

(Model.)

B. H. KLEIN.

WIND WHEEL.

No. 255,432.

Patented Mar. 28, 1882.

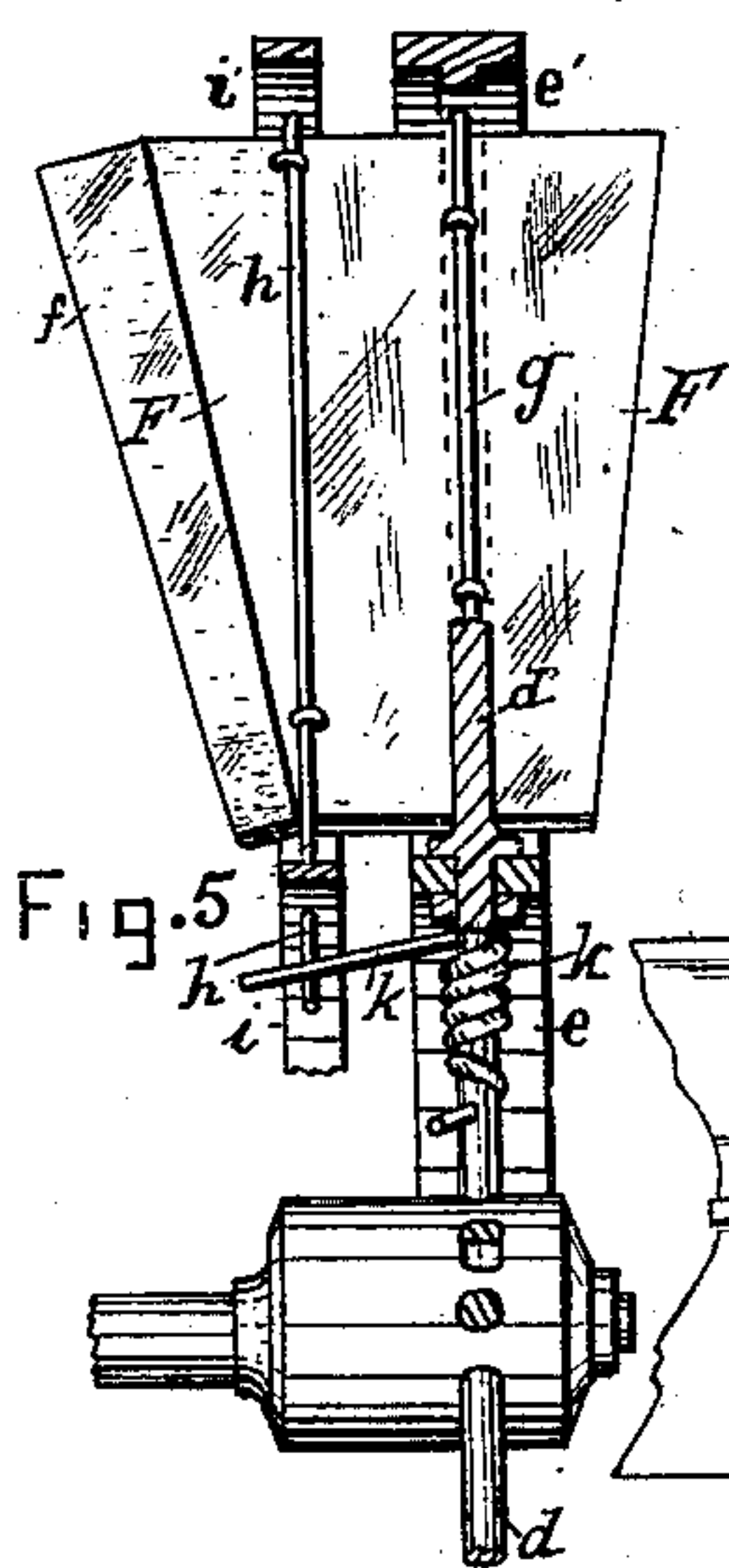
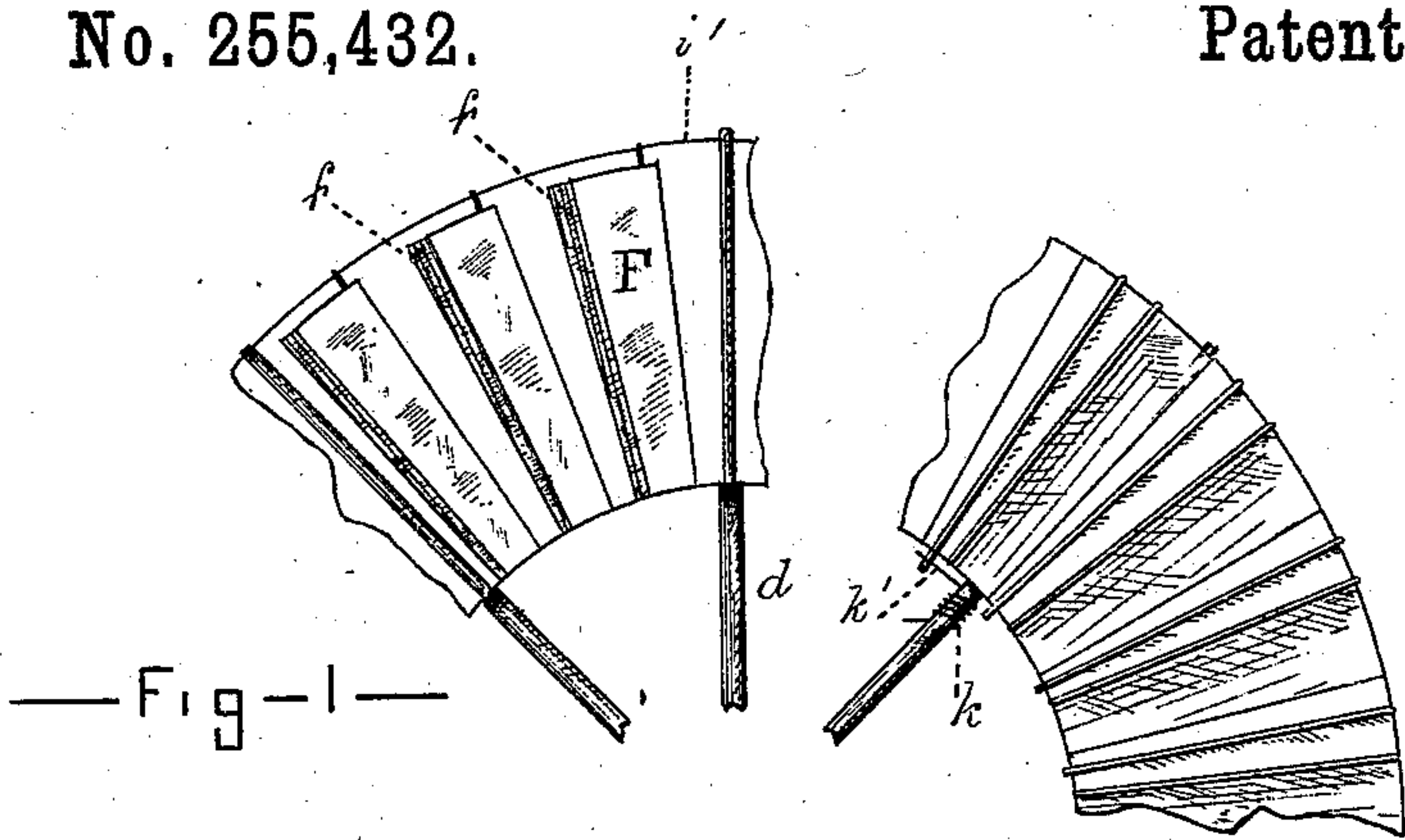


Fig-2

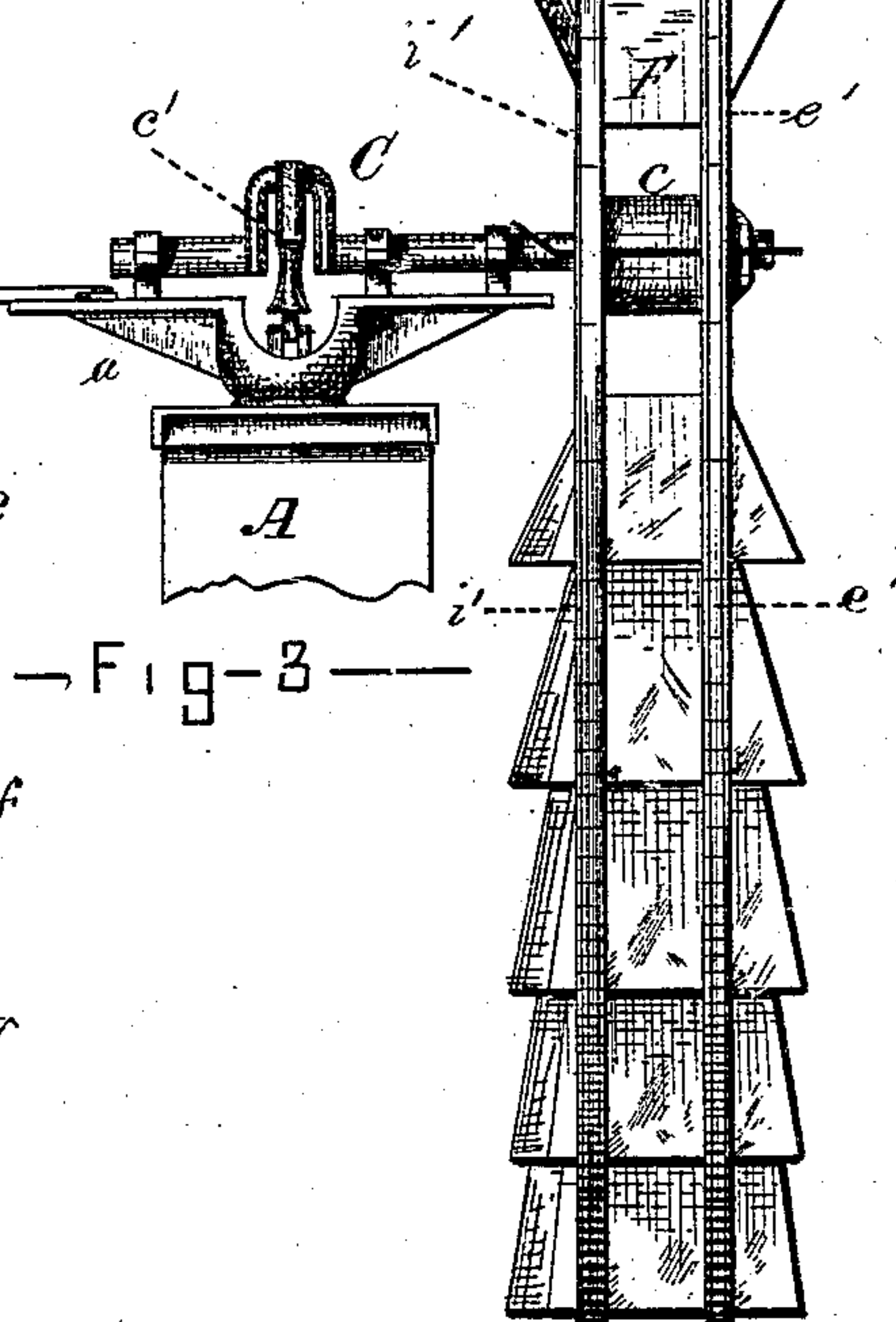
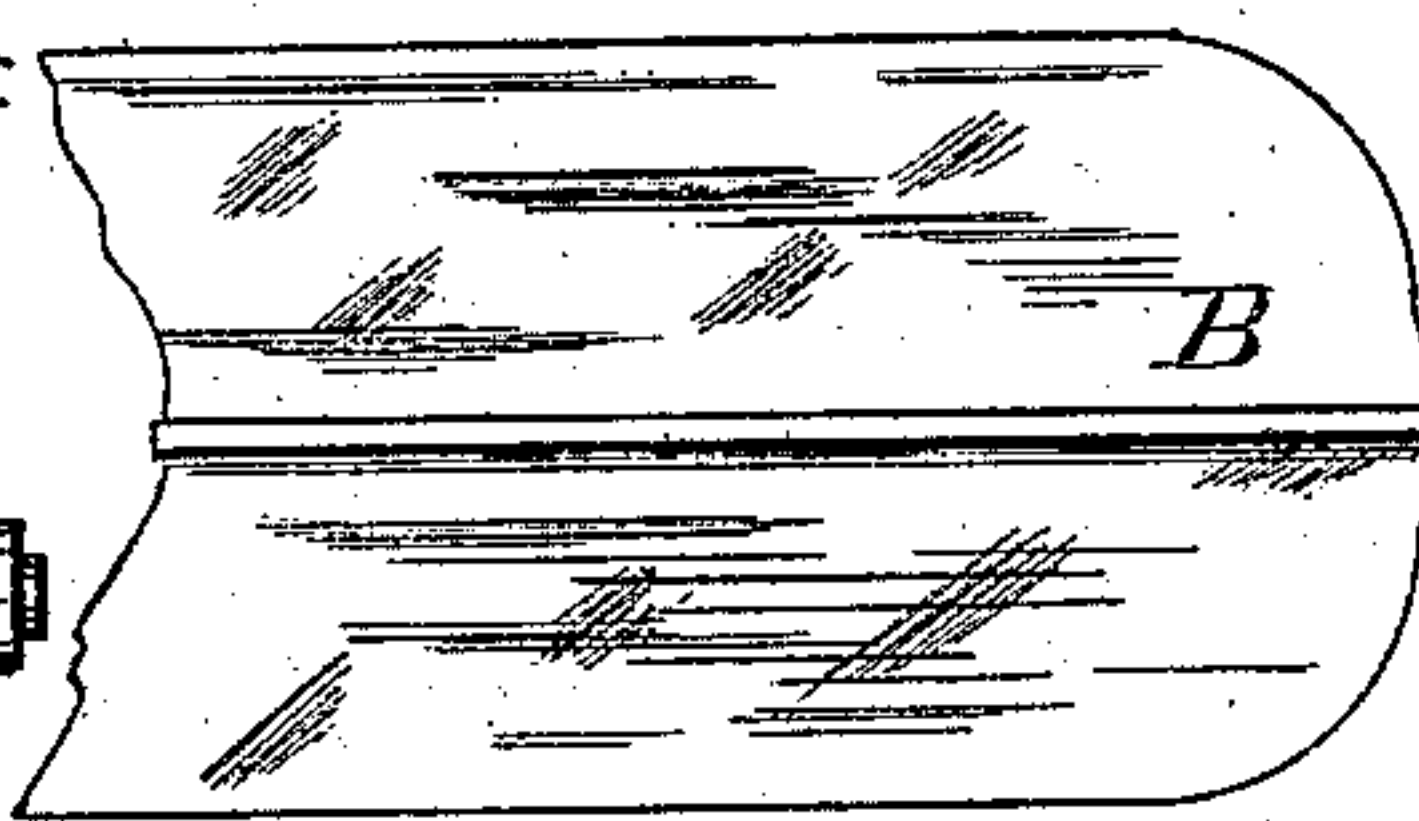


Fig-3

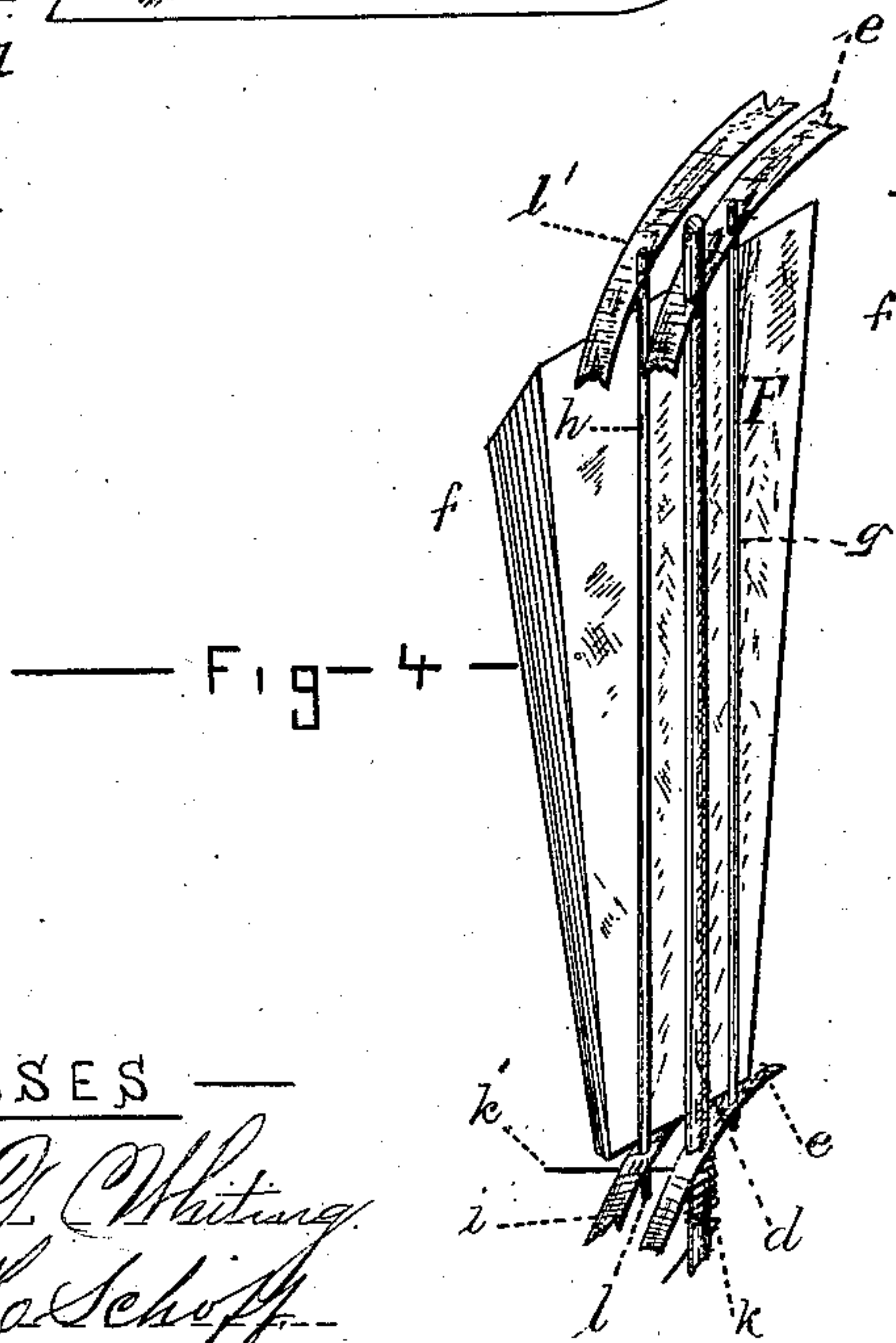


Fig-4

— WITNESSES —

William O. Whitman  
Charles K. Schopf

— INVENTOR —

Benjamin N. Klein  
By James H. Payne

— ADDRESS —



# UNITED STATES PATENT OFFICE.

BENJAMIN H. KLEIN, OF DELAWARE, OHIO.

## WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 255,432, dated March 28, 1882.

Application filed February 16, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN H. KLEIN, a citizen of the United States, residing in Delaware, in the county of Delaware and State of Ohio, have invented a certain new and useful Wind-Wheel for Windmills, of which the following is a specification.

My invention relates to improvements in wind-wheels in which the sails are pivoted to the inner and outer rims, so that when struck by a violent wind said sails will swing upon their pivots and present their edges to the wind.

The object of my invention is to provide means for relieving the pivot of the sails from strain, to prevent the sails from oscillating too freely when swung around, as well as to stay them when swung in the wind, and to afford means for simultaneously swinging such sails into a subsiding violent wind. I attain these objects by devices illustrated in the accompanying drawings, in which—

Figure 1 represents a detail front elevation of a wind-wheel embodying my invention; Fig. 2, a similar elevation of the same in its operative position with the sail's edge to and out of the wind; and Fig. 3, a side elevation of a wind-wheel embodying my invention and showing its connection with tower and tail-vane; Fig. 4, a detail showing the manner of pivoting the sail to the inner and outer rims and auxiliary rims, and also the location of one of the springs used to automatically swing the sails upon their pivots into a decreasing wind; Fig. 5, a detached section, showing the stationary and auxiliary rims, one of the sails, and the manner of pivoting and automatically operating same by means of the spring.

Similar letters of reference indicate the same parts in the several figures of the drawings.

A represents the cap of a windmill-tower supporting a bracket, *a*, tail-vane B, and forming a bearing for the crank-shaft C, carrying upon its outer end the hub *c* and operating the vertical shaft *c'*, all of said parts being of the usual construction. Hub *c* carries the usual number of spokes *d*, which support the inner and outer rims, *ee'*, respectively, between which sails F, having angular or turned-up inner edges, *f*, are pivoted, as clearly shown in Fig. 4 of the drawings, by rods *g*, secured to the

sails by any suitable means, and extending the entire length of the sails a little forward of their center of width, and having their bearings in the inner and outer rims, *e e'*, proper of the wind-wheel. Toward the inner edges of the sails, and likewise secured to the same as are the pivot-rods *g*, are pivot-rods *h*, having their bearings in auxiliary inner and outer rims, *i i'*, respectively, which have no other support, except said rods or the ends of the sails, as the case may be.

By pivoting the sails as above described I have provided an expansible rim, affording a firm support and stay for the sails, without interfering with their free pivotal movement, and at the same time serving to prevent the sails from oscillating upon their pivots, and, moreover, staying them against collapsing when struck by a violent and sudden gust of wind. By an "expansible rim" I mean a rim having the function of spreading itself apart laterally when the sails swing out of the wind.

In order to cause the sails to automatically swing into the wind, one or more coil-springs, *k*, are secured upon the spokes of the wheel and provided with a straight arm, *k'*, engaging with the ends *l* of the pivot-rods *h*, projecting upon the inside of the inner rim, *i*, or with studs upon the inner side of said rim, so as to press the auxiliary rims toward the rims proper, and thus swing the sails upon their pivots. It is obvious, however, that any other form of spring adapted for this purpose might be used without departing from the spirit of my invention—as, for instance, a contracting spiral spring connected at each end to the rims.

For the successful operation of a wind-wheel it is necessary that it should not at all times come to or remain at a standstill when subjected to the pressure of a violent wind, and to obviate such an objection I have provided the sails with the angular edges *f*, for it will be understood that even though the outer edges of the sails be turned direct toward the wind these flanges will be always slightly in the wind, and hence the wind-wheel be kept in motion. Furthermore, by having such angular flanges the sails will hold more wind when full or at an oblique angle to the wind than if their faces were perfectly plain.

It will be seen that by having double rims

which operate to stay the sails, as before described, the strain upon the sails is distributed in such a manner that I may make the rims so light that their combined weight may be  
5 much less than when a single or solid double rim is employed—that is, a rim of extra width, now in use—and thereby I can have a lighter wheel of the same strength and durability.

Having thus described my invention, what I  
10 claim, and desire to secure by Letters Patent, is—

1. In a wind-wheel, the combination, with pivoted sails and with the ordinary wheel rims, of an auxiliary inner and outer rim supported  
15 by said sails, as and for the purpose set forth.

2. In a wind-wheel, the combination, with the ordinary wheel-rims and with the pivoted sails, of the auxiliary outer rim and inner rim,

with the springs for operating said auxiliary rims to automatically swing the sails into the  
20 wind.

3. The combination, with the stationary inner rim and outer rim, and with the movable inner rim and outer rim, of a series of sails provided with angular flanges and pivoted to  
25 said stationary and movable rims.

4. In a wind-wheel, the combination, with the hub, the spokes, the stationary inner rim, and outer rim secured to said spokes, of the movable rims *i* and *i'*, the sails *F*, pivoted as  
30 shown, and a spring connecting the spokes with the pivot *h* or with the rim *i*.

BENJAMIN H. KLEIN.

Witnesses:

HENRY G. SHELDON,

HENRY J. EATON.