M. T. BENTLEY.

BELT PULLEY.

APPLICATION FILED AUG. 26, 1909.

980,744.

Patented Jan. 3, 1911.

Fig. 1.

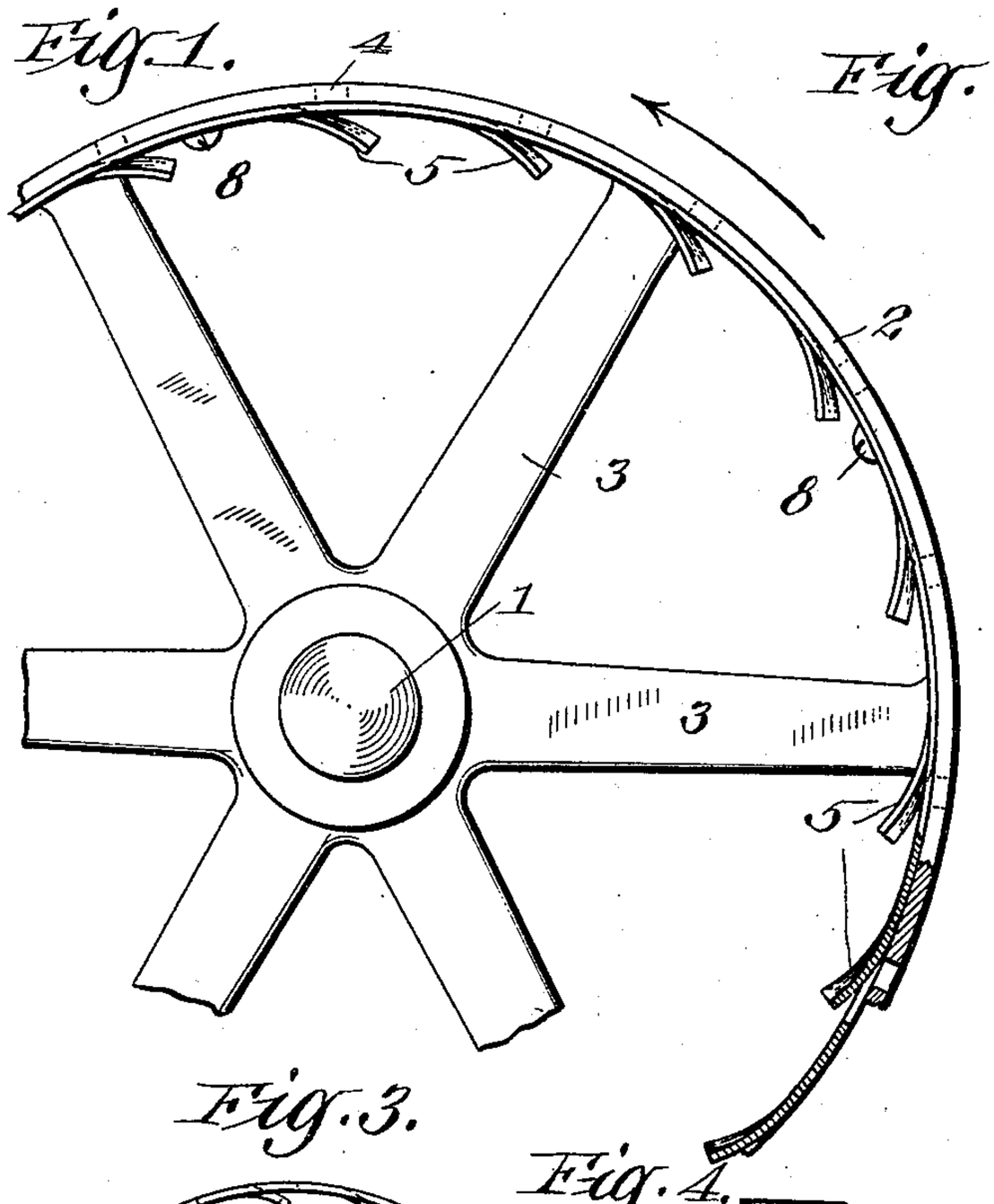

Fig. 2.

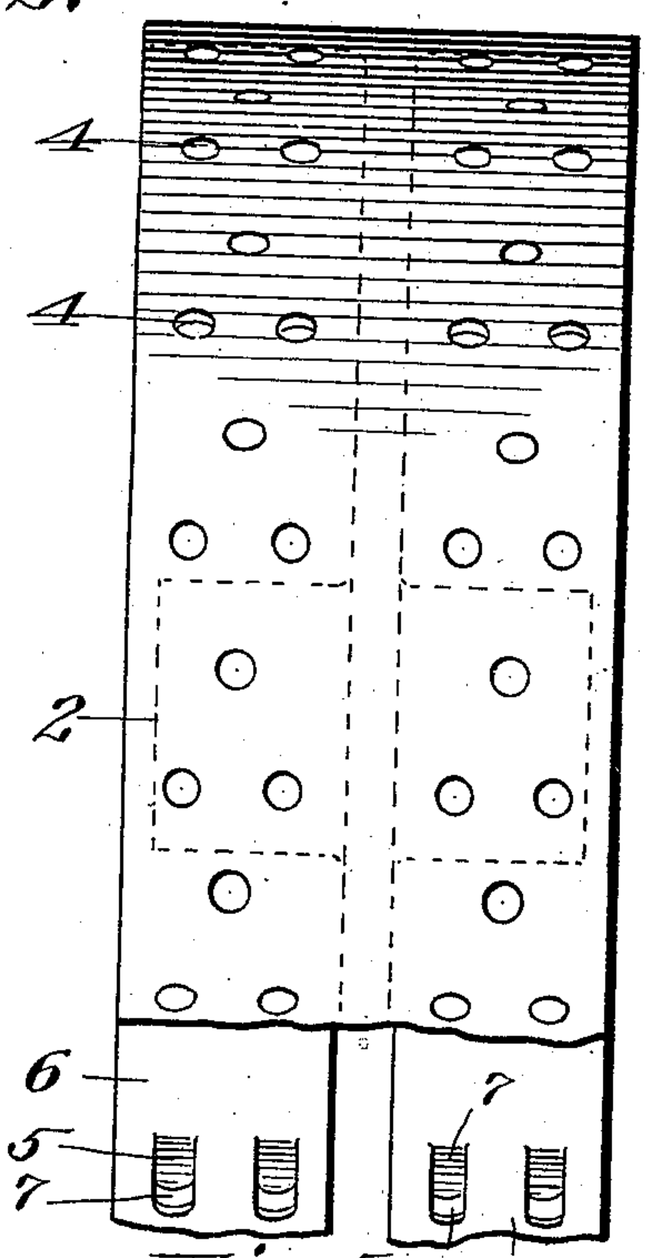

Fig. 3.

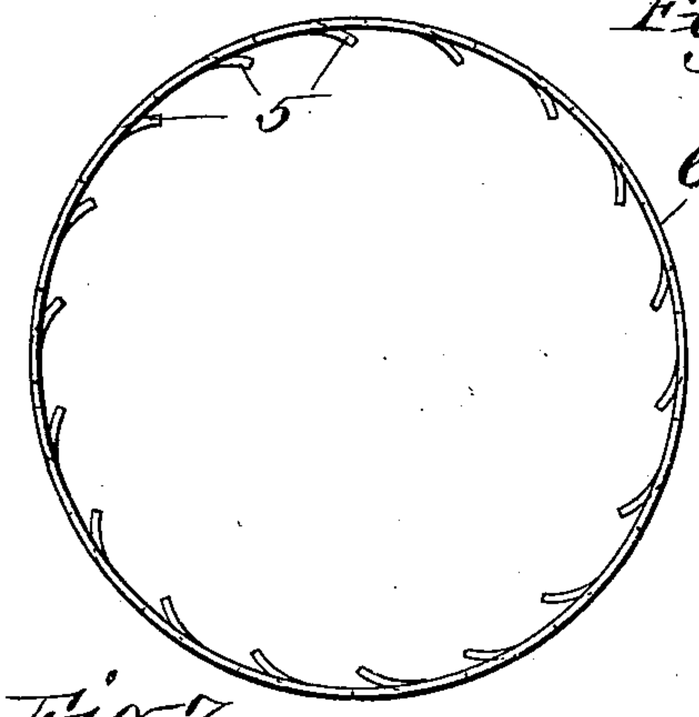

Fig. 4.

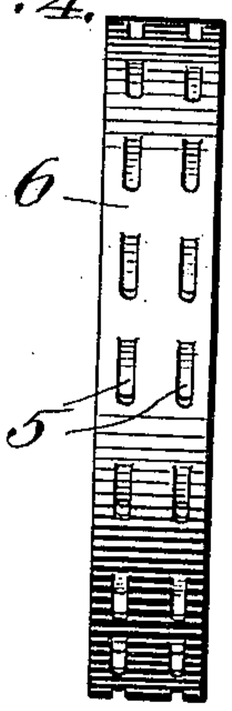

Fig. 5.

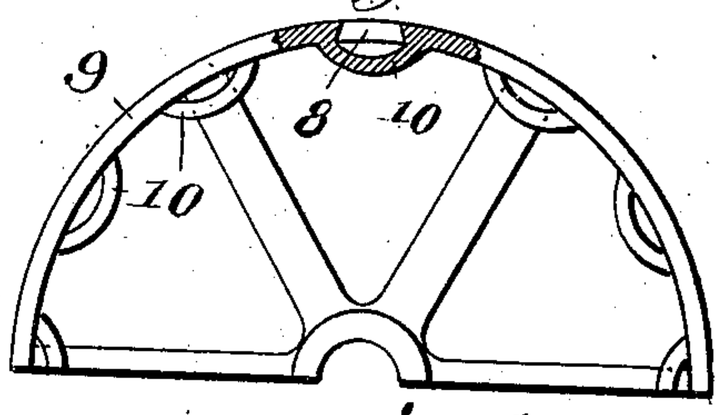

Fig. 6.

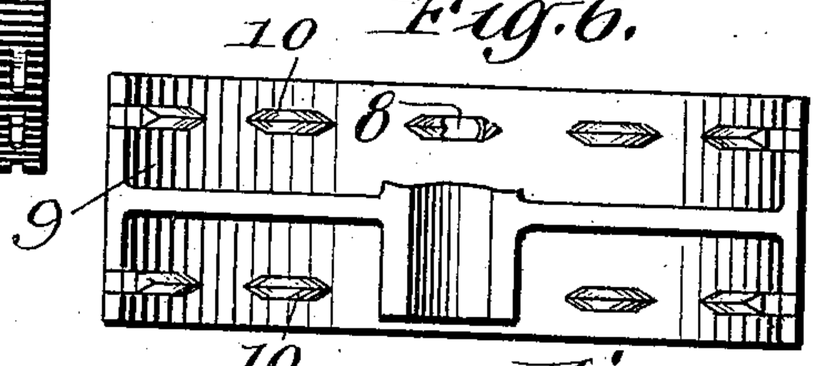

Fig. 7.

Fig. 8.

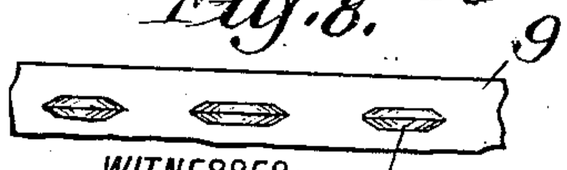

Fig. 9.

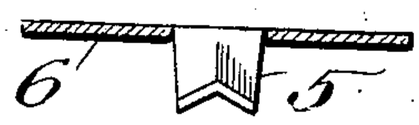

Fig. 10.

Fig. 11.

WITNESSES:

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BELT-PULLEY.

980,744. Specification of Letters Patent. **Patented Jan. 3, 1911.**

Application filed August 26, 1909. Serial No. 514,728.

To all whom it may concern:

Be it known that I, MANTON T. BENTLEY, a citizen of the United States, and residing in the city of York, county of York, and State of Pennsylvania, have invented certain new and useful Improvements in Belt-Pulleys, of which the following is a specification.

The invention relates to belt pulleys, and has for its objects the prevention of slippage between the belt and pulley; to provide simple and efficient means for effecting this by atmospheric action; to provide such means which shall be simple and durable and which will not destroy the balance or impair the structure of the pulley; to provide means of the character indicated which act positively and powerfully by the rotatory motion of the pulley; and to provide such means which may be readily and economically applied to standard forms of pulleys. These and other objects of invention will be obvious to those skilled in the art in part and will in part be more fully set forth herein.

The invention consists in the novel parts, articles, combinations, arrangements, constructions and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, show one embodiment of the invention and serve to illustrate the principles thereof.

Of the drawings: Figure 1 is a side elevation of a pulley constructed in accordance with the principles of the invention, in which a part of the vacuum producing means is attached within the pulley rim; Fig. 2 is a partial elevation of the rim of a pulley with the vane carrying means attached on the inside of the rim; Fig. 3 is a side elevation of the interior member carrying the vanes, the vanes being shown without any transverse curve or bend; Fig. 4 is a front elevation corresponding to Fig. 3; Fig. 5 shows half a cast pulley constructed in accordance with the principles of the invention; Fig. 6 is a bottom plan, referred to Fig. 5, with parts broken away; and Figs. 7 to 11, inclusive, are fragmentary details of certain parts, and show in detail certain features of construction.

Referring to the accompanying drawings, illustrating by way of example an embodied form of the invention, 1 is a shaft upon which the pulley is mounted for rotation. Suitable means for supporting the pulley rim 2 upon the shaft 1 are provided, such as the spider 3. The rim 2 has a plurality of openings 4 therethrough from its outer face on which the belt travels to the opposite or inner side of said rim, these openings passing underneath the belt as it runs around the pulley.

Means are provided fixed to the inner side or face of the rim and in operative relation with the openings 4 for causing a partial vacuum and thereby utilizing the atmospheric pressure on the outer face of the belt to press the belt against the pulley to prevent slippage therebetween. The embodied form of such means comprises members which force or draw the air away from the inner end of the openings 4 through the rotatory motion of the pulley on or with its shaft. Said members are shown as blades 5 located contiguous to one or more of the apertures 4, extending inwardly, that is, toward the center of the pulley, and being inclined away from the rim and in the direction opposite of that of the rotation of the pulley. In Fig. 1, the arrow may be taken to represent the direction of rotation of the pulley, and the blades 5 being related thereto in the manner just described. The blades are shown also as starting out from the rim just ahead of one or more of the apertures 4 referred to the direction of rotation of the pulley. It will be understood that during the rotation of the pulley the blades will tend to push the air inwardly away from the inner ends of the apertures 4, and that the moving air will also act by friction to increase this action, thus producing quite a high degree of rarefaction or partial vacuum between the belt and the contacting pulley face.

In accordance with one feature of the invention, the blades 5 are carried on a member located on the inner side of the rim 2 and which may be fixed in position in any suitable manner. Said member is shown herein as a circular band 6 having apertures 7 therein which register with the apertures 4 in the pulley face. The blades 5 may be struck up from the member 6 if desired, and they are so shown in Figs. 1, 2, 3 and 4 of the drawings. The member 6 may be secured in position in any suitable manner, as it

might be fitted friction tight within the rim. In the present instance, it is shown attached by screws 8 taking into the rim. The member 6 may also be integral or it may consist of a plurality of parts, as found desirable or convenient. The member 6 being separable from the rim renders it reversible, so that should it be desired to reverse the direction of rotation of the pulley it would not be required to reverse the pulley but merely the members 6. In Fig. 2 a member 6 is shown either side of the spider arms 3, and should there be a double row of arms or other support, a member 6 could be arranged therebetween as well as one on each side, in order to utilize and render efficient practically the entire face of the pulley. It will be understood that the foregoing comment, as well as other comments herein, are illustrative rather than restrictive of the scope of the invention.

In certain of its features, the invention is applicable to split steel pulleys by having the blades 5 struck up from the pulley rim, this also making the aperture through the rim. Figs. 3 and 4 might be regarded as an illustration of such a pulley with the support for the rim omitted for clearness, the part marked 6 in such case representing the pulley rim. The invention is, of course, otherwise applicable to this kind of pulleys, as it might be applied thereto in the form shown in Figs. 1 and 2, or in other forms within the scope of the invention.

In Figs. 1, 9, 10 and 11, the blades 5 are shown bent, either curving or angled, transversely of their length. In said figures, the bending is shown away from the rim as it proceeds from the middle of the blades toward the outer or side edges. This gives an additional tendency to the air to flow readily outward from the inner side of the rim apertures as well as along the blade and over its end, as the air is pushed away by the inclined blade traveling with the rotating rim, as already explained.

In accordance with certain aspects of the invention, the blades might be cast on the pulley and the entire structure be integral, and such a structure is shown in Figs. 5 to 8 of the drawings. Fig. 5 shows a half pulley with openings 8 in the rim 9, and with blades 10 integral with the rim. The blades are shown here also with both ends fixed to the rim, although it will be seen that they could be of the form heretofore described, if desired, and vice versa. In Fig. 7 two holes 8 are shown in operative relation with each blade 10. The apertures 8 may be inclined, that is, they may have an increasing diameter toward the inner side of the rim, and it will be found that this also increases the tendency to establish the vacuum desired.

It will be understood that the invention is not limited to the constructions shown and described, but that changes may be wrought therein within the scope of the accompanying claims.

What I claim as my invention, and desire to secure by Letters Patent, is:

1. A belt pulley including in combination a rim, said rim having a peripheral face on which the belt runs, said rim also having openings therethrough which pass underneath the belt as it runs over the pulley face, and means fixed to the inner side of the rim and stationary relatively to said rim and in operative relation with said openings for causing partial vacuums and thereby utilizing the atmospheric pressure on the outer face of the belt as it runs about the pulley to prevent slippage between the belt and the pulley.

2. A belt pulley including in combination a rim, said rim having a peripheral face on which the belt runs, said rim also having openings therethrough which pass underneath the belt as it runs over the pulley face, and means fixed to the inner side of the rim and stationary relatively to said rim, and in operative relation with said openings and acting through the rotatory travel of the pulley to force the air away from the interior end of said openings to create a partial vacuum there and thus utilize the atmospheric pressure on the outer face of the belt as it runs over the pulley face to prevent slippage between the belt and pulley.

3. A belt pulley including in combination, a rim, said rim having openings therethrough from its peripheral face to the opposed or inner face, and members fixed to the rim on said inner face adjacent to said openings and projecting inwardly in an inclined direction and in the opposite direction from the direction of rotation of the pulley.

4. A belt pulley including in combination, a rim, said rim having openings therethrough from its peripheral face to the opposed or inner face, and a member fixed to the rim just forward of an opening, referred to the direction of rotation of the pulley, said member being inclined inwardly toward the center of the pulley.

5. A belt pulley including in combination, a rim, said rim having openings therethrough from its peripheral face to the opposed or inner face, and a blade fixed to the rim in operative relation with said opening and being bent in a direction transverse to its length, to produce a partial vacuum at the inner end of said opening as the pulley rotates.

6. A belt pulley including in combination, a rim, said rim having openings therethrough from its peripheral face to the opposed or inner face, blades fixed to the rim in operative relation to said openings, said blades

being bent in a direction transverse to their length and away from the rim in the direction of their side edges.

7. A belt pulley including in combination, a rim, said rim having a series of openings therethrough from its peripheral face to the opposed or inner face, said series of openings extending around the pulley, a fixed member attached to said rim on the inner side thereof, and devices carried by said member in operative relation to said openings in the rim for causing a partial vacuum in said openings.

8. A belt pulley including in combination, a rim, said rim having a series of openings therethrough from its peripheral face to the opposed or inner side thereof, a circular member fitting around and against said inner face of the pulley rim, said circular member being provided with devices in operative relation with the openings in the pulley rim for causing a partial vacuum in said openings.

9. A belt pulley including in combination, a rim, said rim having a series of openings therethrough from its peripheral face to the opposed or inner side thereof, a circular member fitting around and against said inner face of the pulley rim, said circular member having openings in register with the openings in the rim, and blades extending in an inclined direction of the pulley and in the reverse direction from the direction of rotation of the pulley.

10. A belt pulley including in combination a rim, supporting means between the rim and its axis of rotation, said supporting means being located centrally of the rim, circular members fitting on the inner face of the pulley rim on either side of said support, blades extending inwardly from said members and also in a reverse direction from the direction of rotation of the pulley, said rim and members having apertures therein at the base of said blades.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MANTON T. BENTLEY.

Witnesses:

C. W. McLaughlin,

John A. Lewis.