

A. WESTCOTT.

Churn.

No. 35,120.

Patented April 29, 1862.

Fig. 2.

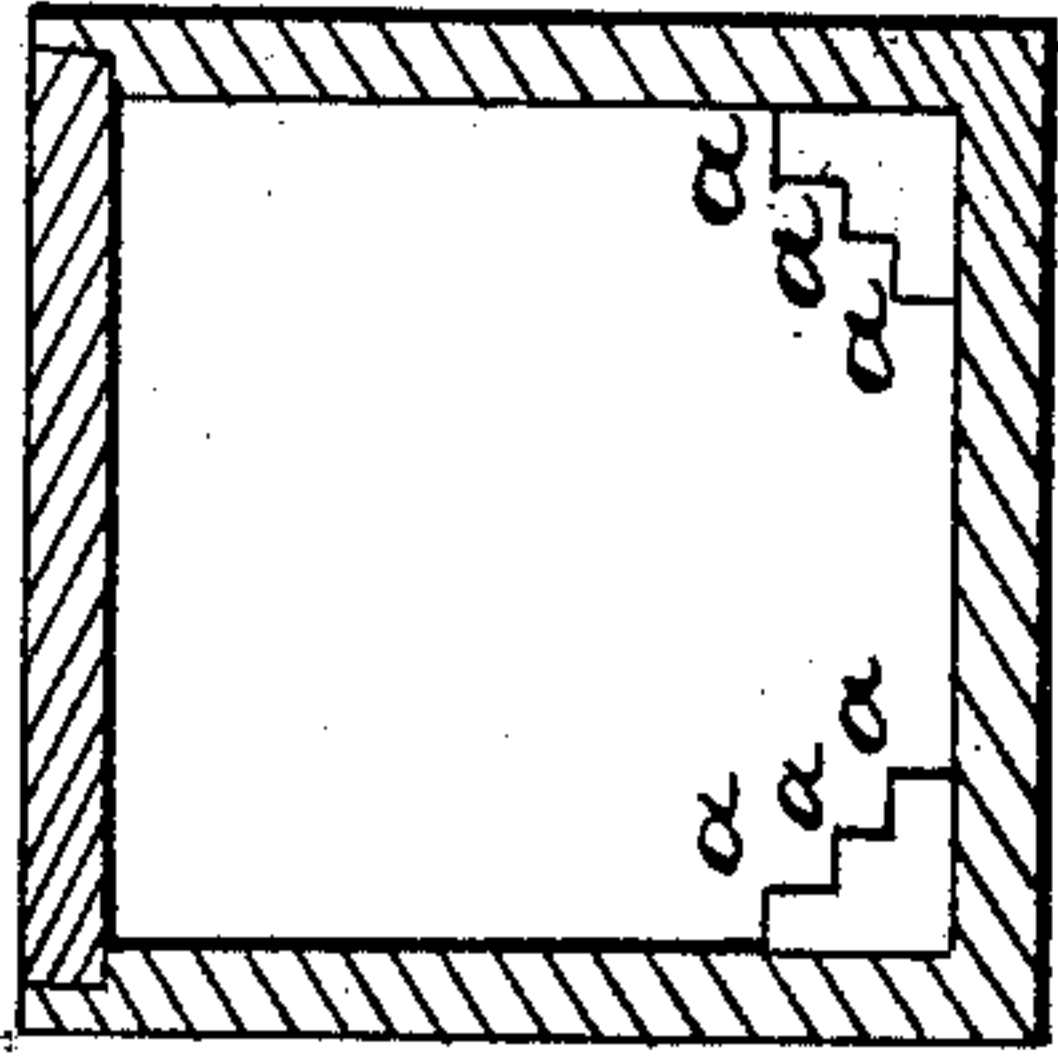


Fig. 3.

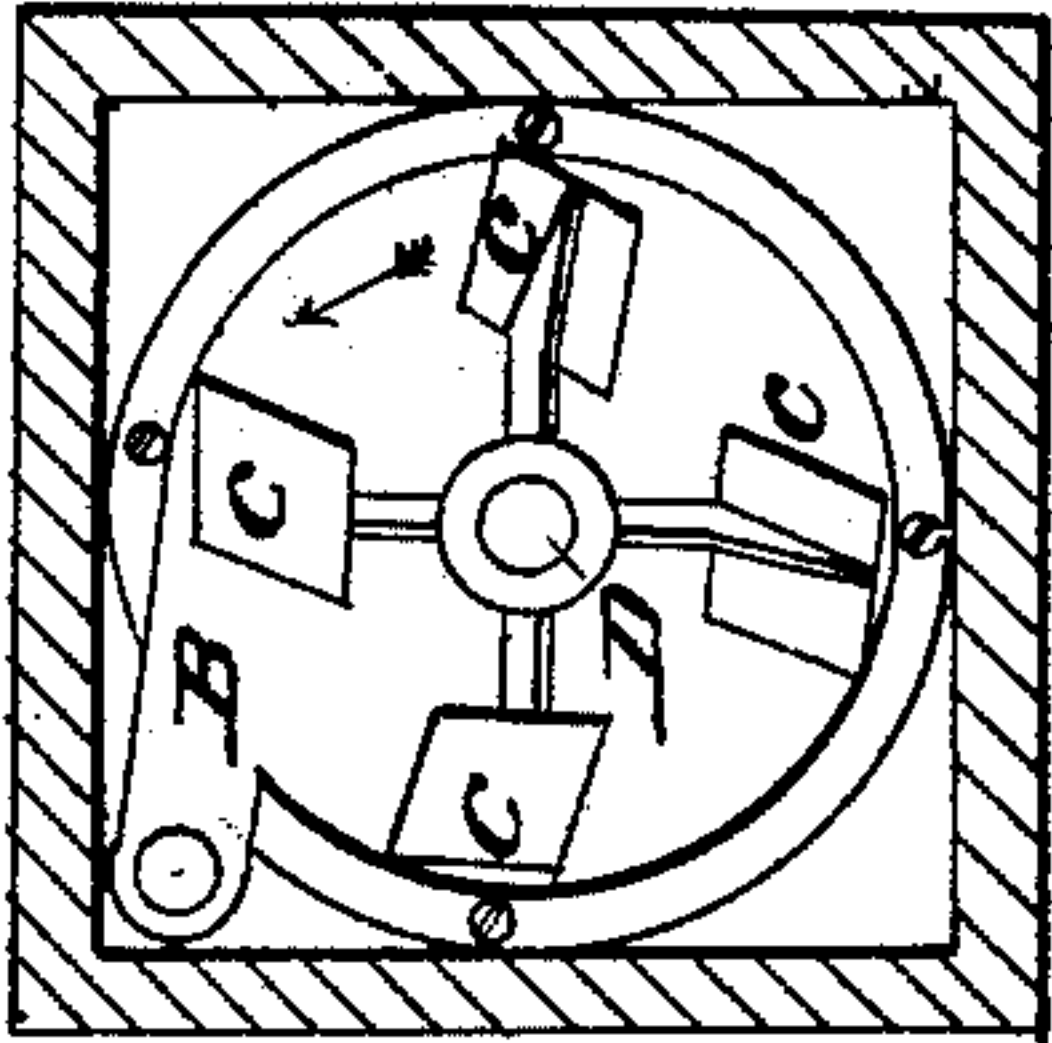


Fig. 4.

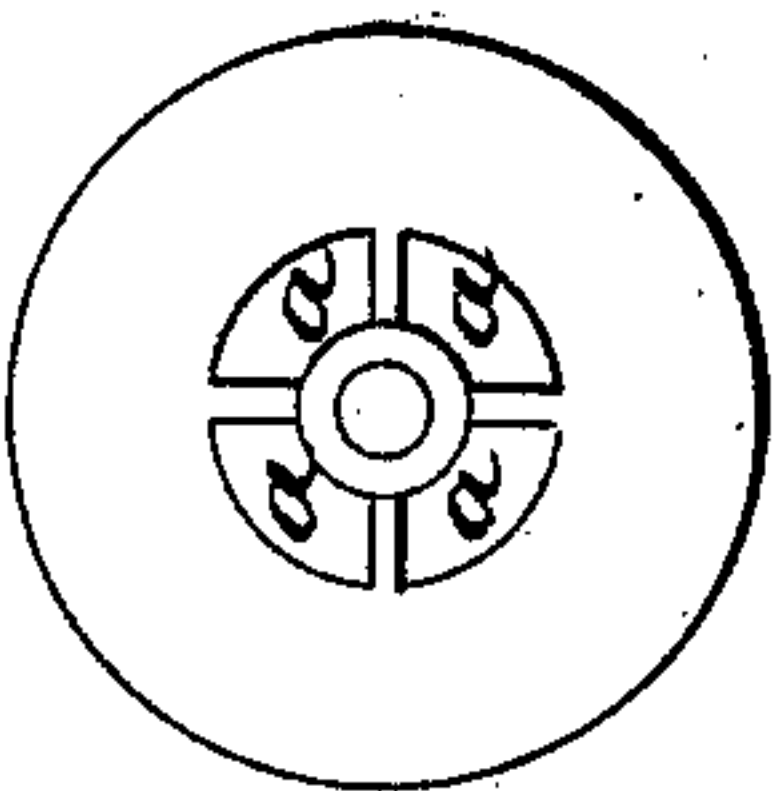


Fig. 7.



Fig. 1.

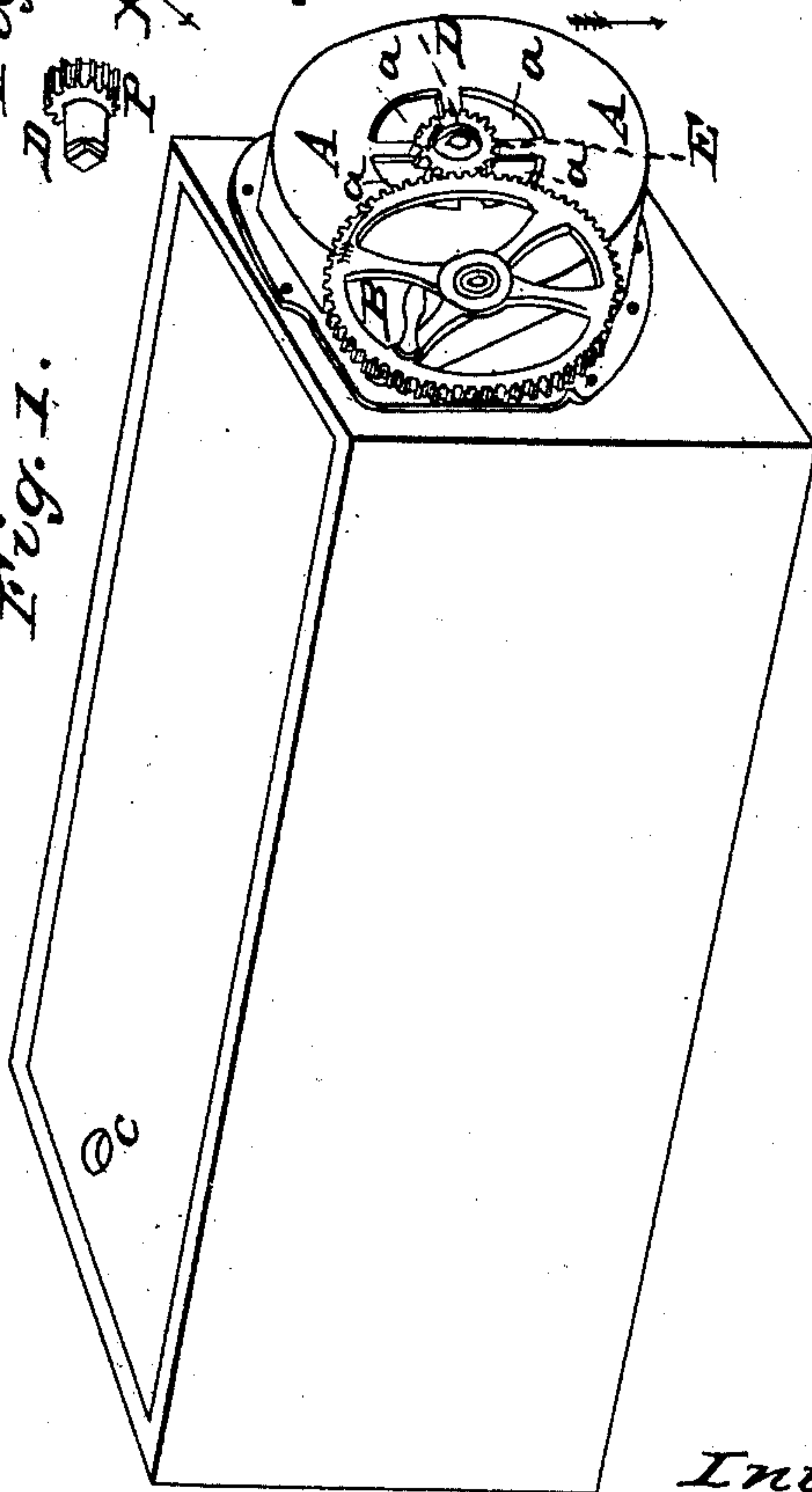


Fig. 5.

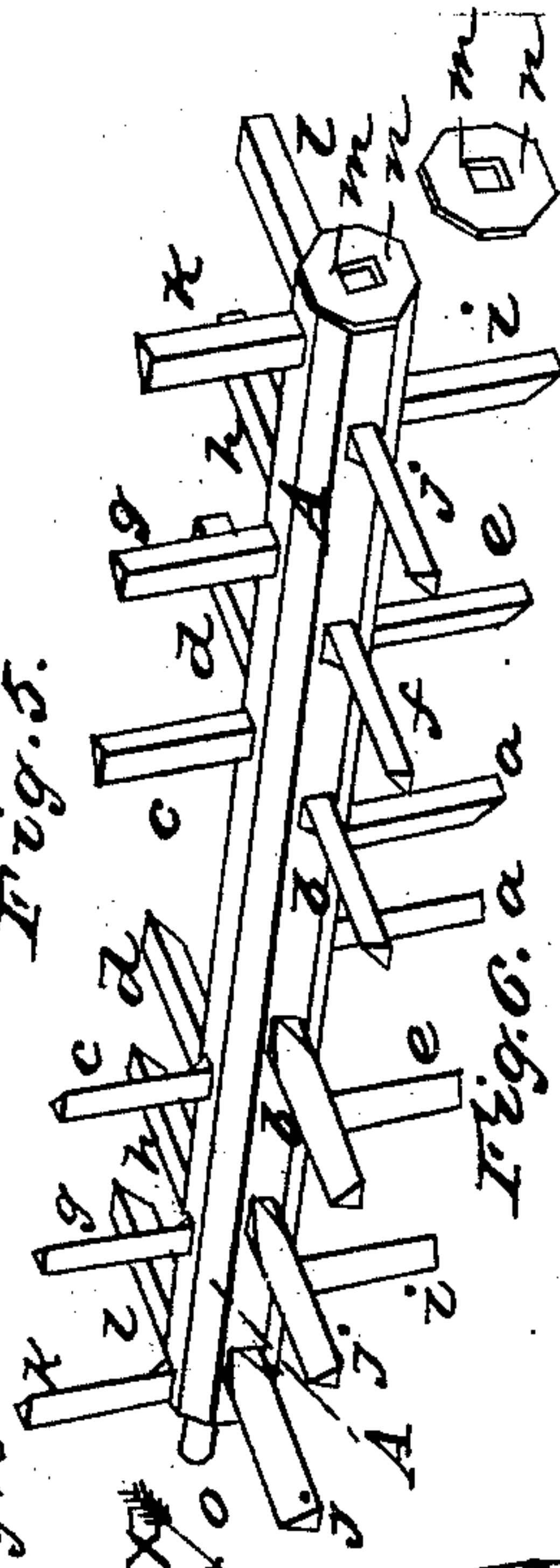
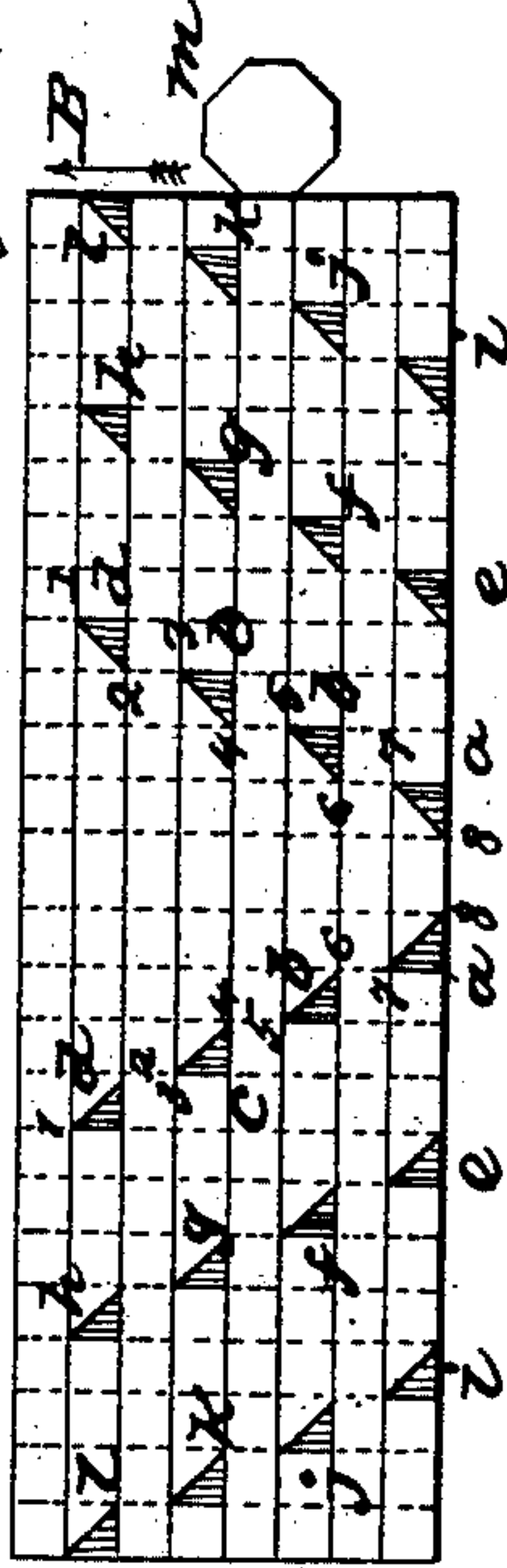


Fig. 6.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN CHURNS.

Specification forming part of Letters Patent No. 35,120, dated April 29, 1862.

To all whom it may concern:

Be it known that I, AMOS WESTCOTT, of the city of Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Churns; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the peculiar manner of forming and arranging the dasher-paddles for rotary churns, hereinafter described, and of the method of forcing a current of air through the fluid while it is being acted upon by said dasher-paddles.

The churn with my improvements consists, essentially, of a box, Figure 1, supplied with a revolving shaft furnished with dasher-paddles, and of an air-drum and fan-wheel on the outside of the box for the purpose of creating and propelling a current of air through the box while the churning is being performed, and of a crank and suitable gear-wheels, both for propelling the shaft and for driving the apparatus for supplying the air, as aforesaid.

This box (represented in Fig. 1) is made of a suitable size, its length as compared with its diameter being about two to one. The lower inside angles of this box, formed by the bottom and sides, are supplied with steps or breakers, as represented at *a a a a*, Fig. 2, which represents a transverse section of said box. These steps are so placed that the ends of the dasher-paddles in their revolution will just clear them. To the gear end of the box is attached a hollow cylinder or drum, *A A*, Fig. 1. Fig. 3 is an end view of churn and drum with its head removed. Fig. 4 is the head of the drum, in which *a a a a* are apertures for ingress of air into the drum.

B, Fig. 3, is a branch or outlet to the drum leading to the hole *C*, which is made through the end of the churn to allow the air to pass from the drum to the inside of the churn. This drum, Fig. 3, incloses a fan-wheel, *c c c c*, which is upon the same shaft *D*, Figs. 1 and 3, of the smaller gear-wheel and revolves with it, as shown by the arrow, Fig. 3. The diameter and depth of the drum, which is closed at the outer end, with the exception of the four openings *a a a a*, Fig. 4, will be regulated by the power of the fan-wheel, which

must depend largely upon the velocity with which it revolves. When its velocity is no greater than the main shaft *A A*, Fig. 1, of the churn, as is the case in my churn, as described, this fan-wheel will require to be, in full-sized churns, from six to eight inches in diameter and at least one inch in depth; but if its motion should be increased, which may be done either by extra gearing, band, or friction-wheels, either the diameter or depth, or both, may be proportionately diminished. It hardly need be stated that the effect of this fan-wheel thus inclosed under rapid motion would be to draw in air through the apertures *a a a a*, Figs. 1 and 4, in the center of the otherwise closed end of the drum and to force it into the box, whence it escapes through the hole *c*, Fig. 1, in the cover of the box at the opposite end of the churn. This drum, instead of being made of metal and projecting outward from the end of the box, may be formed by turning it out of the wood constituting the end of the churn, in which case this drum, or, rather, circular chamber, would only need to complete it a metallic or wooden cap or cover similar to that represented in Fig. 4. This latter method of forming the drum to inclose the fan-wheel will doubtless be found the cheapest and most convenient.

A A, Fig. 5, represents a wooden shaft, which is octagonal, to which the dasher-paddles *a a b b c c d d*, &c., are attached. This shaft is provided on the one end with the pivot *o* and on the other with the metallic plate *m*, with a square hole, *n*, in the center, fitting and coupling with the square end of the metallic shaft *P*, Fig. 8, of the smaller gear-wheel, *D*, Fig. 8, and *E*, Fig. 1.

Structure and arrangement of the dasher-paddles.—To the construction and arrangement of the dasher-paddles I desire to call particular attention, as much importance is attached to both in my improvement of churns. Of the shape of these paddles a clear idea will be had from Fig. 7, *A* and *B*, which present an end view of these paddles and about the size which will be used in ordinary churns. It will be readily seen that when revolving in the direction shown by the arrows *a* and *b*, Fig. 7, they not only represent, but they are, in fact, plain paddles; but when the

motion of the shaft is reversed, so as to revolve in the direction indicated by the arrow *c*, Fig. 7, they are diagonal paddles. In other words, this shape combines in one the plain and the diagonal dasher-paddle, and hence may be properly designated the "plano-diagonal dasher-paddle." The importance of this shape will be better seen by describing the manner in which they are set upon the shaft in connection with the object which is sought to be accomplished. These paddles are placed spirally upon the shaft *A A*, Fig. 5, so as to form a double "screw-dash," the one representing a right-hand screw and the other a left-hand screw from the center of the shaft toward either end or from either end toward the center, and are of such a size and placed at such a distance from each other as to have their combined width occupy the exact length of the shaft. This is clearly shown by the dotted lines in Fig. 6. Fig. 5, *A A*, represents this shaft in perspective; also, the paddles *a a b b c c d d*, &c., set as above described. Fig. 6, *a a b b c c d d*, &c., represents the corresponding paddles and their arrangement as they would appear were the whole surface of the shaft *m*, Fig. 6, spread out upon a plane.

It will be readily seen that if the shaft *m*, Fig. 6, were to be revolved in the direction indicated by arrow *A*, Fig. 6, these paddles would act simply as plane or flat paddles, while if the motion of the shaft is reversed, as indicated in the arrow *B*, Fig. 6, their action and effect upon the fluid would be entirely different. On the latter supposition all the fluid, Fig. 6, embraced between the points 1 1 in the paddles *d d* by their action would be forced between the points 2 2 in the same paddles, and be thus brought on a line with the points 3 3 in the next set of paddles, *c c*. These in like manner would carry it between the points 4 4 to receive the same action by the paddles *b b*, and finally discharging between the floats *a a* at the points 8 8. In other words, by a single revolution all the fluid which is embraced between the points 1 1 in the paddles *d d* tends to the center and to be forced through the space between the paddles *a a* at the points 8 8. By tracing the effect of the paddles *h g f e* and *l k j i* it will be seen that the effect is to propel the fluid or any substance floating in it that distance toward the center equal to their combined width. It will hence be seen that by using this form of paddle and this ar-

rangement of paddles upon the shaft I not only have the "screw-dash" in form, but one which is really such in its operation and effect. During the process of churning the shaft and paddles will be revolved in the direction indicated by the arrow *X*, Fig. 5, and *A*, Fig. 6—*i. e.*, the plain or flat side of the paddles will be employed; but when the churning process is completed, by reversing the motion of the shaft and paddles the effect of these paddles will be to gather the butter in a mass in the center of the churn, and to a very large extent to "work it over," which is an object of no little importance as connected with the process of butter making.

Although in the drawings furnished the arrangement of the paddles upon the shaft is such as to gather the butter at the center of the churn or in a vertical plane midway between the two ends of the box of the churn, yet I by no means confine myself to this point as the place at which the butter shall be gathered. The butter may be collected by the action of these paddles at any other vertical plane which may be selected in the box of the churn, parallel to the one shown, by having the paddles so arranged upon the shaft as that the spiral or spirals shall commence in that plane.

I do not claim the plain or flat nor the diagonal dasher-paddles, nor the plain paddle diagonally set upon the shaft; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination of the plano-diagonal dasher-paddles, Fig. 7, *A* and *B*, with the box, Fig. 1, and with the shaft *A A*, Fig. 5, when these paddles are set in such a manner about the shaft, Figs. 5 and 6, that when the shaft is turned in such direction as to make the diagonal faces of the paddles strike the cream or milk their effect will be to force the particles of butter, whether large or small, which may be floating in the fluid, toward a vertical plane in the box of the churn parallel to its ends.

2. The employment of the fan-wheel, Figs. 3 and 4, constructed essentially as and for the purposes set forth, in combination with the other parts of the churn, as above described.

AMOS WESTCOTT.

Attest:

CHAS. E. FITCH,
CHAS. A. NASH.