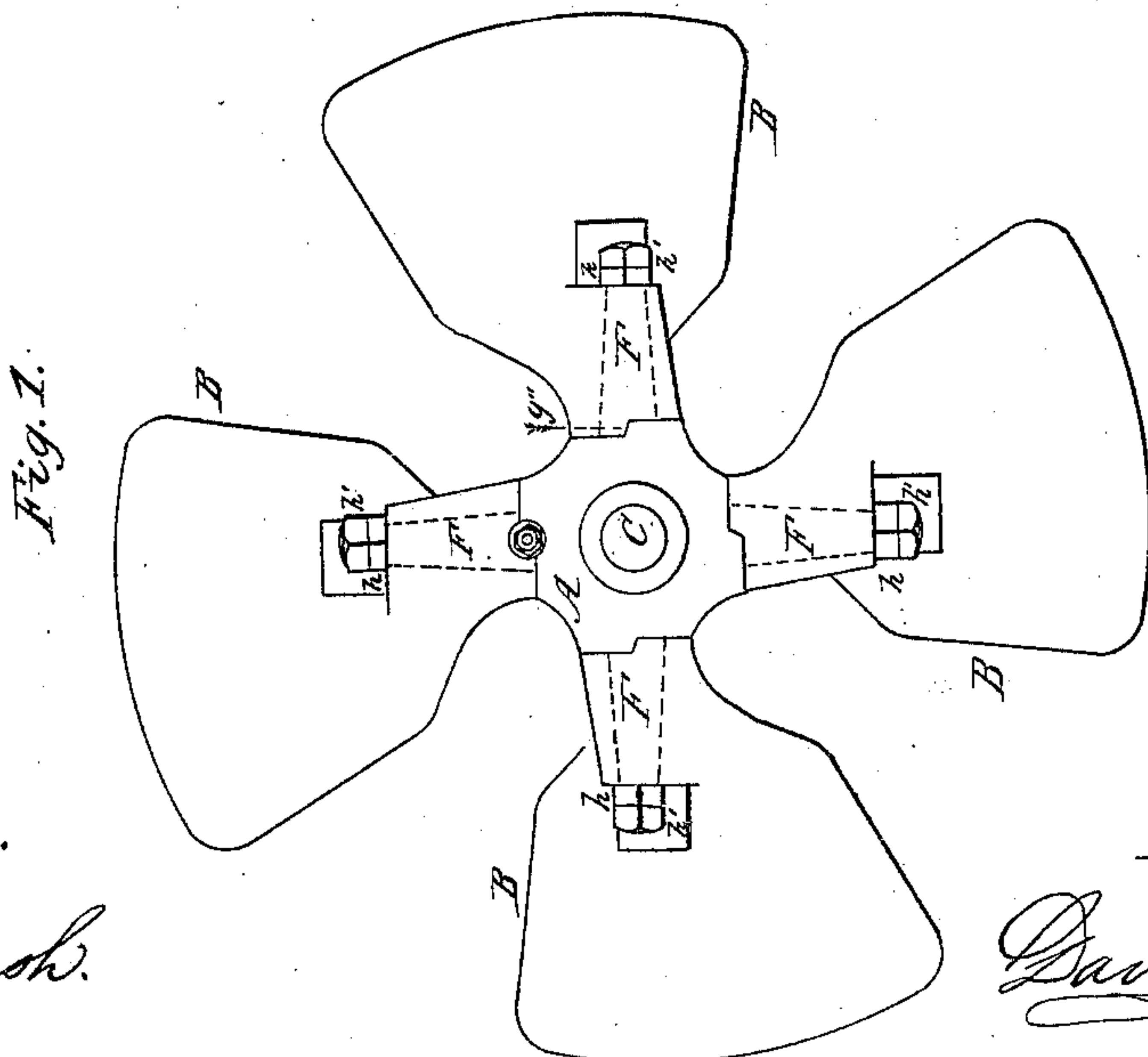
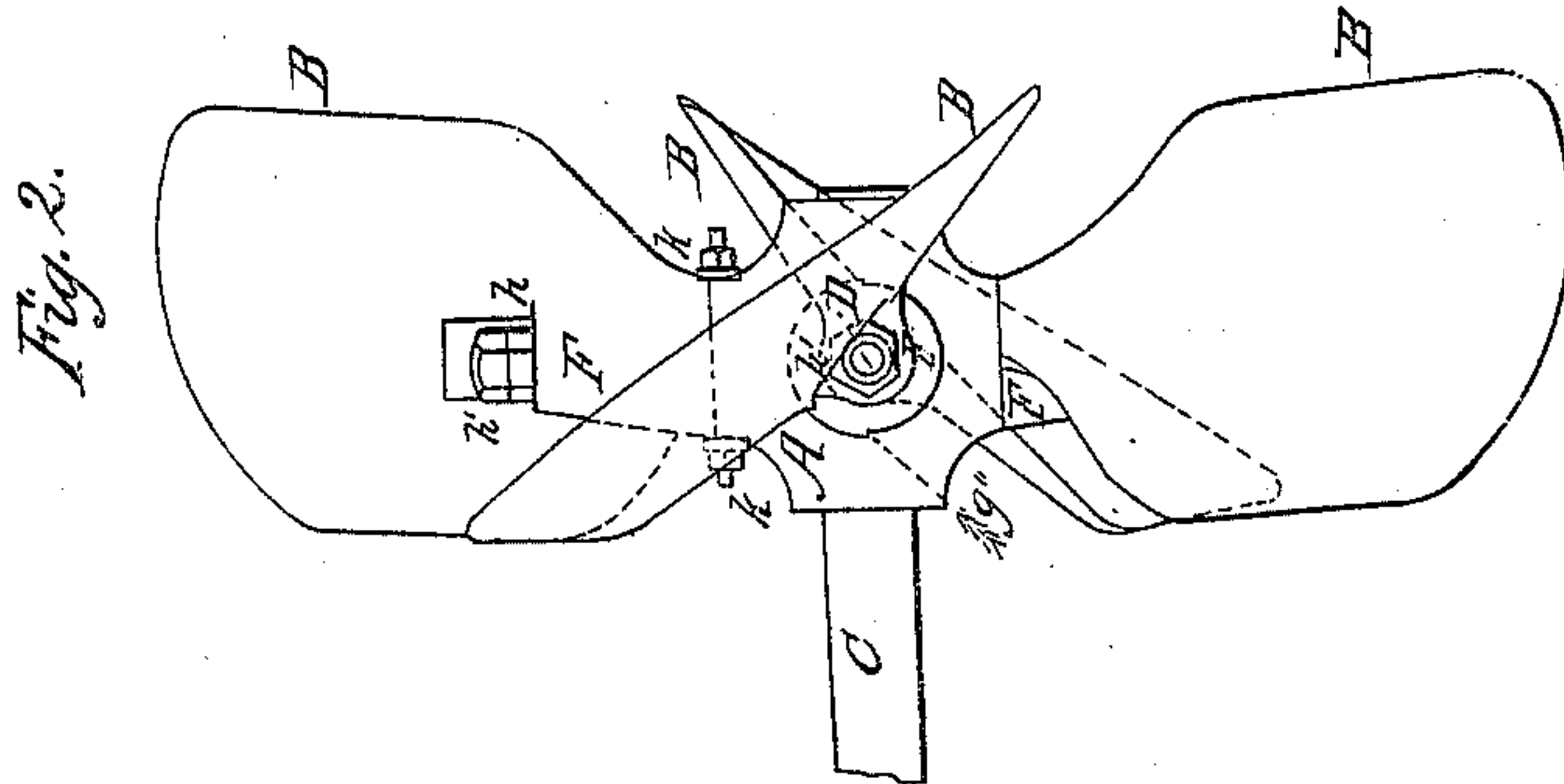
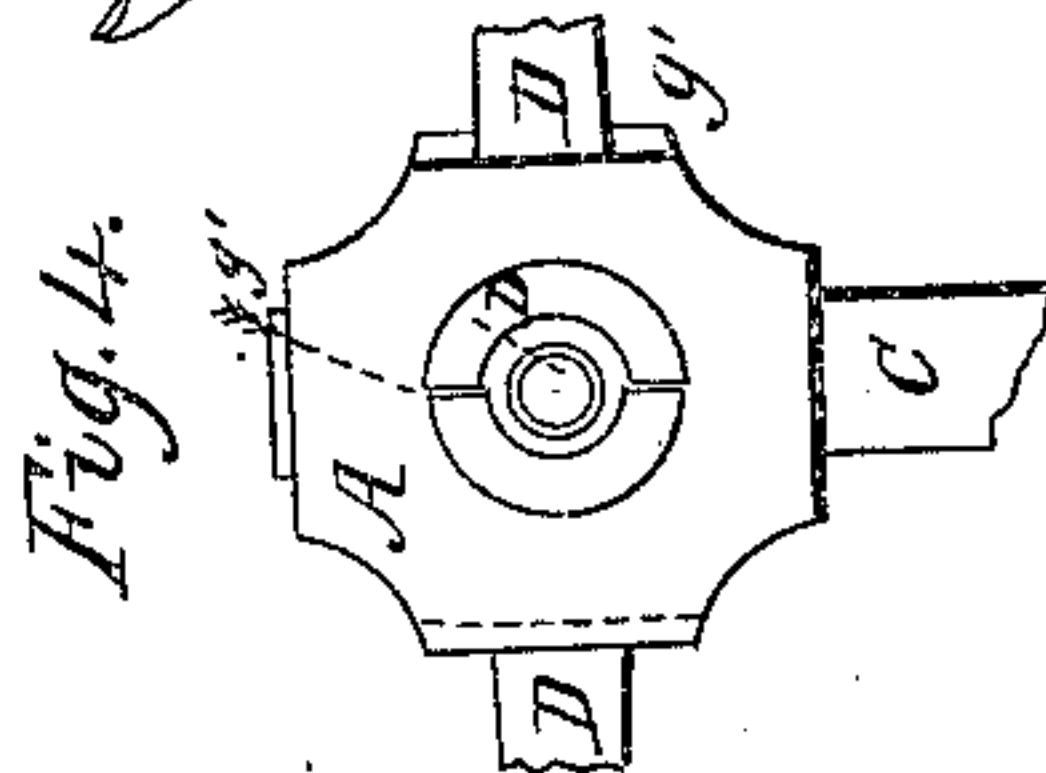
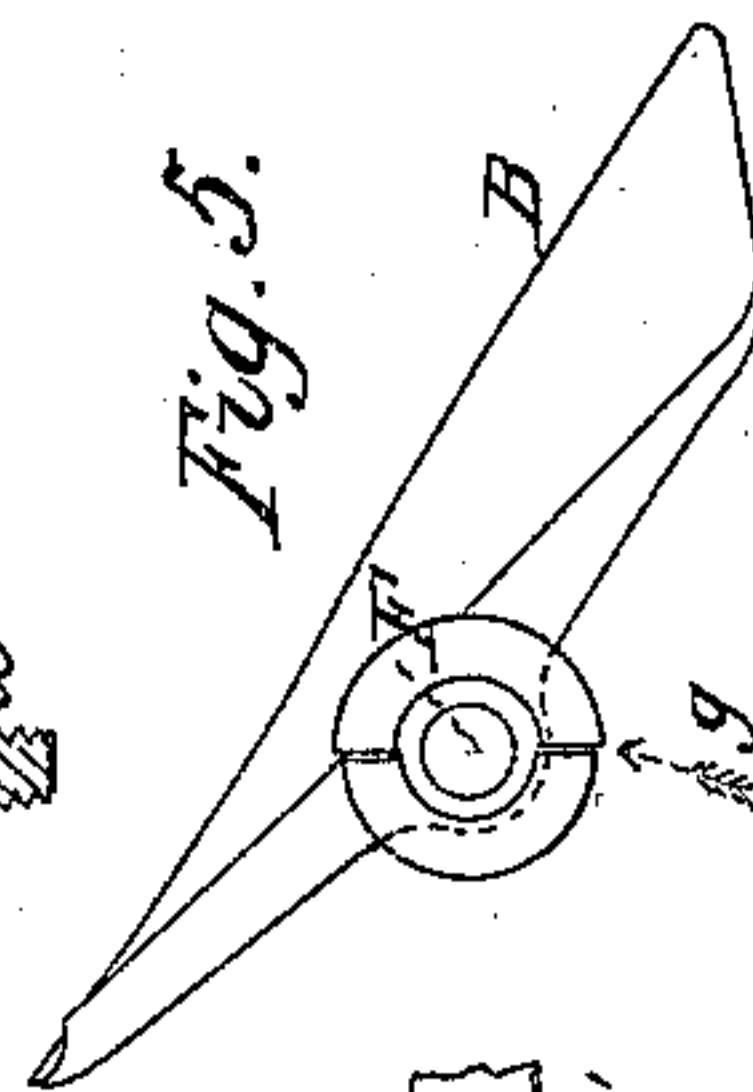
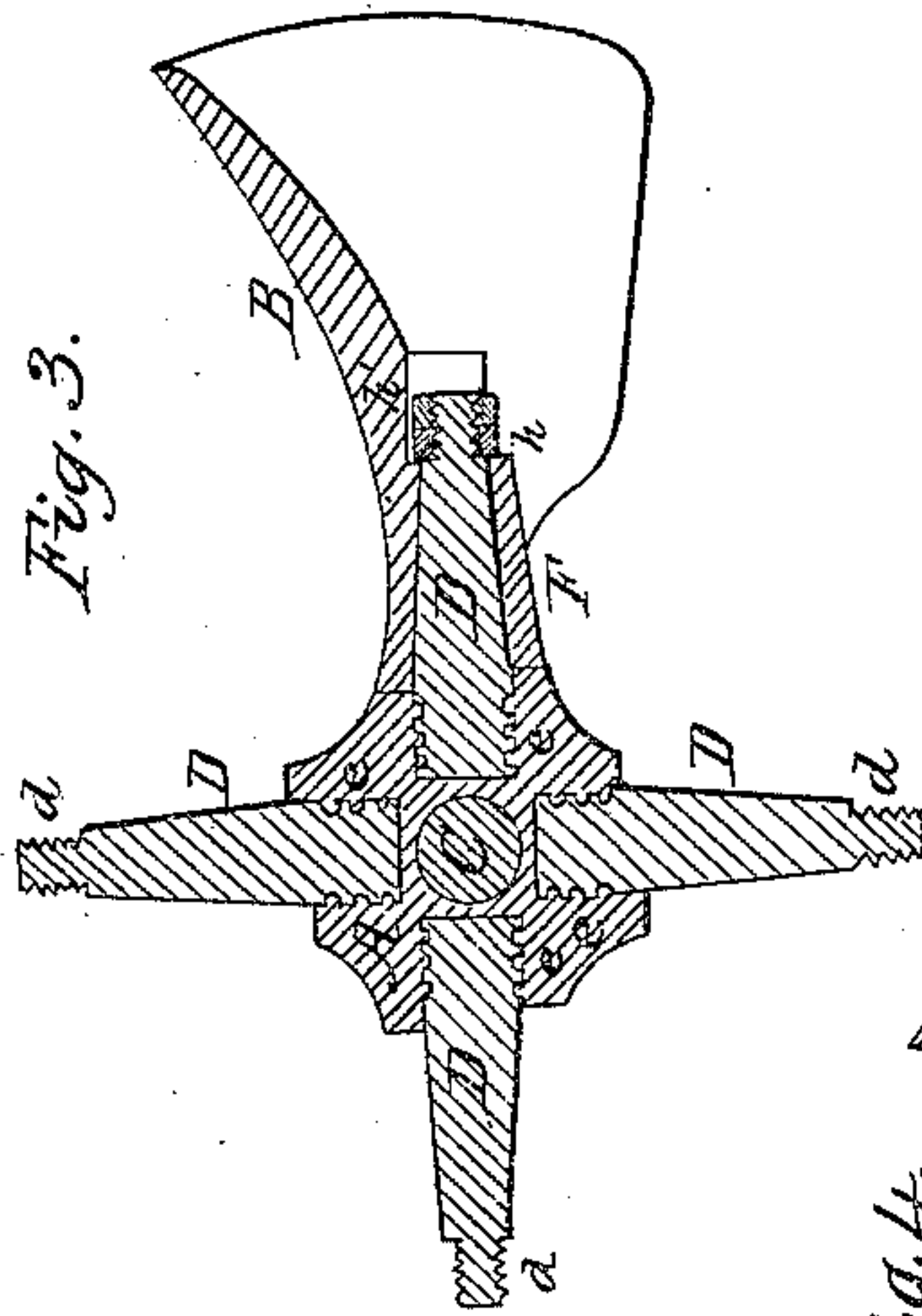
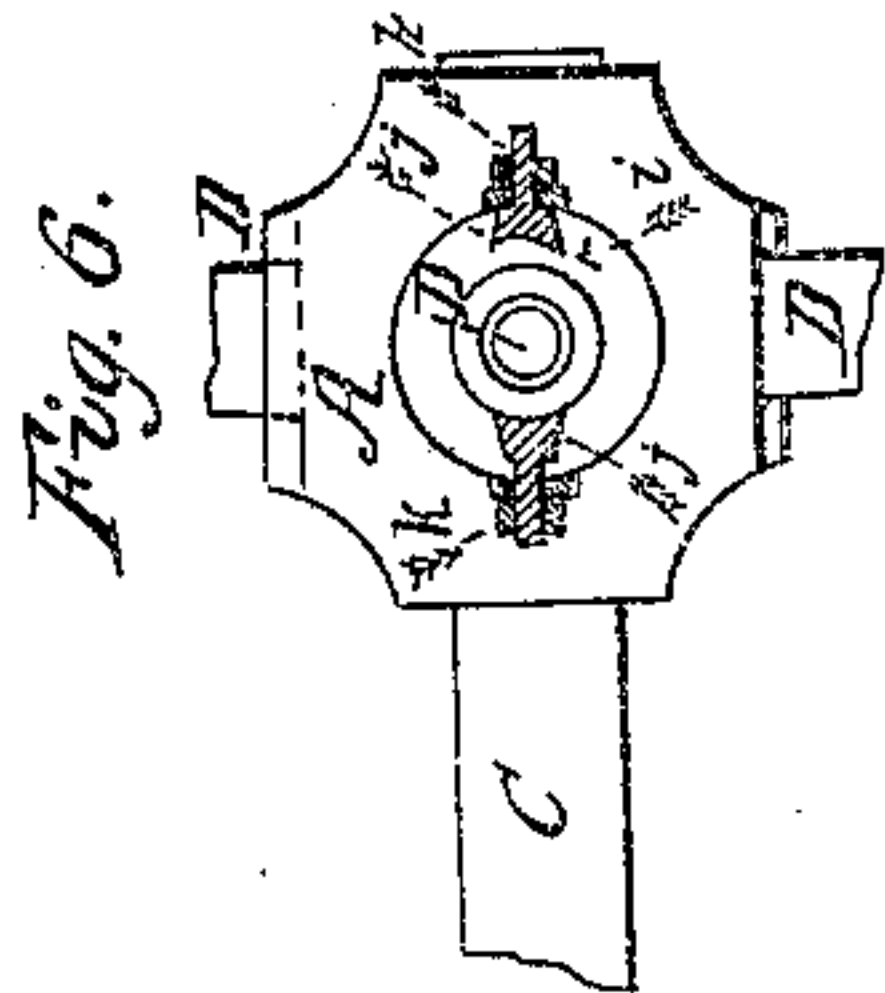
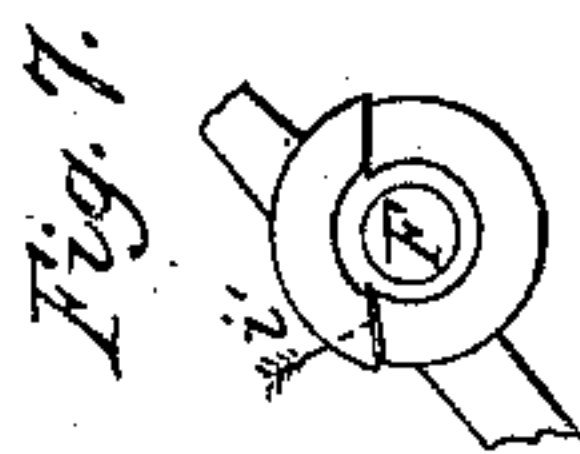


D. Bell.

Screw Propeller.

*No. 1605.
32,009.*

Patented Jun. 25, 1861.



*Witnesses.
W. H. Forbush
S. B. Forbush.*

*Inventor.
David Bell*

UNITED STATES PATENT OFFICE.

DAVID BELL, OF BUFFALO, NEW YORK.

SCREW-PROPELLER.

Specification of Letters Patent No. 32,609, dated June 25, 1861.

To all whom it may concern:

Be it known that I, DAVID BELL, of the city of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Propeller-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and the letters of reference marked thereon, in which—

Figure I is a front elevation of my improved wheel. Fig. II is a side elevation of same. Fig. III is a section, by a plane at right angles to the shaft, and passing through the center of the hub. Fig. IV is a plan of hub. Fig. V is an edge view of a single blade, showing the socket through which the arm passes to connect it to the hub. Fig. VI is a plan of hub showing arrangement for changing pitch. Fig. VII is a plan of socket, as constructed to combine with device for changing the pitch.

The nature of my invention consists, 1st, in casting the hub and blades separately, and connecting them together by means of wrought iron arms slightly conical in form projecting from the hub at right angles to the shaft and equidistant from each other (said arms being connected to the hub in casting), and which pass through corresponding sockets formed at the inner ends of the blades—the blades being firmly held to the hub by nuts screwed upon the ends of the arms so that should one or more blades be broken they may be replaced by new ones; 2d. in a device for increasing or diminishing the pitch of the blades.

Letters of like name and kind refer to like parts in each of the figures.

A represents the hub.

B, B, represent the blades.

C represents the shaft.

The hub has four, (more or less) wrought iron arms (D) projecting from it, at right angles to the shaft and to each other. These arms are made slightly conical in form; tapering toward the outer ends upon which screw threads are cut as shown at (d) (Fig. III) and are connected to the hub in casting. A number of annular grooves are formed upon their inner ends, as shown at (e) which grooves are filled by the metal of the hub in casting so that the arms are held firm and solid in the hub.

The blades are cast separately from the

hub, and have corresponding conical sockets (F) formed at their inner ends and upon the back of the blade through which sockets the arms D pass. The inner base of the socket is formed with a shoulder (on a line passing through the center of the socket) as shown at (g) and the hub with a similar but reversed shoulder as shown at g' which shoulders butt against each other as shown at (g'') when the blade is connected to the hub thus preventing any strain which may come upon the blade from turning it upon the arm. Each blade is held firmly to the hub by means of a nut (h) which is screwed upon the end of the arm D down upon the outer base of the socket (F) which nut is prevented from becoming loose by means of the second or "jam nut" (h').

As the socket is formed entirely upon the back face of the blade the front or propelling face will retain its proper form throughout its whole surface and its propelling power will not be in the least diminished. Nor will the power of the wheel in backing be materially diminished in consequence of the socket.

The 2d clause of my invention which relates to changing the pitch of the blades is represented in Figs. VI and VII and is also shown as applied to one blade in Figs. I and II.

The shoulders upon the hub and blade instead of being upon a line passing through the center of the arm and socket as before described are cut away as shown at i and i' Figs. VI and VII so as to leave dovetail spaces between them upon opposite sides of the arm, D, which spaces are filled by the wedges (j) which have a screw thread, and nut (k) upon their outer ends. By loosening one nut and moving the wedge nearer the center of the arm, and then tightening the other nut, and drawing its wedge from the center the blade will be caused to turn slightly upon the arm for an axis, so as to increase or diminish the pitch (as the case may be)—a very slight movement at the hub will cause a change of several degrees in the outer edge of the blade. The pitch may be changed by a modification of this device to wit by cutting away the shoulder upon the hub or blade upon one side of the arm and driving in a key or wedge upon the other and vice versa.

As the blades of wheels in use upon inland

waters and canals are liable to be accidentally broken the utility of my improvement will be readily seen. To replace a broken blade it is simply necessary to load the boat
5 down in the bow so as to bring the nut on the arm above water when the broken blade may be removed and a new one put on. The weight of the wheel is but slightly (if any) increased and a proportionate strength is re-
10 tained in all its parts.

I claim:

1. The socket, F, formed on the back of the blade, substantially as and for the purposes set forth.

2. The wrought iron arms (D) connected 15 to the hub in the process of casting in combination with the removable blade substantially as described.

3. The combination of the wedges (j) 20 with the dovetail spaces between the shoulders on the hub and blade for the purpose of changing the pitch of the wheel substantially as described.

DAVID BELL.

Witnesses:

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E. B. FORBUSH.