

(No Model.)

H. BIRKHOLZ.  
CONVEYER.

No. 426,488.

Patented Apr. 29, 1890.

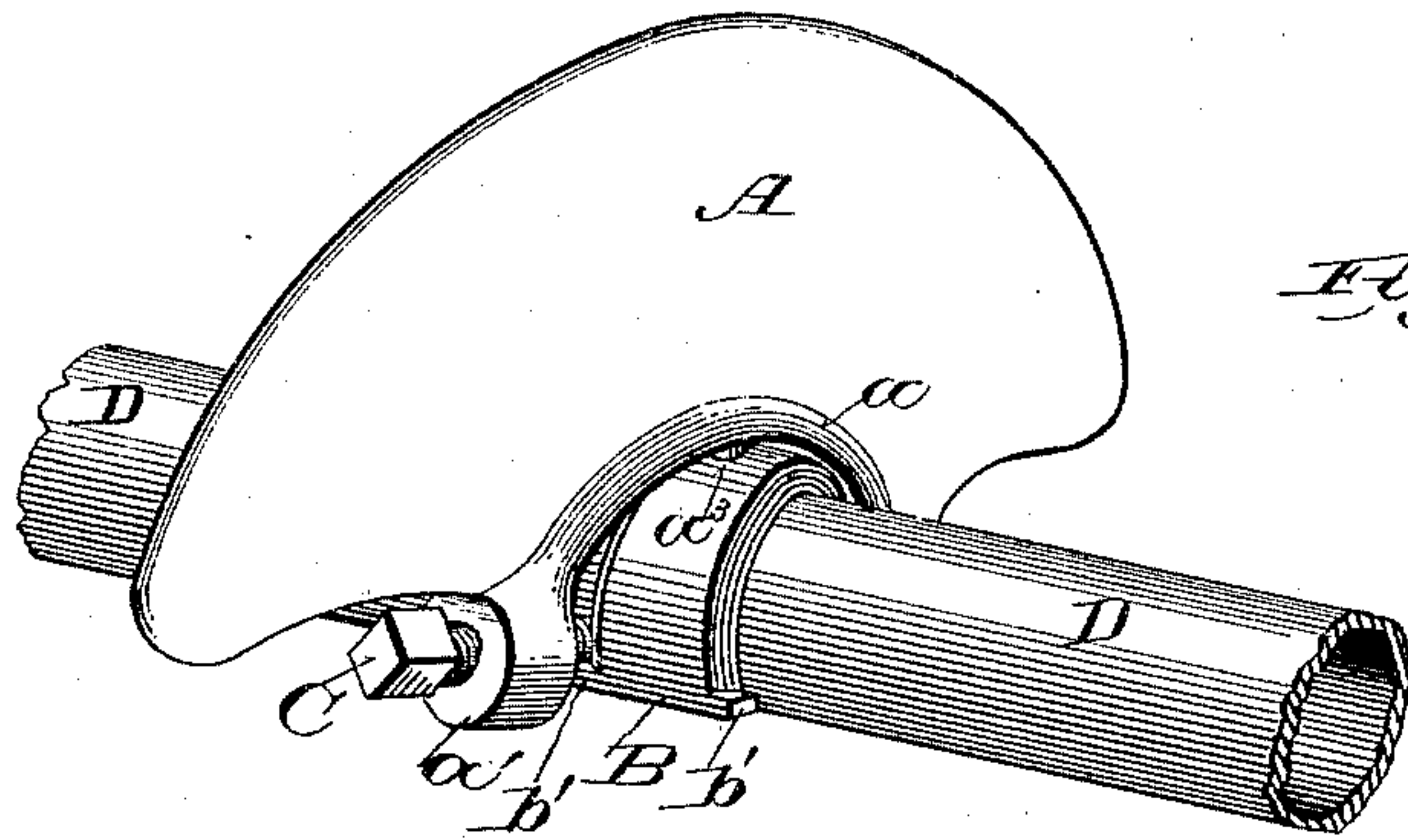


Fig. 1.

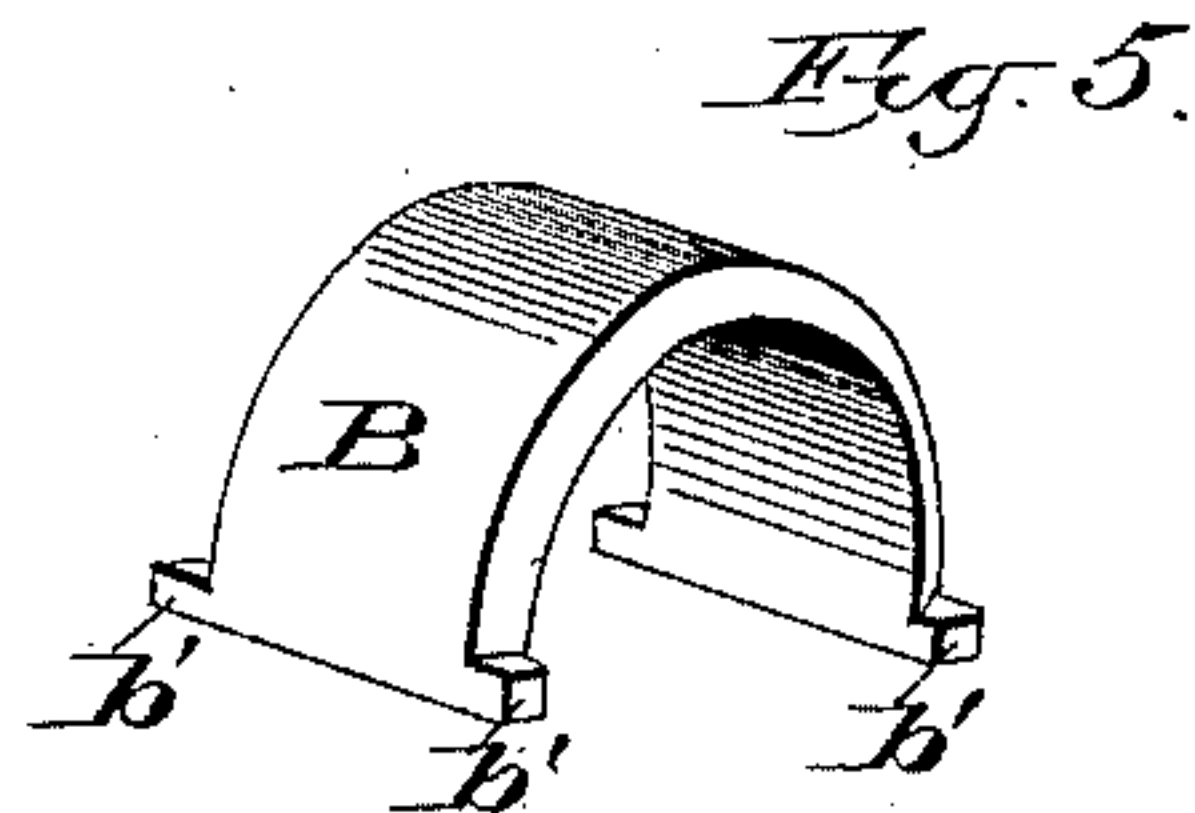


Fig. 5.

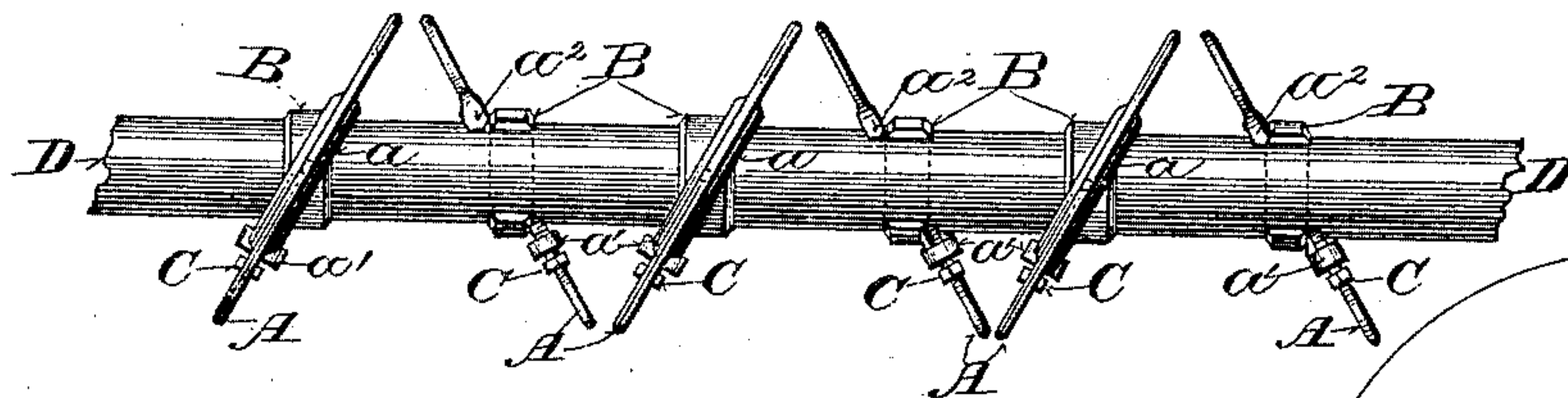


Fig. 2.

Fig. 3.

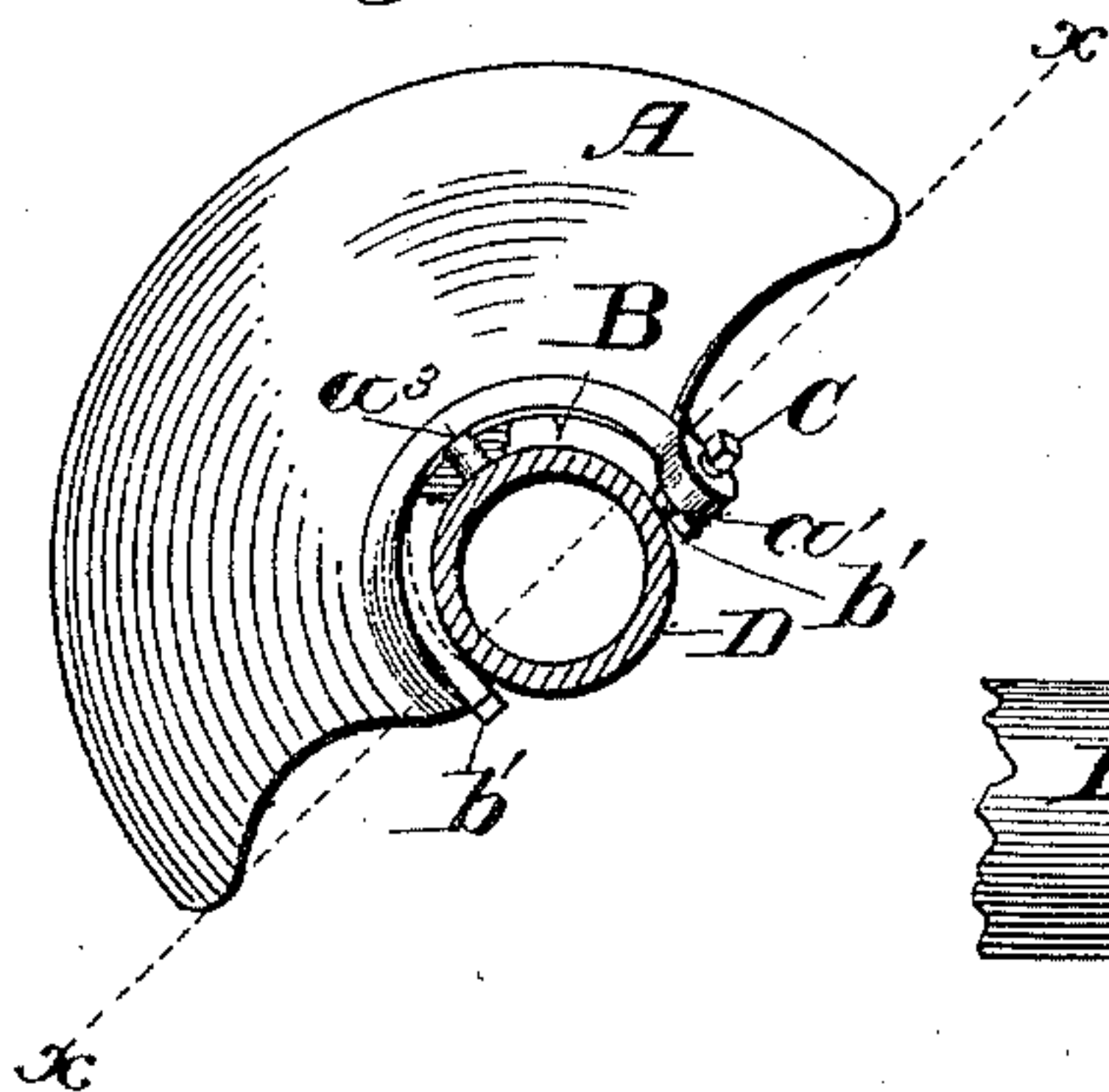


Fig. 4.

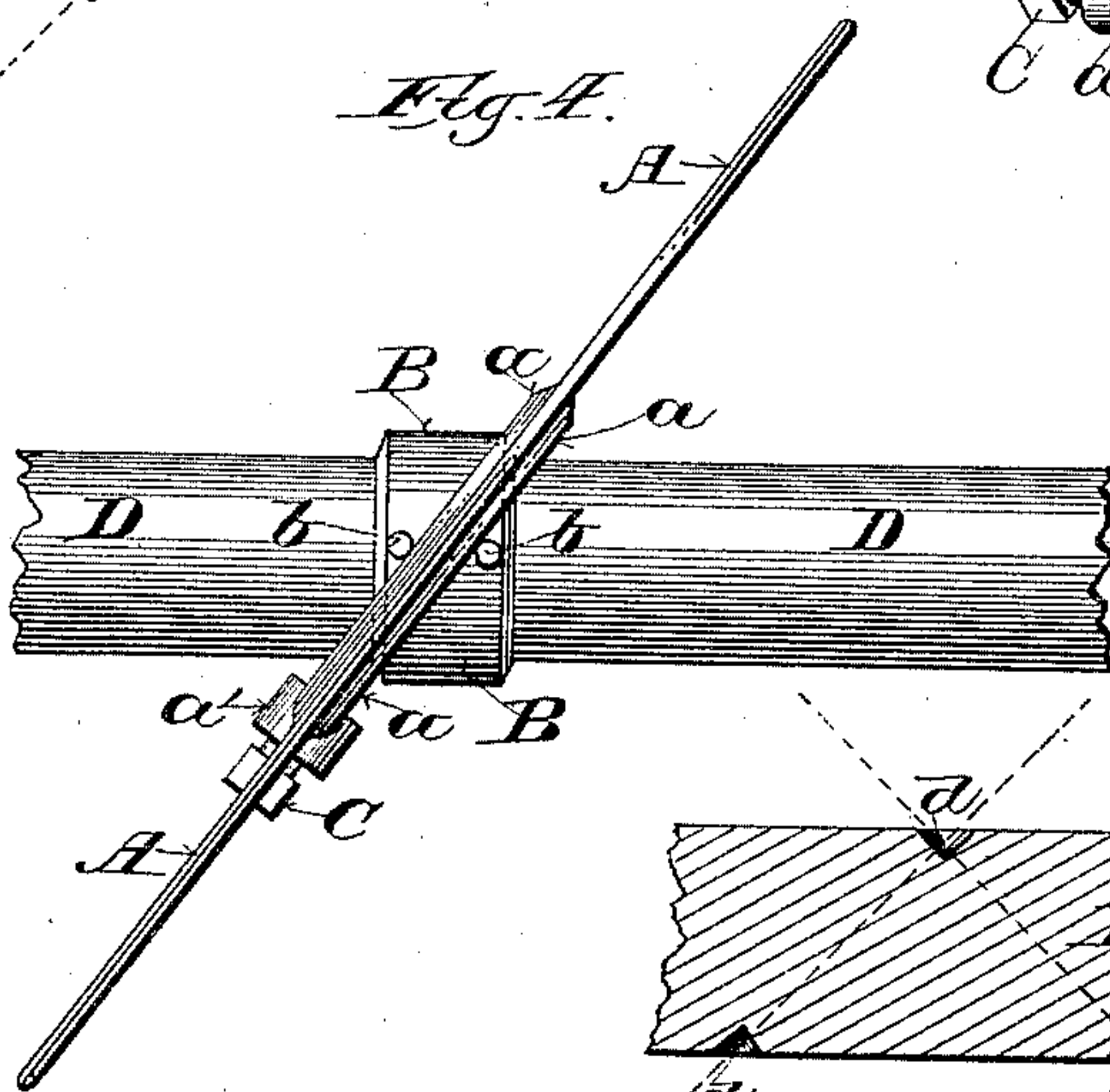
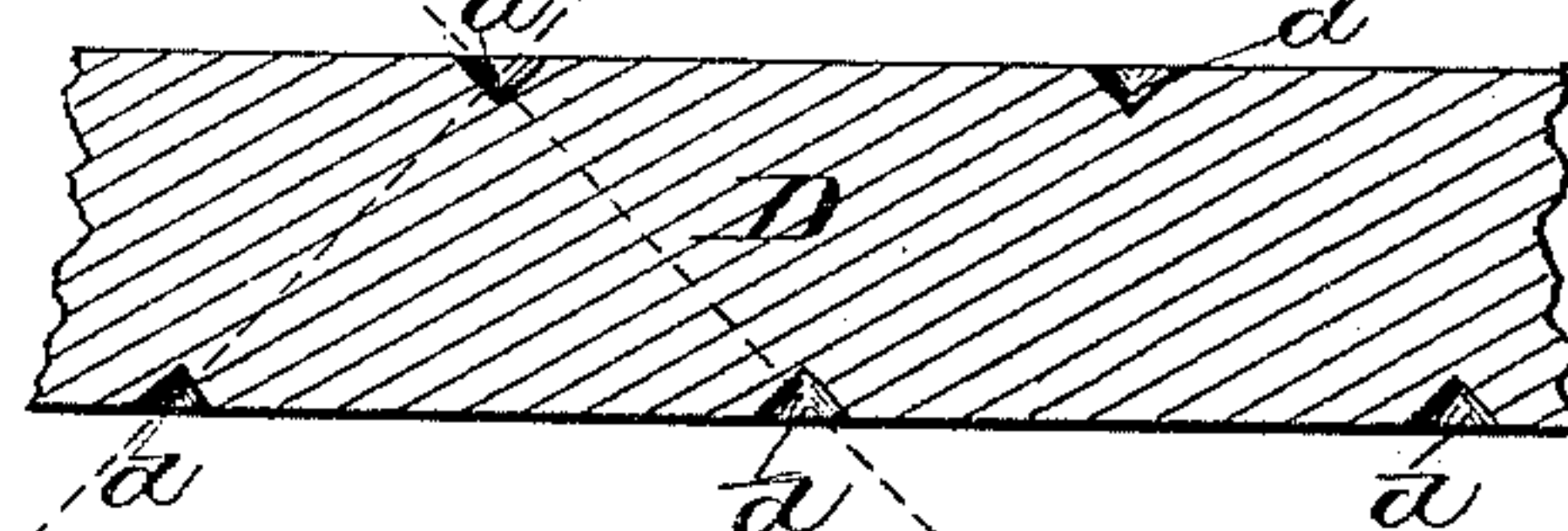


Fig. 7.



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# UNITED STATES PATENT OFFICE.

HANS BIRKHOLOZ, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO EDWARD P. ALLIS & CO.; MARGARET W. ALLIS, WILLIAM W. ALLIS, EDWARD P. ALLIS, JR., CHARLES ALLIS, AND EDWIN REYNOLDS, ALL OF MILWAUKEE, WISCONSIN, EXECUTORS OF EDWARD P. ALLIS, DECEASED, SOLE MEMBER OF THE FIRM OF EDWARD P. ALLIS & CO.

## CONVEYER.

SPECIFICATION forming part of Letters Patent No. 426,488, dated April 29, 1890.

Application filed January 23, 1888. Serial No. 261,605. (No model.)

*To all whom it may concern:*

Be it known that I, HANS BIRKHOLOZ, a citizen of the United States, residing in the city and county of Milwaukee, and State of Wisconsin, have invented certain new and useful Improvements in Conveyers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to provide conveyers with reversible flights, to facilitate the attachment to, removal from, and adjustment upon the conveyer-shaft of the flights, in the construction and mode of attachment of the flights to the conveyer-shaft, to secure lightness, simplicity, economy, and strength, and in the operation of the conveyer to attain the greatest efficiency.

It consists, essentially, of certain peculiarities in the construction of the flights and of the means of attaching them to the conveyer-shaft, hereinafter specifically set forth, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a perspective view of one of my improved conveyer-flights. Fig. 2 is a plan view or elevation of a portion of a conveyer embodying my improvements. Fig. 3 is a side elevation of a flight and its connections. Fig. 4 is a plan view, on an enlarged scale, of a flight with a slightly-modified form of the fastening by which it is held in place. Fig. 5 is a detail view of the collar by which the flight is held at an angle to the conveyer-shaft, and Figs. 6 and 7 are details of a modification of the fastening dispensing with the collar.

I am aware that reversible metallic conveyer-flights are not, broadly, new; but in the construction of flights of this class hitherto made considerable metal or material has

been employed in the fastenings on the side of the conveyer-shaft opposite the flights. It is obvious that whatever material is used in a plane flight or its fastenings on the opposite side of the axis of rotation, or of a line (such as  $x x$ , Fig. 3) intersecting it, is detrimental to the action of the conveyer, inasmuch as such material acts in a direction opposite the action of the flight proper. To dispense with such detrimental material in the construction of the flights or of their fastenings has been heretofore either at the expense of efficiency in the fastening or strength in the flight, or has necessitated the employment of a more expensive metal or mode of construction. These various disadvantages I aim to avoid and at the same time to attain the advantages hereinbefore mentioned by my improved device.

Referring to the drawings, D represents the conveyer-shaft, preferably made of gas-pipe or tubular metal, although shafts of any other suitable form or material may be used.

A A are the conveyer-flights, which I prefer, in order to attain the greatest working capacity, to make as nearly semi-elliptical in form as practicable, and for the sake of economy, together with lightness, I prefer to employ cast-iron in their construction.

B B are rings or segmental collars, preferably beveled on their edges and loosely mounted upon the conveyer-shaft D. The flights A A are formed at the center with semi-elliptical recesses to fit when set at an inclination to the axis of rotation or to shaft D over the collars B B. At the ends of these recesses the flights are provided on one side with inwardly-projecting lugs  $a^2 a^2$  and on the other side with threaded ears or nuts  $a' a'$ , to receive the set-bolts C C, in line with the lugs  $a^2 a^2$ . The lugs  $a^2 a^2$  and bolts C C are constructed and arranged to engage the shaft D on the opposite side of its greatest thickness or diameter from the flights themselves, and thereby draw the flights snugly against the collars B B and secure them to said shaft. The lug  $a^2$  and tip of the screw C



of each flight, bearing in the angle between the collar B and shaft D on opposite sides of said collar and of said shaft, cramp the collar on the shaft, and thereby hold it and the flight securely in place. The flights are preferably re-enforced about their central recesses by flanges  $a a$ , which present broad bearing-faces against the peripheries of the collars B B.

To prevent the flight from turning upon its lug  $a^2$  and set-bolt C, a central projection  $a^3$  is formed either on the flight, as shown, or on the collar B, and engages a corresponding depression or opening in the collar or flight. This projection  $a^3$ , being central, permits of the reversal of the flight and serves to prevent its lateral displacement in either position.

Instead of the projection  $a^3$ , I may provide lugs  $b b$  on the collar B, as shown in Fig. 4, or in a line at right angles to that in which they are shown, to engage opposite sides of the flight and prevent its lateral displacement in either position; or the flanges  $a a$  may be extended to furnish a sufficiently-wide bearing on the collar B to prevent lateral displacement of the flight.

It is obvious that the inclination of the flights to the shaft D may be varied by changing the width of the collars B B.

With the herein-described method or means of fastening the flight to the shaft the greatest strain is in a line passing through the strongest section of the flight and intersecting the axis of rotation at right angles to the line  $x x$  or to the line passing through the lug  $a^2$  and tip of the bolt C. The flight and its fastening device are confined nearly to one side of the shaft, thereby increasing its efficiency, and the flight may be made of cast-iron, which is cheaper than malleable or wrought iron, necessarily employed for lightness and strength in those flights whose fastenings extend around the conveyer-shaft to a point opposite the flight itself.

The segmental collars B B are open on one side, so as to permit of their being passed into place on the conveyer-shaft over the side thereof, and they are provided at the ends on each side with lateral projections  $b' b'$ , as shown most clearly in Fig. 5, to engage the lugs  $a^2$  on the flights and hold the latter in the proper position relative to said collars while the set-bolts C are being turned up and the flights secured to the shaft.

The projections  $b' b'$  on the collars B B may be dispensed with, as shown in Fig. 2, although I prefer to construct the collars with them, as shown in Figs. 1 and 5, as they facilitate setting the flights, together with said collars, upon the shaft D.

The edges of the collars B B, in connection with the shaft D, furnish seats for the engagement of the lugs  $a^2$  and points of bolts C, constituting bearings and fastenings for the flights, by which they are held upon the conveyer-shaft obliquely thereto; but similar seats for the engagement of the bearings of

the flights may be provided by forming in the conveyer-shaft grooves, recesses, or indentations, as  $d d$ , as shown in Figs. 6 and 7, or by providing ribs or shoulders on said shaft, any of these constructions affording the necessary seats for the engagement of the bearings of the flights and preventing said bearings from slipping lengthwise of said shaft. I prefer, however, to use the segmental collars described, because by this means the seats for the bearings of the flights can be readily adjusted upon the conveyer-shaft, and the distance between the flights and their angular position thereon can thereby be varied as desired; or collars of different widths may be employed, so as to hold the flights at any desired inclination to the axis of rotation.

In case indentations are made in the shaft, as shown in Figs. 6 and 7, the line passing through the lug  $a^2$  and the set-bolt C need not necessarily pass through the shaft past its center or on the side of its axis opposite the flight.

In place of the screw-threaded bolts C, any other suitable adjusting devices may be employed, whereby each or either of the bearings of a flight may be moved toward the other for the purpose of bringing them into engagement with the seats on opposite sides of the conveyer-shaft.

I claim—

1. The combination, in a conveyer, with the conveyer-shaft provided on opposite sides with seats, of a flight having a laterally-opening recess and bearings at the ends of said recess, one of which is movable toward the other, so as to enable them to engage with the seats on opposite sides of said shaft and hold the flight thereon at an inclination thereto, substantially as and for the purposes set forth.

2. The combination, in a conveyer, with a shaft having seats on opposite sides in lines oblique to its axis, of a flight having a laterally-opening recess adapted to be placed over the side of said shaft and set thereon at an inclination thereto, and provided at the ends of said recess with bearings adapted to engage with said seats, whereby the flight is held on said shaft at an inclination thereto, substantially as and for the purposes set forth.

3. The combination, in a conveyer, with a shaft provided on opposite sides with seats, of a reversible flight having a laterally-opening recess and bearings at the ends of said recess, one of which is movable toward the other, said bearings being constructed and arranged to engage with said seats on the opposite side of the center of said shaft from the flight itself, whereby the flight is held upon said shaft at an inclination thereto, substantially as and for the purposes set forth.

4. The combination, in a conveyer, with the conveyer-shaft provided on opposite sides with seats adapted to be engaged by the bearings on the flight and prevent the same from slipping lengthwise of the shaft, of a flight having a laterally-opening recess adapt-



ed to be placed over the side of the shaft and to permit of the flight being set at an inclination thereon, said flight being provided at the ends of the recess therein with bearings adapted to engage with said seats and hold the flight on said shaft at an inclination thereto, substantially as and for the purposes set forth.

5. The combination, in a conveyer, with a shaft having seats on opposite sides thereof, of a flight having a recess to pass over the side of said shaft, and a laterally-projecting flange at the edge of said recess, whereby the flight is strengthened and a broad bearing is afforded, the flight being provided at the ends of said recess with bearings adapted to engage the seats on said shaft and hold the flight thereon at an inclination thereto, substantially as and for the purposes set forth.

6. The combination, in a conveyer, with the conveyer-shaft, of a collar mounted thereon and forming therewith seats for the engagement of the bearings of a flight, and a flight having a laterally-opening recess, and bearings at the ends of said recess adapted to engage the opposite edges of said collar and opposite sides of said shaft, whereby the flight is held thereon at an inclination thereto, substantially as and for the purposes set forth.

7. The combination, in a conveyer, with the conveyer-shaft, of a segmental collar adjustably mounted thereon and forming therewith seats for the engagement of the bearings of a flight, and a flight having a laterally-opening recess, and bearings adapted to engage opposite edges of said collar and opposite sides

of said shaft, one of said bearings being movable toward the other, substantially as and for the purposes set forth.

8. The combination, in a conveyer, with the conveyer-shaft, of a segmental collar mounted thereon and provided with lateral projections, and a flight having a laterally-opening recess to pass over the side of said shaft, and provided with bearings at the ends of said recess adapted to engage with opposite edges of said collar and opposite sides of said shaft, substantially as and for the purposes set forth.

9. The combination, in a conveyer, with the conveyer-shaft provided on opposite sides thereof with seats for the engagement of the bearings of a flight, of a flight having a laterally-opening recess, and provided at one end of said recess with an inwardly-projecting lug and at the other end thereof with a threaded perforation, a threaded bolt adapted to work in said perforation in line with said lug, said bolt and lug constituting the bearings of the flight and adapted to engage with the seats on said shaft and hold the flight thereon at an inclination thereto, and a lug adapted to prevent the flight from turning or tipping on its bearings, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HANS BIRKHOLZ.

Witnesses:

HANS P. CLAUSSEN,  
OTTO E. RASWALL.