying-machine the combination with the revoluble perforated basket comprising cones placed base to base, of devices for opening and closing said basket and continuously-operating mechanism operatively connected with said devices, for automatically opening and closing said basket, substantially as described.

8. In a centrifugal drying-machine, the combination with the revoluble perforated basket comprising a pair of cones placed base to base and having a permanent opening between

them, a movable closing device for said permanent opening, of a continuously-operating shaft and operative connections between said shaft and said closing device for automatically opening and closing said basket, substantially as described.

9. In a centrifugal drying-machine the combination with the basket comprising two cones placed base to base and having a permanent opening between them, a driving-shaft for rotating said basket, a movable closing device for said permanent opening, a sleeve adapted to slide on said driving-shaft, operatively connected with said closing device, a continuously-operating shaft and operative connections between said shaft and said sleeve, for automatically and intermittently moving said closing device into and out of operative position with respect to said basket, substantially as described.

10. In a centrifugal drying-machine the combination with the revoluble basket comprising perforated cones placed base to base rigidly secured together and having a permanent opening between said bases, an annular strip of flexible material secured to one of said cones and a movable annular closing device adapted to close said opening in the basket and to engage said flexible strip, substantially as described.

11. In a centrifugal drying-machine the combination with the revoluble basket comprising two perforated cones placed base to base with a permanent annular opening between them, of a movable closing device for said basket consisting of an annular ring adapted to close said permanent opening, said ring having at its lower edge an inwardly-turned annular flange adapted to engage the exterior of the lower cone and having its upper edge extended past said permanent opening to a point above the plane occupied by the masse-cuite in the basket, whereby said closing device prevents the masse-cuite from leaving the basket, substantially as described.

12. In a centrifugal drying-machine the combination with the revoluble basket comprising perforated cones placed base to base and having a permanent opening between said bases, of an annular closing device adapted to close said opening and provided at one edge with an inwardly-extending annular flange, annular strips of flexible material secured to the basket on opposite sides of said permanent opening adapted to be engaged by said flange, and by the other edge of said annular closing device, substantially as described.

13. In a centrifugal drying-machine the combination with the revoluble basket comprising perforated cones placed base to base and having a permanent opening between said bases, of an annular closing device adapted to be moved over said openings, said device having its lower edge provided with an inwardly-extending annular flange, an annular flexible strip on the lower cone adapted

to be engaged by said flange and annular flexible strip on the upper cone, one adapted to engage the inner side of the closing device and another extending beyond and engaging
5 the top of said closing device, substantially as described.

14. In a centrifugal drying-machine the combination with the revoluble basket comprising perforated cones placed base to base
10 and having a permanent opening between them of an annular closing device adapted to

be moved over said opening, said annular closing device having at one edge an inwardly-extending annular flange and a flexible annular strip secured to said basket in the path
15 of said closing device, substantially as described.

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Witnesses:

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