

C. E. SWEET.  
FASTENING MEANS FOR TURBINE BLADES.  
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966,138.

Patented Aug. 2, 1910.

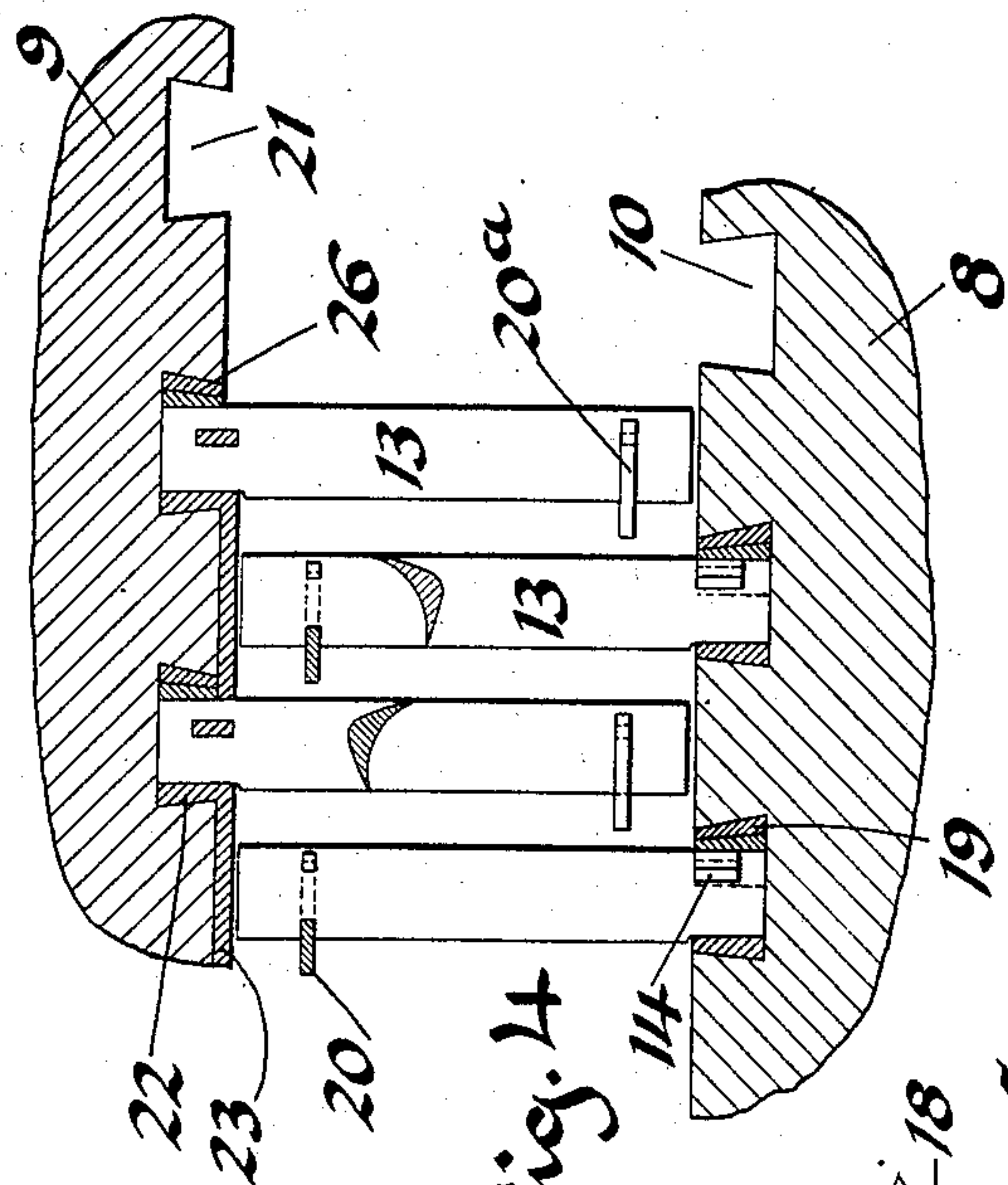


Fig. 1.

WITNESSES:  
*B. E. Sweet*  
*B. F. Funk*

Fig. 4.

Fig. 5.

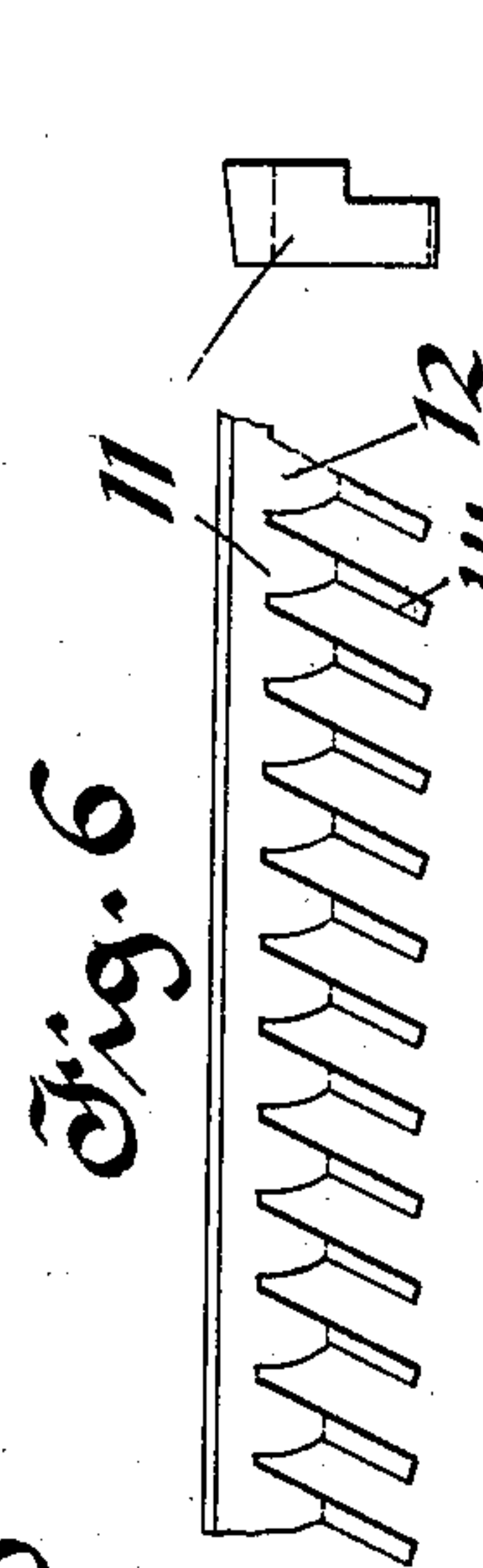


Fig. 6.

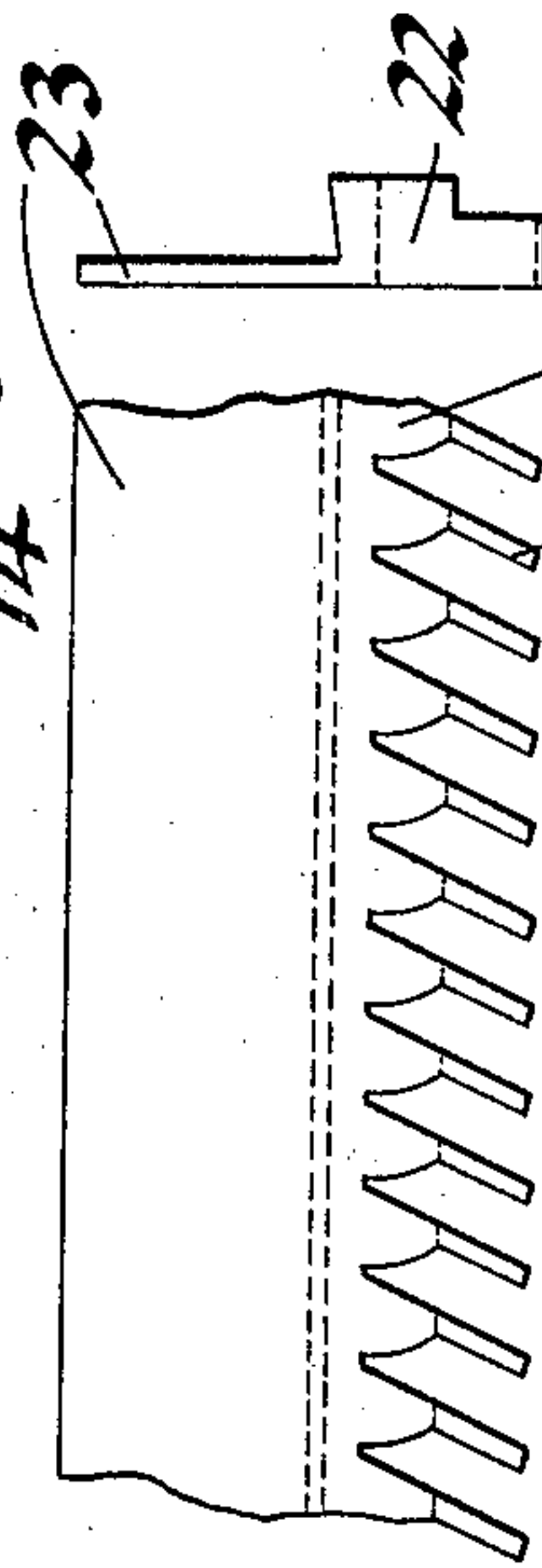


Fig. 7.

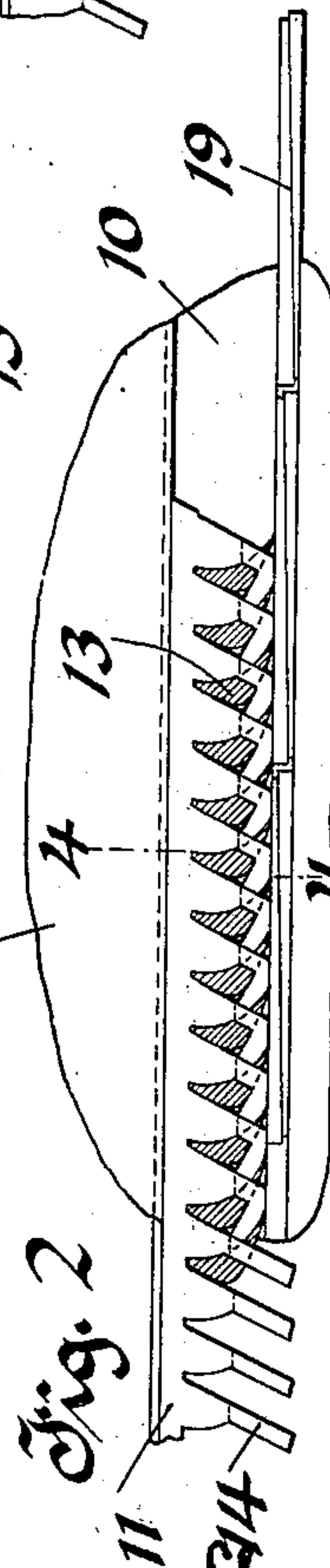


Fig. 2.

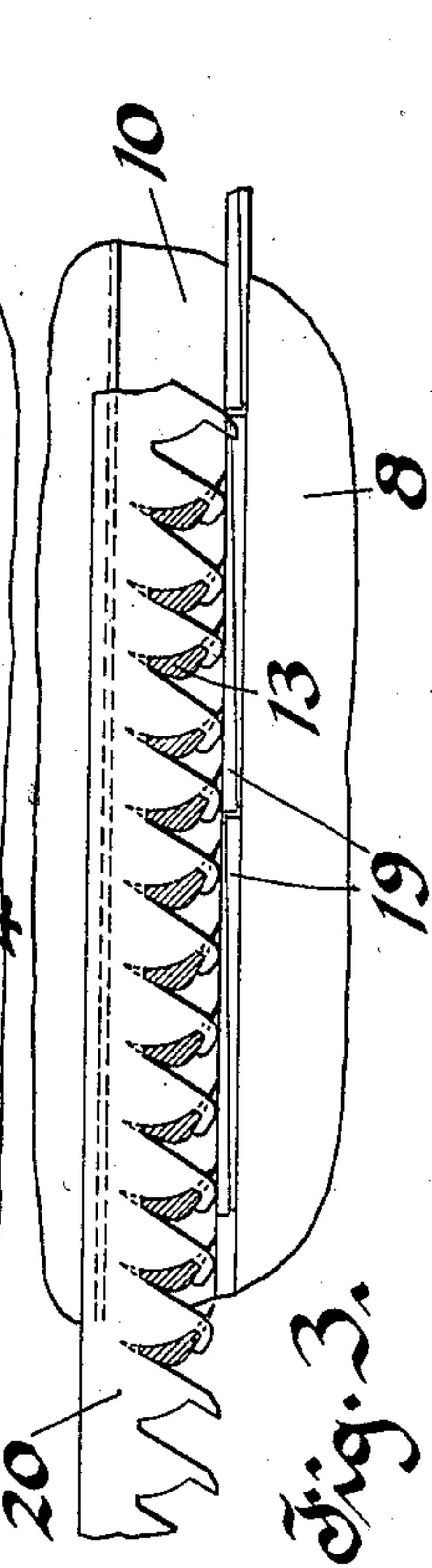


Fig. 3.

BY

INVENTOR.  
*C. E. Sweet*  
*J. D. Burr*  
ATTORNEY IN FACT.



# UNITED STATES PATENT OFFICE.

CHARLES E. SWEET, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

FASTENING MEANS FOR TURBINE-BLADES.

966,138.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed January 25, 1909. Serial No. 474,026.

*To all whom it may concern:*

Be it known that I, CHARLES E. SWEET, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Fastening Means for Turbine-Blades, of which the following is a specification.

This invention relates to turbine blading.

One object is to provide means whereby the blades may be conveniently attached to the rotor or stator so as to reduce the liability of their becoming loose during the operation of the turbine.

Another object of the invention is to provide means whereby the securing means for the blades may also support a protective covering or lining for the blade-carrying element.

It is also the purpose of this invention to improve generally upon this class of device.

In the drawings: Figure 1 is a side elevational view of a portion of a blading section; Fig. 2 is a sectional view on the line 2—2 of Fig. 1; Fig. 3 is a sectional view on the line 3—3 of Fig. 1; Fig. 4 is a sectional view on the line 4—4 of Fig. 2; Fig. 5 is a detail perspective view of one of the blades; Fig. 6 is a plan view of a blade-securing strip to connect the free ends of the blades; and, Fig. 7 is a plan view of the base strip for securing the blades to the blade-carrying element.

Referring now to the drawings by numerals of reference, in which a preferred embodiment of my invention is shown, 8 designates a rotor and 9 a stator of a turbine of approved construction. The rotor 8 is shown as being provided with a plurality of undercut slots 10 for receiving a base or foundation strip 11. The strip 11 is shown as being provided with a plurality of outstanding projections 12 spaced apart to receive the turbine blades 13. The ends of the projection 12 are reduced as indicated at 14 to form bendable portions which may be bent in the plane of the strip to provide anchors for the blades.

A blade 13 is illustrated in detail in Fig. 5 and it is shown as comprising a concavo-convex body portion provided at its base end with a hole or opening 15, while the inner edge of said blade adjacent to said hole is cut away as at 16 to fit against the edge of the strip 11 in a space formed by two

adjacent projections 12. The end of the blade 13 distant from the base is provided with a notch 17 and adjacent thereto is a hole or opening 18. The hole 15 in the base of the blade is adapted to receive the reduced portion 14 of one of the projections 12 so that when said portion 14 is bent, for example in the manner shown in Fig. 2, the blade will be secured to the strip 11. The strip 11 may be arcuate and of sufficient length to secure a number of blades together so that a built up section will be provided, a number of which will constitute a ring to fit entirely around the rotor. The section thus formed may be secured in undercut slots 10 by the wedges 19. The outer or free ends of the blades 13 may be secured together by a strip 20 similar to the strip 11 but somewhat thinner than the strip 11 in view of the fact that it does not have to be seated in a slot or groove.

The stator 9 is provided with slots 21 similar to those designated by 10 for the rotor. The slots 21 are provided to receive strips 22, each of which is provided with a projecting flange 23 of approximately a width equal to the distance between two adjacent rows of blades and the flange 23 snugly rests against the surface of the element to which the strip is secured (in this instance the stator) so as to form a protective covering or lining therefor. The strip 22 is provided with outstanding projections 24 spaced apart to receive the blades and having reduced bendable terminals 25 similar to those designated by the reference numeral 14 so that when said blades are in the spaces formed by adjacent projections 24 the reduced portions 25 may be bent in the plane of the strip after passing through the openings 15 so as to lock the blades to the strip.

By reference to Fig. 4 it will be observed that the flanges 23 project over and cover the wedges 26 which secure the strips 22 in place in the groove 21 so that while the flanges serve as protective coverings for the element to which they are secured they also cover the wedges and prevent their working loose, that is, a flange on one strip will cover the wedges for fastening another strip.

It will be apparent in the event it is necessary to repair the turbine or if it is desirable to examine any of the blades that the whole



section may be readily removed and a new one inserted. The free ends of the blades carried by the strips 22 are secured together by fastening strip 20<sup>a</sup> similar to the one 5 designated by the reference numeral 20 for securing the blades to the strip in the rotor.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together 10 with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other 15 means.

What I claim is:

1. A base strip for turbine blades having a flange providing a protective covering for the element to which the strip is secured and 20 outstanding projections on the strip adapted to be bent to form blade anchors.

2. A base strip for turbine blades having a flange projecting from one longitudinal edge and bendable outstanding projections 25 on the opposite edge of the strip.

3. A base strip for turbine blades having a flange projecting from one longitudinal

edge, and outstanding projections on said strip having ends bendable at angles to the projections to anchor a blade to the strip. 30

4. A base strip having projections spaced apart to embrace turbine blades, the edges of which are cut away to bear against said strip, and bendable projections on said base strip to pass through holes in the blades. 35

5. A base strip having blade engaging projections spaced apart and bendable in the plane of the strip to engage notches in the blades.

6. A base strip having a laterally projecting flange forming a protective covering for the element to which the strip is secured, blades secured to said strips, and securing means comprising projections having portions bendable in the plane of the strip to 45 pass through openings in said blades.

In testimony whereof, I have hereunto subscribed my name this 23rd day of January, 1909.

CHARLES E. SWEET.

Witnesses:

C. W. MCGHEE,  
GEO. C. WALKER.