

(Model.)

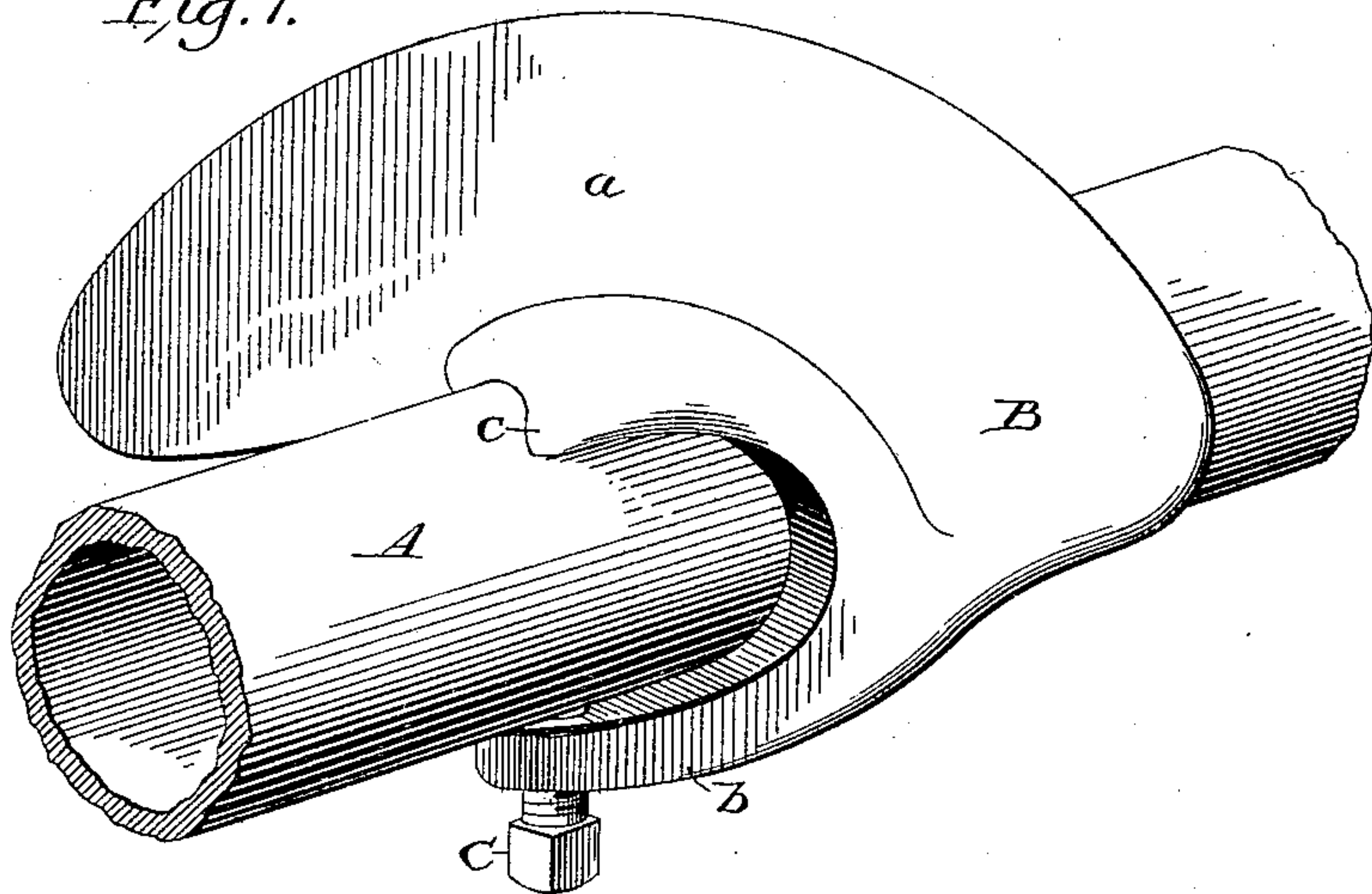
2 Sheets—Sheet 1.

H. BIRKHOLZ.  
SPIRAL CONVEYER.

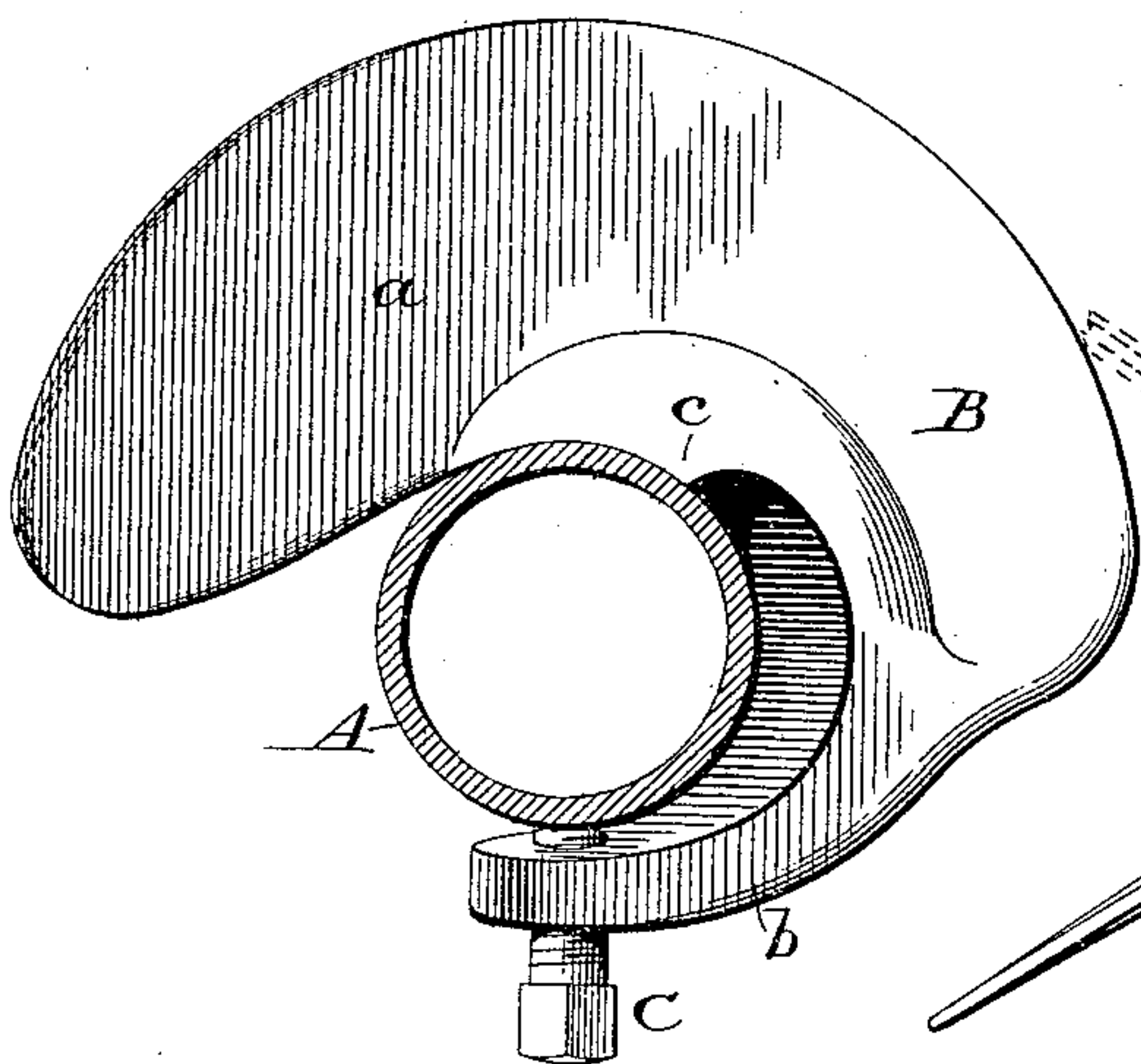
No. 371,542.

Patented Oct. 18, 1887.

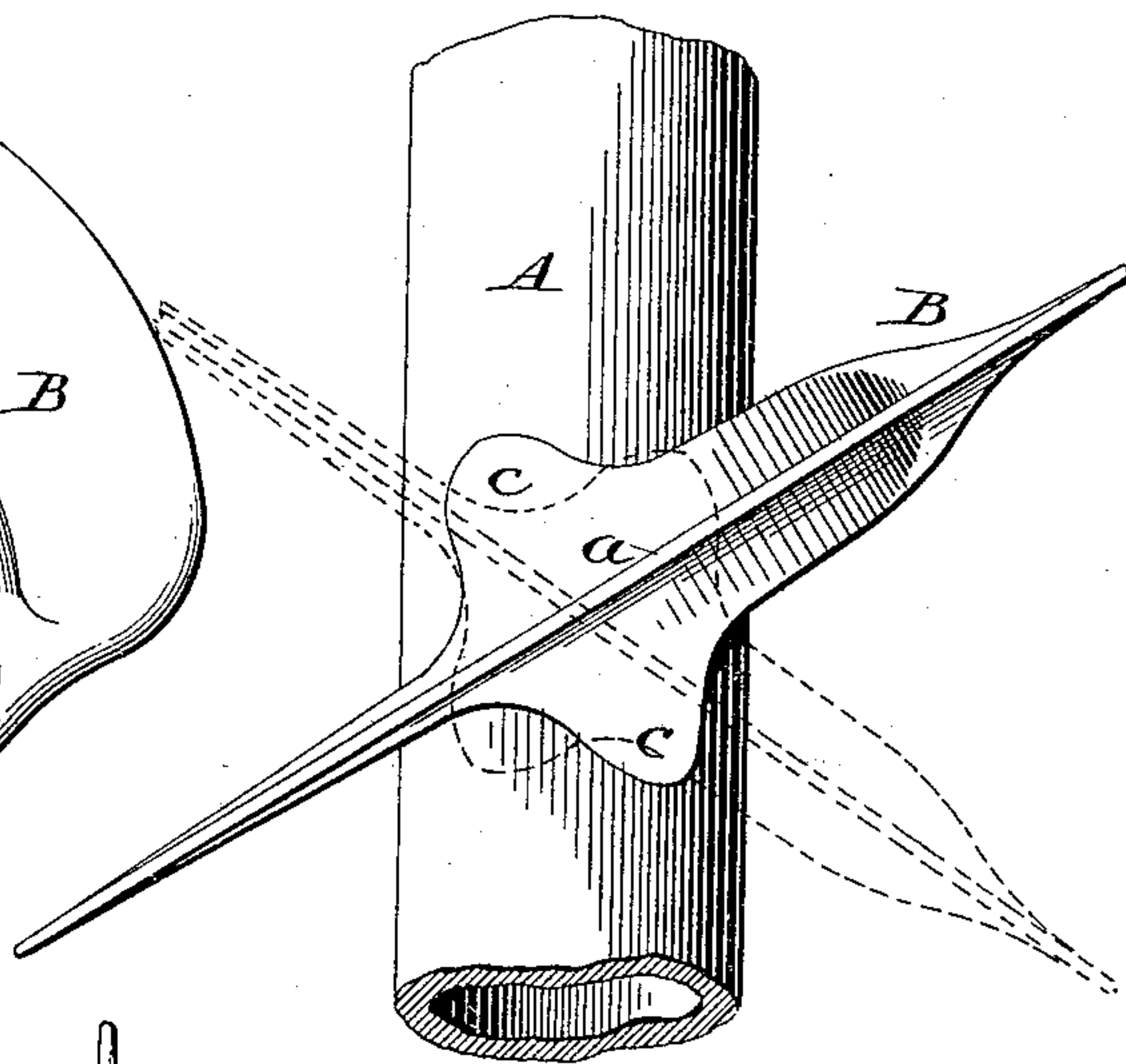
*Fig. 1.*



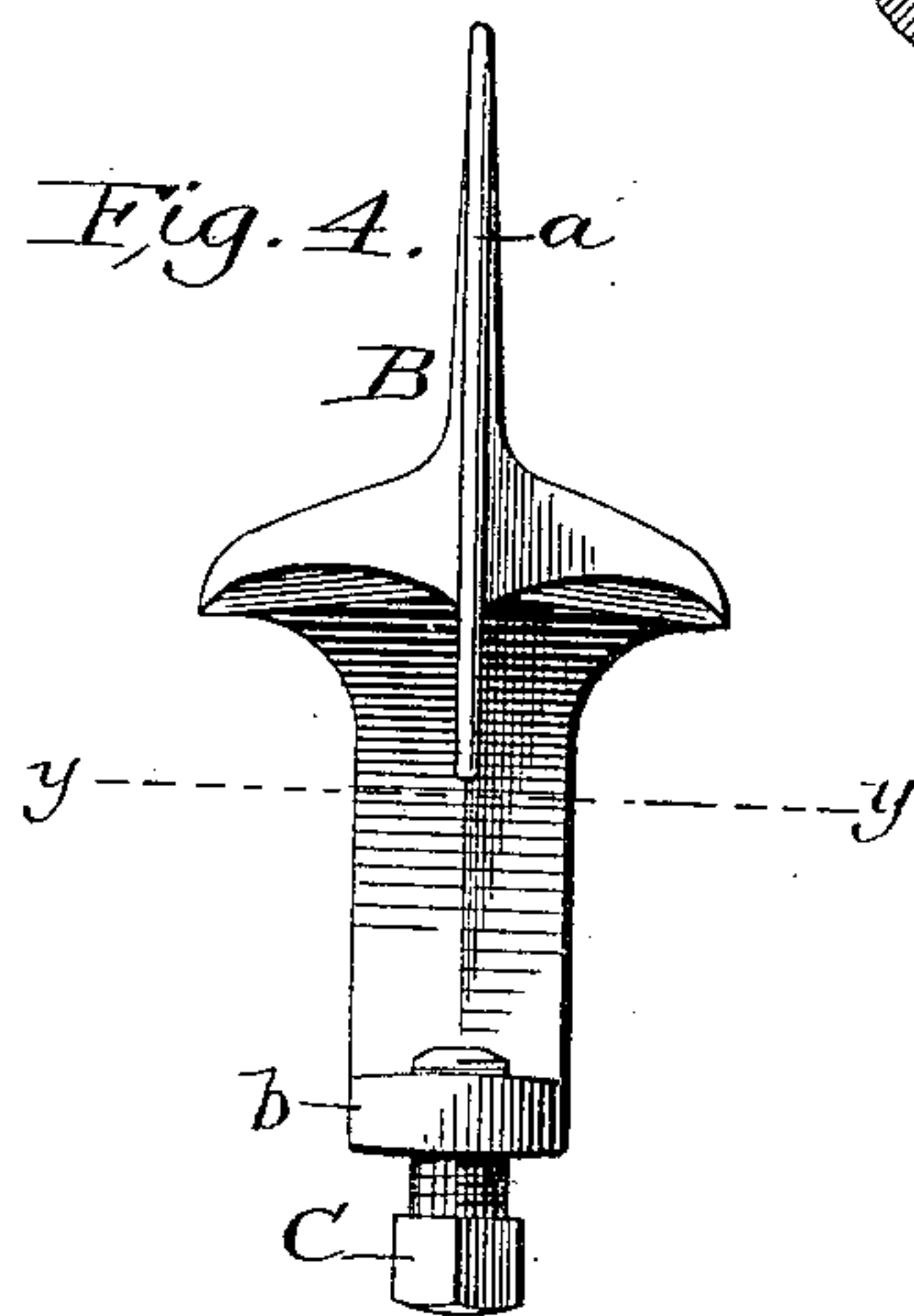
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



Witnesses:

James P. Huffam  
Arthur Ashley

Inventor:  
Hans Birkholz,  
by Rodger Lons,  
his Atty.

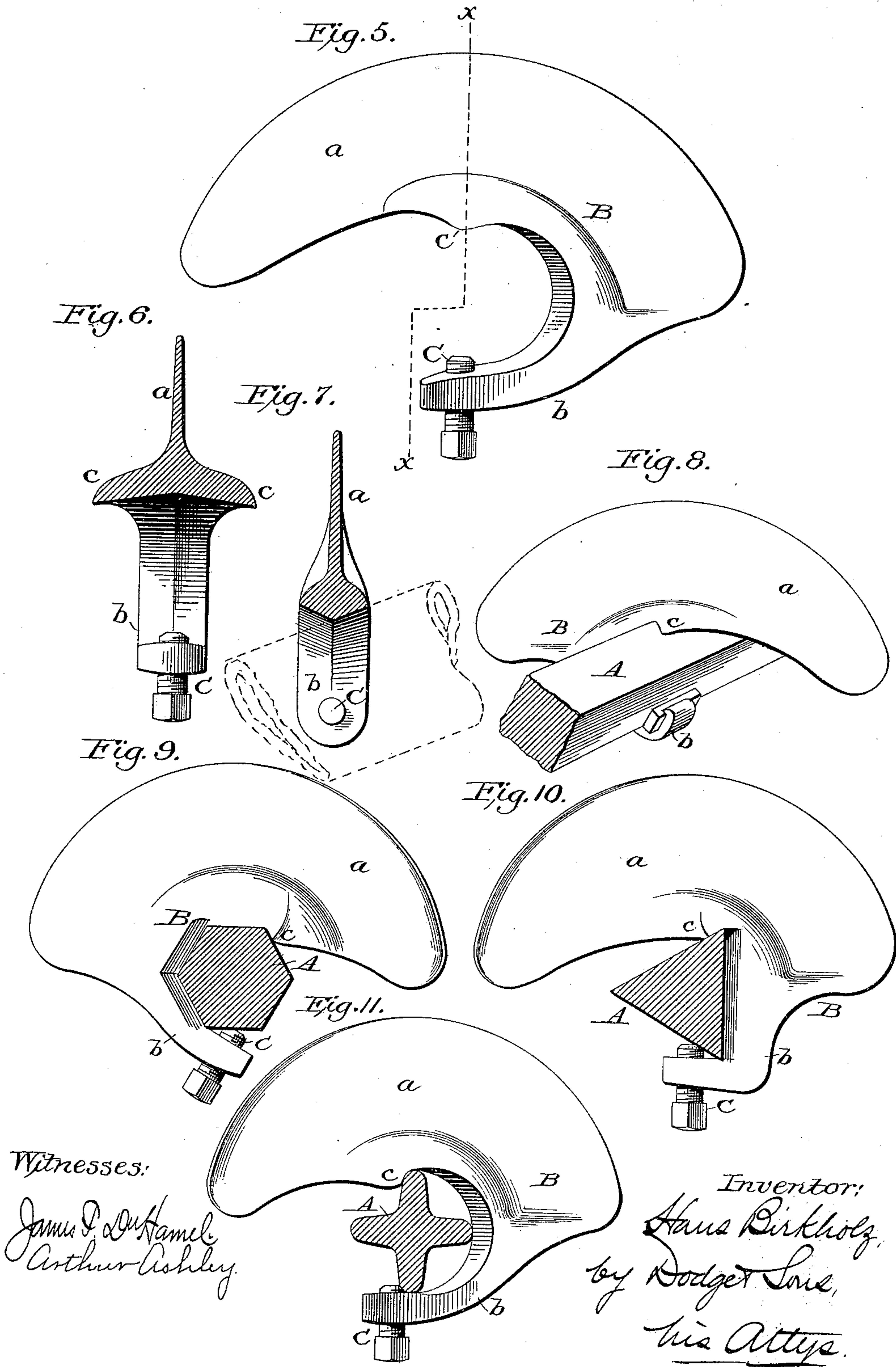
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2 Sheets—Sheet 2.

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SPIRAL CONVEYER.

No. 371,542.

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Witnesses:

James P. DuHamel  
Arthur Ashley

Inventor:

Hans Birkholz,  
by Dodge & Sons,  
his Attys.



# UNITED STATES PATENT OFFICE

HANS BIRKHOLOZ, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO EDWARD P. ALLIS & CO., OF SAME PLACE.

## SPIRAL CONVEYER.

SPECIFICATION forming part of Letters Patent No. 371,542, dated October 18, 1887.

Application filed August 13, 1887. Serial No. 246,825. (Model.)

*To all whom it may concern:*

Be it known that I, HANS BIRKHOLOZ, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Spiral Conveyers, of which the following is a specification.

My invention relates to spiral conveyers; and it consists in constructing the same with a central shaft of any desired form in cross-section and with a series of independent detachable flights, each having an arm to extend to the side of the shaft opposite that occupied by the flight, said arm being furnished with a set-screw, wedge, or equivalent device for drawing and holding the flight firmly against the shaft, the construction permitting each flight to be set to feed right or left, as desired.

In the annexed drawings, Figure 1 is a perspective view of one of my improved flights applied to a shaft; Fig. 2, a vertical transverse section of the shaft, showing the flight in position thereon; Fig. 3, a top plan view of the same; Fig. 4, an edge view of the flight; Fig. 5, a side view of the same; Fig. 6, a sectional view on the line *xx* of Fig. 5; Fig. 7, a sectional view on the line *yy* of Fig. 4; Figs. 8, 9, 10, and 11, views illustrating the application of my improved flight to shafts of different form in cross-section.

In the various figures, A indicates a shaft, which may be of metal or of wood and of any desired form in cross-section, a cylindrical tubular shaft of metal being preferred on account of lightness, strength, and cheapness.

B in the several figures indicates a flight, of which any desired or suitable number will be applied to the shaft, their distances apart being a matter of discretion with the miller or mill-furnisher, depending upon the work to be performed. Each flight consists of a segmental blade, *a*, the outer edge of which is, when the flight is in position, concentric, or practically so, with the axis of the shaft A, which carries it, an arm, *b*, to extend to the opposite side of the shaft, and short ears or lugs *c*, to bear upon the shaft. As the flight occupies an oblique position when in use, it will be seen that to make its outer edge thus concentric with the shaft when in place thereon said edge must be of greater radius than the distance from the

axis of the shaft to the outer edge of the flight as it stands fixed upon the shaft.

The arm *b* of the flight curves away from the inner edge of the flight and in a reverse direction, thus forming with the curved inner edge of the flight a semicircular seat to receive or to fit upon the shaft. If, however, an angular instead of a cylindrical shaft be used, the seat is modified accordingly, being in all cases made to conform to the contour of the shaft.

The distance between the free or outer end of arm *b* and the inner face or edge of the flight, or the inner face of the lugs *c* thereof, is sufficient to permit the flight to be applied to or removed from the shaft laterally; but it is advisable, though not essential, to make the distance sufficient to permit this only when the flight is turned obliquely to the axis of the shaft in one or the other direction.

The inner face of blade *a* and a portion of arm *b* are beveled each way from the middle toward the sides, producing a double or  $\wedge$ -shaped bearing-surface, so that a flat bearing may be secured, whether the flight be set obliquely to the right or left.

When the flight is applied to the shaft and brought to its oblique position, one lug or ear *c* will stand in advance and the other in rear of a given axial plane, and if drawn firmly against the shaft they will prevent the flight from shifting its position or varying its inclination. For the purpose of thus drawing and holding the ears and the inner edge of the blade firmly against the shaft, I provide, preferably, a set-screw, C, as shown in Figs. 1, 2, 4, 5, 9, 10, and 11; or I may substitute for the screw a wedge or other well-known equivalent, as shown in Fig. 8.

The screw, wedge, or other fastening bears at the side of the shaft opposite the lugs or ears *c c* and causes them to be drawn and held in close contact therewith, a feature of importance, in that it secures a better bearing for the flight than where the screw or fastening tends to lift the flight up off the shaft, as in some previous plans.

No claim is made herein to anything shown or described in a prior application filed by me October 4, 1886.

I do not herein claim, broadly, a laterally-

removable flight, nor a flight with a double beveled bearing-face capable of being turned to the right or to the left at will; but I limit my claim to such a flight when provided with  
5 an arm extending to the opposite side of the shaft and there provided with a fastening device serving to draw the flight toward the shaft. In other words,

What I claim is—

- 10 1. A conveyer consisting of a shaft and a series of detachable flights, each provided with an arm projecting from the flight or blade and bent or curved to pass about the shaft to the side opposite that occupied by the flight, and  
15 a fastening device carried by said arm and serving to draw the flight or blade firmly against the shaft.

2. The herein-described conveyer-flight, consisting of blade *a*, having arm *b* and lugs *c c*, and a set-screw or equivalent fastening device 20 carried by said arm.

3. The combination, substantially as set forth, of a shaft, as *A*, and a flight, *B*, consisting of blade *a*, arm *b*, and lugs *c c*, the inner face of the blade and arm being beveled each 25 way from the middle, and a fastening device carried by arm *b* and serving to hold the flight firmly against the shaft.

In witness whereof I hereunto set my hand in the presence of two witnesses.

HANS BIRKHOLZ.

Witnesses:

RICHD. BIRKHOLZ,

THEODORE F. WAMBOLD.