P. E. DUTCHER.

MAST, STACK, OR THE LIKE.

APPLICATION FILED JAN. 13, 1920.

1,408,868. Patented Mar. 7, 1922.

Fig. 1.

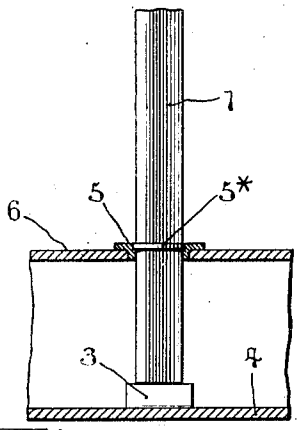


Fig. 3.

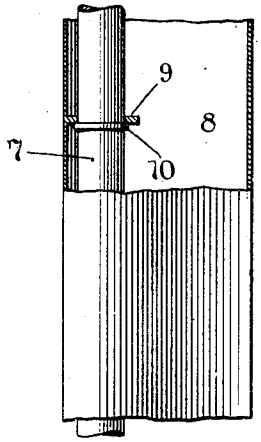


Fig. 4.

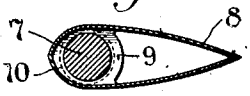


Fig. 5.

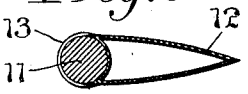


Fig. 6.

Fig. 7.

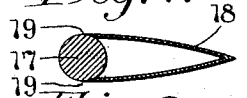


Fig. 9.

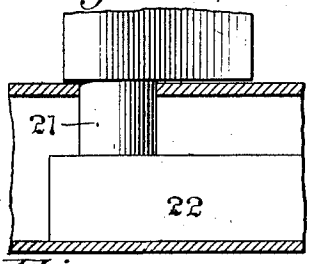


Fig. 10.

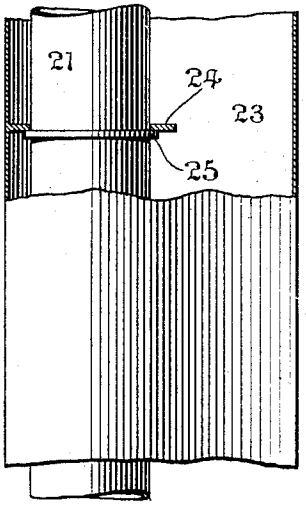


Fig. 2.

Fig. 8.

Fig. 12.

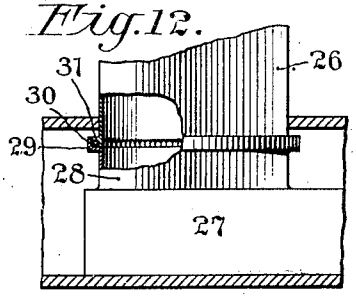


Fig. 11.

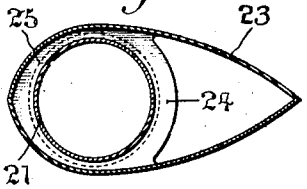


Fig. 14.

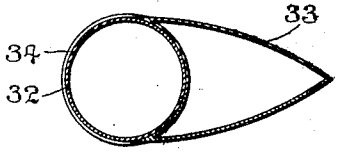


Fig. 17.

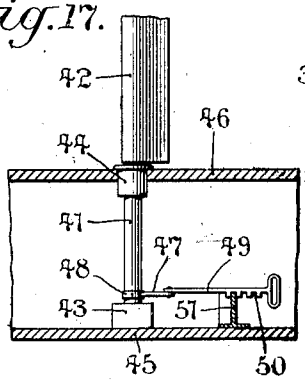


Fig. 16.

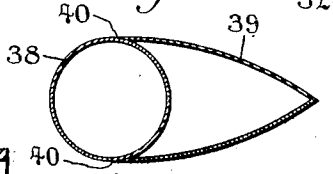


Fig. 15.

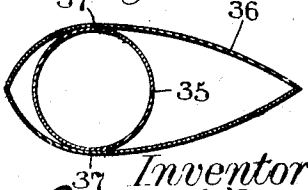
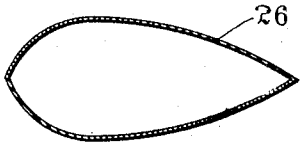


Fig. 13.



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Brosseau

UNITED STATES PATENT OFFICE.

PIERPONT E. DUTCHER, OF UPPER MONTCLAIR, NEW JERSEY.

MAST, STACK, OR THE LIKE.

1,408,868. Specification of Letters Patent. Patented Mar. 7, 1922.

Application filed January 13, 1920. Serial No. 351,173.

To all whom it may concern:

Be it known that I, PIERPONT E. DUTCHER, a citizen of the United States, and resident of Upper Montclair, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Masts, Stacks, or the like, of which the following is a specification.

This invention relates to an improved arrangement of masts, stacks or other upright projections on vessels, buildings, etc., whereby the said masts, stacks, etc., present less resistance to the passing air either generated by the movement of the vessel or in the form of wind.

In the art of propelling vessels or other moving structures, one of the important factors to be overcome is the resistance of the air, and this resistance may be generated by the movement of the vessel, or be in the form of wind resistance. A similar problem also arises in connection with the erection of tall slender structures such as factory stacks, except that the only force encountered in this connection is that of the wind, since the object itself is stationary.

It has been known for some time that the wind resistance could be greatly decreased if the structure were elongated in cross section and the longitudinal axis of its cross section presented endwise to the air current. The form of cross section which has been found most suitable for this purpose is substantially fish shaped and is known as a "stream-line" configuration.

My invention consists in a new application of these known facts and consists broadly in providing masts, stacks and the like, with means whereby their wind resistance may be decreased irrespective of the direction of relative movement between the air and the object.

This invention is to be sharply distinguished from the application of stream-line forms to the struts of airplanes, because an airplane will drift with any wind coming from a lateral direction and is, therefore, subject to conditions pronouncedly different from those encountered by masts, stacks or the like.

A practical embodiment of my invention is represented in the accompanying drawings, in which,

Fig. 1 represents a detail section partly in elevation, showing a mast embodying my invention.

Fig. 2 represents a horizontal section through the mast shown in Fig. 1.

Fig. 3 represents a detail section, partly in elevation showing a modified form of mast embodying my invention.

Fig. 4 represents a horizontal section through the parts shown in Fig. 3.

Figs. 5, 6, 7 and 8 represent horizontal sections through modified forms of masts embodying my invention.

Fig. 9 represents a detail section partly in elevation showing a stack embodying my invention.

Fig. 10 represents an enlarged detail section of the same, partly in elevation.

Fig. 11 represents a horizontal section through the parts shown in Fig. 10.

Fig. 12 represents an enlarged detail section, partly in elevation and partly broken away, showing a modified form of stack.

Fig. 13 represents an enlarged horizontal section through the stack shown in Fig. 12.

Figs. 14, 15 and 16 represent horizontal sections through modified forms of stacks.

Fig. 17 represents a detail section, partly in elevation, on a small scale, showing the means for rotatably adjusting a mast.

Referring to the form shown in Figs. 1 and 2, the mast is denoted by 1 and may be composed of any suitable material. It is stream-line in cross section and is mounted for rotatable adjustment in a step 3 secured to a lower part 4 of a vessel, and also rotatably mounted in a collar 5 fixed in the deck 6 or other relatively raised portion of the vessel, which collar receives a circular band 5* on the mast. By mounting the mast in this way, it may be turned in any direction so as to present the longitudinal axis of its cross section endwise to the wind in order to decrease the resistance. For instance, in case the mast should be mounted on a steam vessel steering a northerly course against a northeasterly wind, the mast could be turned until its longitudinal axis pointed northeasterly, thereby very greatly reducing the retarding effect of the wind upon the movement of the vessel. Of course, it will be understood that the longitudinal axis is presented in such a way that the blunter part of the cross section is toward the wind, as this is one of the well understood principles in connection with the employment of stream-line forms.

Referring to the form shown in Figs. 3 and 4, the mast is denoted by 7 and is sur-

rounded by a tube 8, which may be composed of sheet metal or other suitable material. The tube 8 is stream-line in cross section as clearly shown in Fig. 4 and has a series of bands 9 secured thereto which bands are calculated to rest upon collars 10 fixed to the mast 7. This construction rotatably supports the tube 8 upon the mast 7. In this instance the mast itself is not rotatably mounted, but the tube may be moved either manually or automatically by the wind itself so as to properly present the longitudinal axis of its cross section to the wind for reducing the resistance.

In the modified form shown in Fig. 5, the mast is denoted by 11 and a tube 12 is mounted at one side thereof by means of bands 13 which surround the mast. The tube 12 is thus movable in a rotary direction about the mast and may operate in the same way as the form shown in Figs. 3 and 4.

In the form shown in Fig. 6, the mast is indicated by 14 and is surrounded by a tube 15, which may be secured to the sides of the mast as indicated at 16. In this form the mast itself is rotatable.

In the form shown in Fig. 7, the mast is denoted by 17 and is provided on one side with a hollow projecting element 18, which may be fastened to the mast at each side as indicated at 19. This element 18 may be composed of sheet metal like the tubes already described. In this construction, the mast is rotatable.

In the form shown in Fig. 8, the mast 20 is solid like the form of Figs. 1 and 2, but its cross section is somewhat blunter. In this form the mast is rotatable.

Referring to the form of stack shown in Figs. 9, 10 and 11, the stack is denoted by 21 and rises from a boiler mechanism which is conventionally represented at 22. The stack is surrounded by a tube 23 which is provided with a series of bands 24 that surround the stack 21 and rest upon collars 25 fast on the stack. In this way the tube 23 is rotatably mounted upon the stack so that it may be turned manually or automatically to present the longitudinal axis of its cross section properly to the wind.

In the form shown in Figs. 12 and 13, the stack is denoted by 26 and is itself stream-line in cross section. The boiler mechanism is conventionally represented at 27 and is connected with a lower section 28 of the stack which has a circular recess 29 fitted to accommodate a ball bearing 30. The bottom of the stack 26 has a circular flange 31 designed to rest upon the ball bearing 30. As a result of this construction, the stack 26 is rotatable on the bearing 30 so that it may be turned in the proper direction as already described.

In the form shown in Fig. 14, the stack is represented by 32 and is provided at one side with a tubular element 33 that is secured thereto by bands 34, which surround the stack. In this instance, the stack is not rotatable, but the tube 33 is rotatably mounted upon it for movement into the proper position.

In the form shown in Fig. 15, the stack is indicated by 35 and is surrounded by a tubular element 36, which may be secured at the sides as indicated at 37. In this form, the stack is rotatable.

In the form shown in Fig. 16, the stack is indicated by 38 and is provided on one side with a hollow projecting element 39 that may be fastened at the sides as indicated at 40. In this instance, the stack itself is rotatable.

In Fig. 17, I have shown means for manually adjusting a mast, stack or the like in a rotary direction and, for the purpose of illustration, the object to be rotated may be considered as a mast 41 which is of such form and construction in cross section as shown in any one of Figs. 2, 6, 7 and 8. The upper part of the mast which has the stream-line formation is marked 42. The mast 41 is rotatably mounted in a step 43 and collar 44, which may be secured to the hull 45 and deck 46 of a vessel, respectively. An arm 47 is fast to a band 48 that is pinned to the lower part of the mast 41, and the free end of the arm is pivoted to the end of a lever 49, which is provided with notches 50 designed to engage a tooth 51 that is fast to the hull 45. By lifting the lever 49 out of engagement with the tooth 50, the mast 41 may be turned to any desired position and the lever reengaged with the tooth to hold the mast in said position. This is simply one simple form of mechanism which might be used for this purpose.

It will be seen from the foregoing description, when taken in connection with the drawings, that I have provided means for embodying my invention, in which substantially the same result is obtained whether the mast, stack or the like is itself capable of adjustment in a rotary direction or whether it has an exterior element which is capable of such adjustment. Therefore, I wish to make it clear that when, in the claim, I say that the mast, stack or the like is so constructed that its exterior surface may be turned in a rotary direction, I intend to include structures in which the mast, stack or the like is itself movable, as well as structures in which an exterior attachment to the mast, stack or the like is movable.

I desire it to be understood that various changes may be resorted to in the form, construction and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not

intend to be limited to the details herein shown and described except as they may be included in the claim.

What I claim is:

A mast, stack or the like having an exterior cross sectional shape of stream-line form, said mast, stack or the like being so constructed that its exterior surface may be rotated, and means for rotating the said surface.

In testimony, that I claim the foregoing as my invention, I have signed my name, this fifth day of January 1920.

PIERPONT E. DUTCHER.