No. 750,920. PATENTED FEB. 2, 1904.

E. L. WAGNER.

PULLEY.

APPLICATION FILED JAN. 5, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

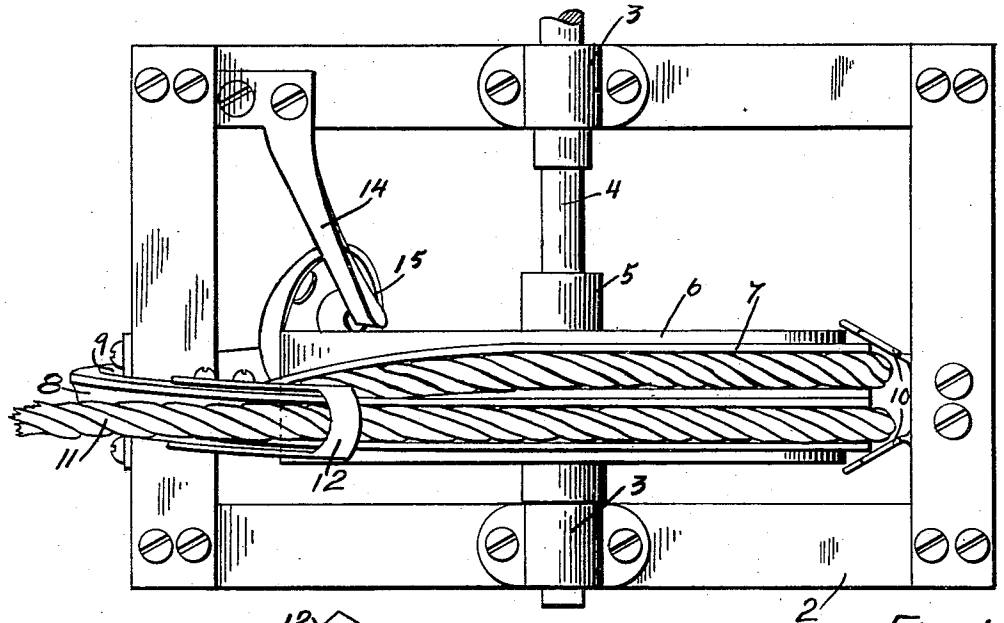


FIG. 1

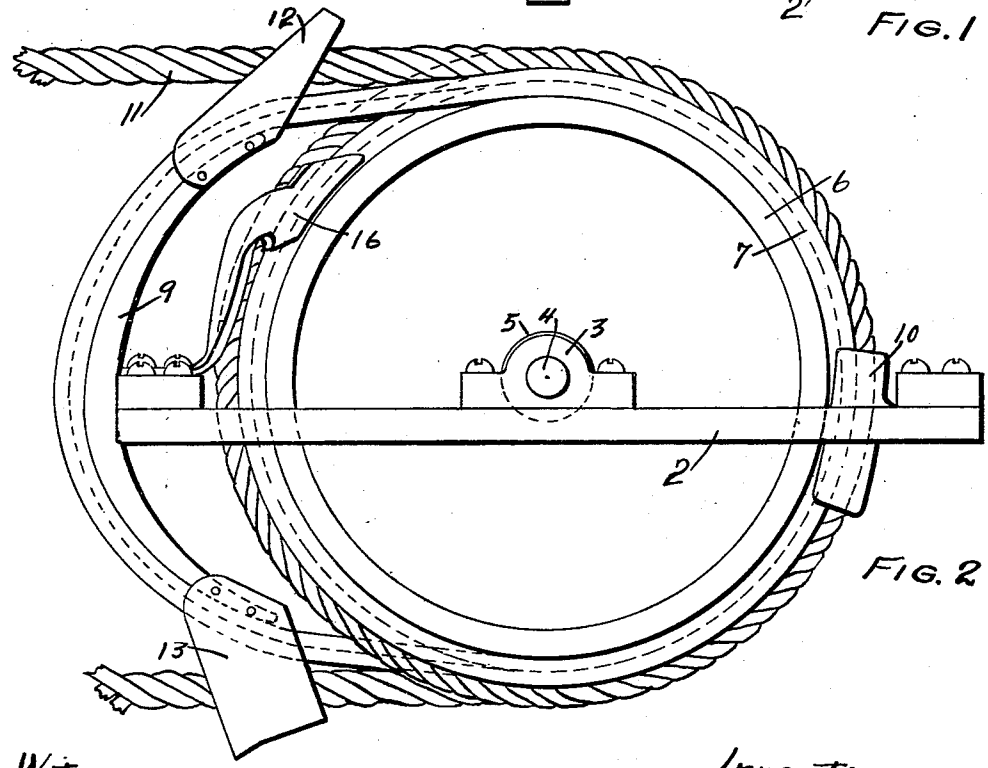


FIG. 2

Witnesses
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Inventor
Emil L. Wagner
By Paul & Paul
his attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 750,920. PATENTED FEB. 2, 1904.

E. L. WAGNER.

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NO MODEL. 4 SHEETS—SHEET 2.

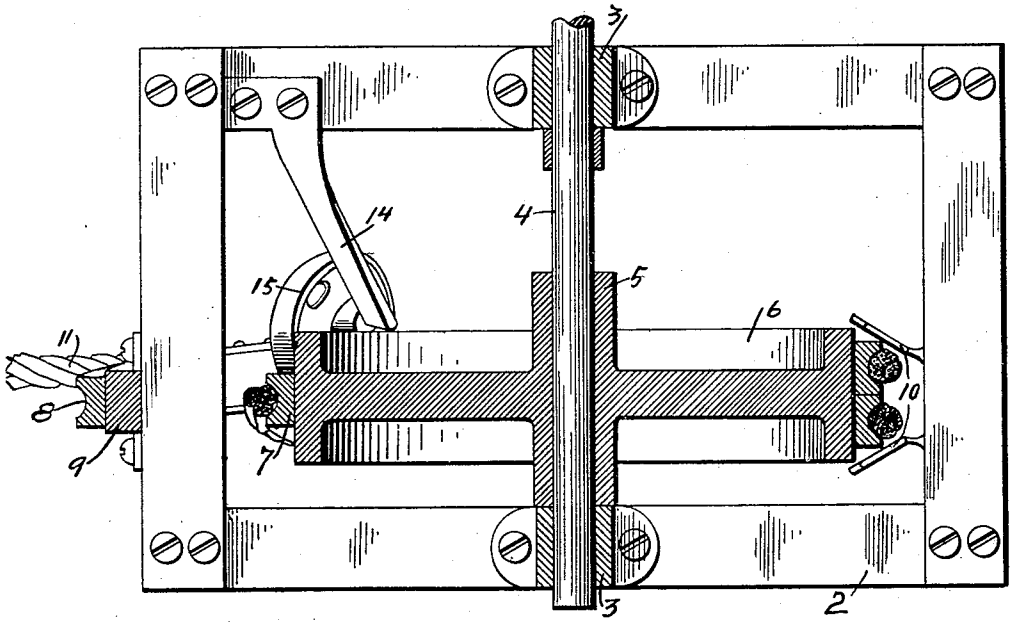


FIG. 3

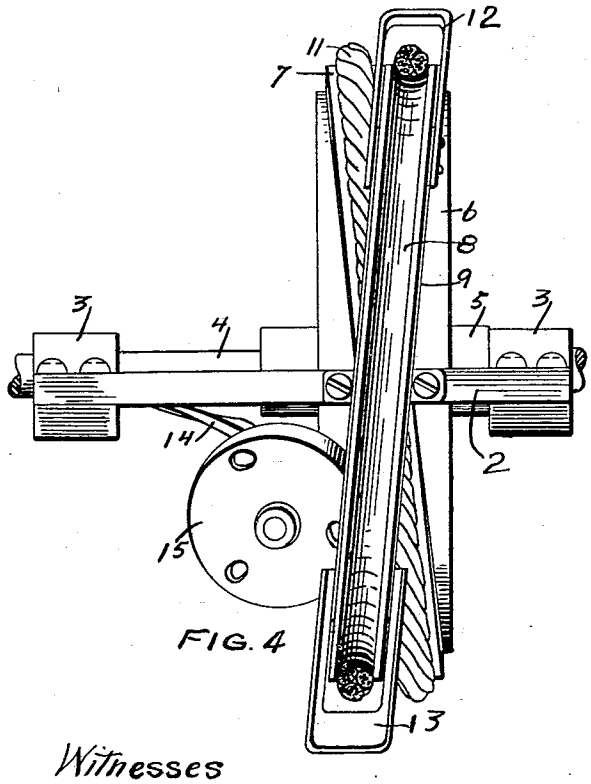


FIG. 4

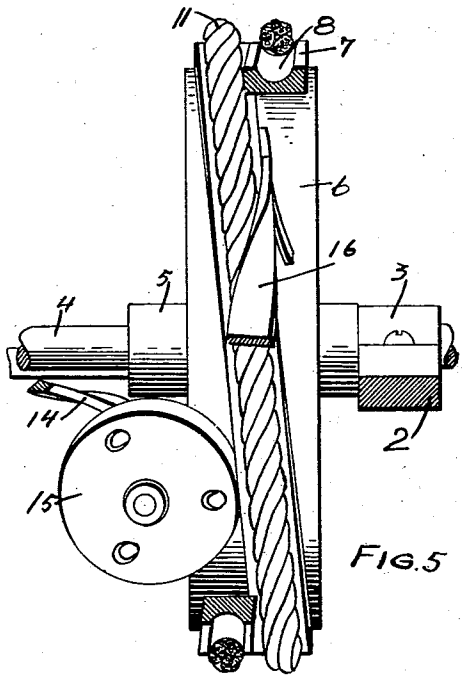


FIG. 5

Witnesses
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No. 750,920. PATENTED FEB. 2, 1904.

E. L. WAGNER.

PULLEY.

APPLICATION FILED JAN. 5, 1903.

NO MODEL. 4 SHEETS—SHEET 3.

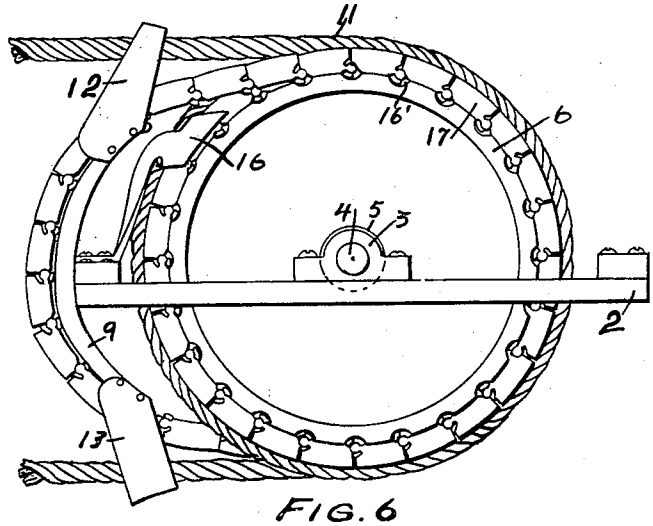


FIG. 6

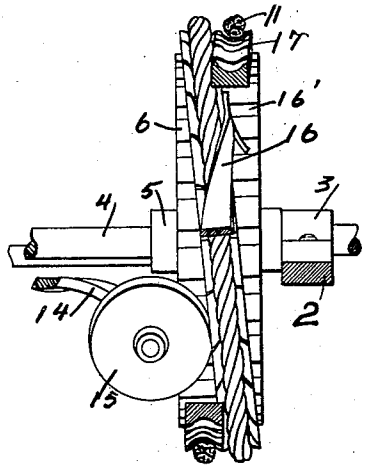


FIG. 7

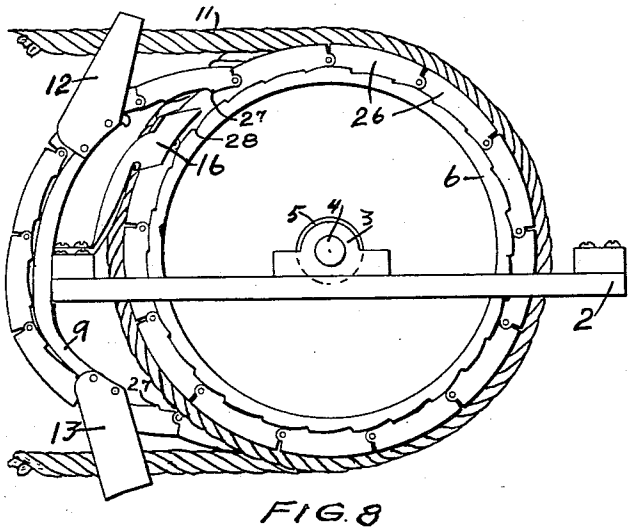


FIG. 8

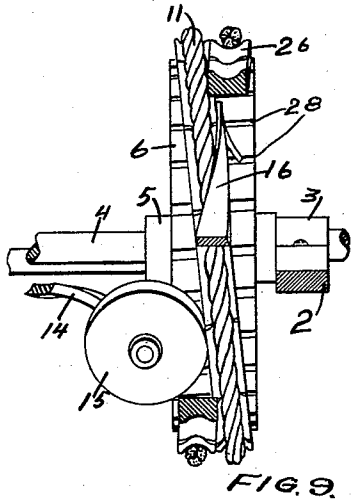


FIG. 9.

Witnesses
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his attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 750,920. PATENTED FEB. 2, 1904.

E. L. WAGNER.

PULLEY.

APPLICATION FILED JAN. 5, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

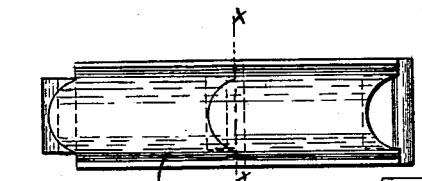


FIG. 10


FIG. 11

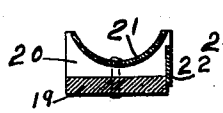


FIG. 18

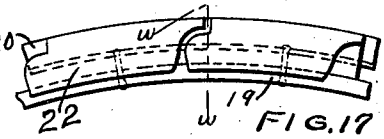


FIG. 17

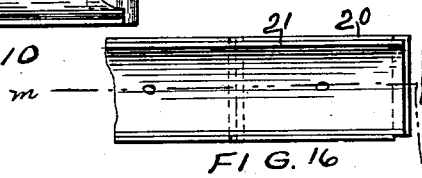


FIG. 16

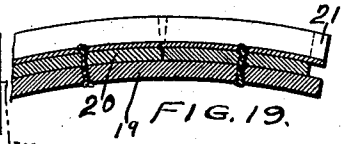


FIG. 19.

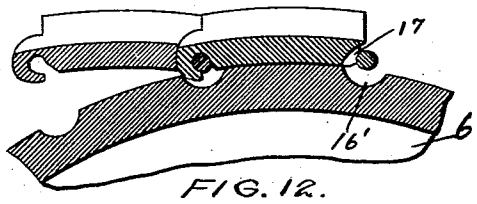


FIG. 12.

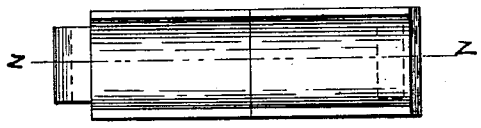
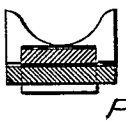


FIG. 13.


FIG. 14

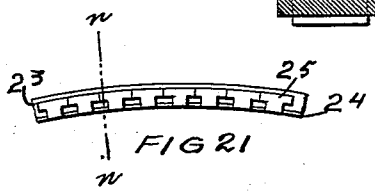


FIG 21



FIG. 22

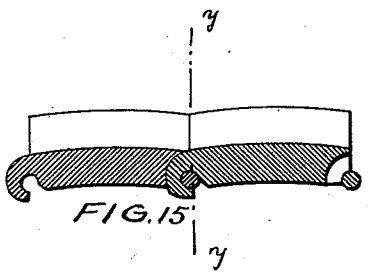


FIG. 15

FIG. 20

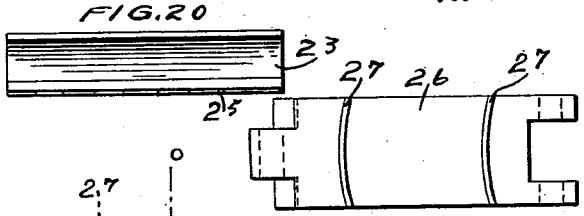


FIG. 24

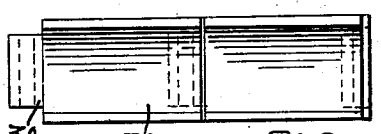


FIG. 27

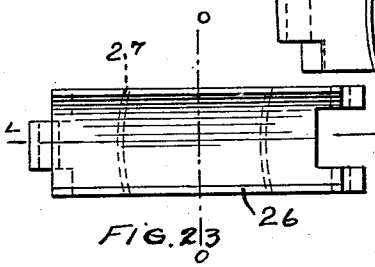


FIG. 23

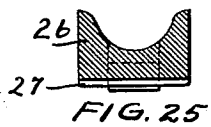


FIG. 25

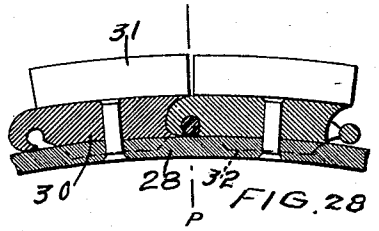


FIG. 28

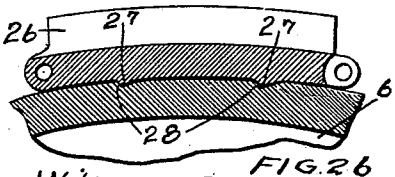


FIG. 26

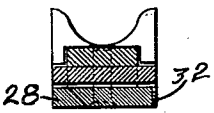


FIG. 29.

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Inventor
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By Paul & Paul
his attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 750,920. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

EMIL L. WAGNER, OF ABERDEEN, SOUTH DAKOTA.

PULLEY.

SPECIFICATION forming part of Letters Patent No. 750,920, dated February 2, 1904.

Application filed January 5, 1903. Serial No. 137,776. (No model.)

To all whom it may concern:

Be it known that I, EMIL L. WAGNER, of Aberdeen, Brown county, South Dakota, have invented certain new and useful Improvements in Pulleys, of which the following is a specification.

My invention relates to pulleys for use with ropes, cables, chains, or belts for transmitting power from place to place or in connection with elevating or hoisting devices, and is designed as an improvement over the devices shown and described in Letters Patent of the United States Nos. 630,760, 660,783, and 682,395, issued to me August 8, 1899, October 30, 1900, and September 10, 1901.

The invention consists generally in an endless band looped or wrapped around the pulley and arranged to travel therewith under the rope and prevent the latter from being worn by contact with guides or other fixed or movable parts.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a pulley embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse section of a pulley, showing the endless band looped thereon. Fig. 4 is an edge view. Fig. 5 is a similar view, partially in section, showing the rope crossing from one side of the pulley to the other. Fig. 6 is a side elevation showing a modified form of band. Fig. 7 is an edge view, partially in section, of the same. Fig. 8 is a side elevation showing still another form of band. Fig. 9 is an edge view, partially in section, of Fig. 8. Fig. 10 is a plan view of a portion of a link band. Fig. 11 is a section on the line $x\ x$ of Fig. 10. Fig. 12 is a vertical section of a portion of the periphery of a pulley and the link band fitting thereon. Fig. 13 is a plan view of a modified form of band-link. Fig. 14 is a section on the line $y\ y$ of Fig. 15. Fig. 15 is a section on the line $z\ z$ of Fig. 13. Fig. 16 is a plan view of a portion of still another modification in the construction of the band. Fig. 17 is an edge view. Fig. 18 is a section on the line $w\ w$ of Fig. 17. Fig. 19 is a section on the line $m\ m$ of Fig. 16. Fig. 20 is a plan view of still another construction. Fig. 21 is an edge view of the same. Fig. 22 is a cross-section on the line $n\ n$ of Fig. 21. Fig. 23 is a plan view of a further modification in the band construction. Fig. 24 is a bottom view of the same. Fig. 25 is a transverse section on the line $o\ o$ of Fig. 23. Fig. 26 is a section substantially on the line $l\ l$ of Fig. 23. Fig. 27 is a plan view of a further modification in the construction of the band. Fig. 28 is a longitudinal section of the same. Fig. 29 is a transverse section on the line $p\ p$ of Fig. 28.

In the drawings, 2 represents a suitable frame having bearings 3 for a shaft 4, whereon the hub 5 of a flat-faced pulley 6 is secured. In my patents above referred to I have provided the face of the pulley with grooves in which the rope, cable, or chain or other power-transmitting device is placed, and I have provided various guides, movable and fixed, for engaging the rope to direct the loop from one side of the pulley to the other. I have found, however, that these parts engaging the rope cause more or less wear thereon, and to obviate this objection I have in this invention provided a smooth flat-faced pulley and arranged thereon an endless band 7, having a grooved or concave face 8. This band is made of any suitable material—such as leather, metal, or leather and metal combined, but preferably leather—and is looped or wrapped around the pulley corresponding to the number and manner of the turns made by the rope and is preferably conducted across the face of the pulley by a curved guiding-shoe 9, secured to the frame 2. This shoe conducts the band from one side of the pulley to the other and is preferably provided with a concave face to aid in retaining the band thereon. I may, however, use a wheel in place of this shoe for the same purpose. At the opposite side of the pulley I provide clips 10, that prevent the band from slipping off the face of the pulley at that point.

The power-transmitting means, which I have shown in this case to consist of a rope 11,

though it will be understood that a cable, chain, or equivalent device may be employed, is looped or wrapped around the pulley in the manner described in my patents above referred to; but instead of resting directly upon the face of the pulley, as in said patents, it lies in the groove 8 in the face of the band, which will travel with the pulley, there being sufficient friction between the pulley and band to prevent the latter from slipping. The shoe 9 is provided with guides 12 and 13, which pass over the rope and prevent it from accidentally slipping out of the groove in the band. A bracket 14 is mounted on the frame 2, carrying an idle wheel 15, that engages the edge of the band 7 to direct the same across the face of the pulley and having a function corresponding to the wheel described in my former patents. I also prefer to provide a guide 16 on the opposite side of the pulley to engage the edge of the band to prevent it from running off the edge of the pulley when driven backward. When the pulley is driven forward, the band will slide over the shoe, being directed thereby toward the side of the pulley from whence it started, and the rope will engage and travel with the band without coming in contact with the guides or with the face of the pulley and nearly all wear on the rope or other power-transmitting means that may be employed will be avoided.

In Figs. 6 and 7 I have shown the pulley provided on its periphery with a series of transverse grooves or depressions 16′, and in place of the all-leather band shown and described with reference to Figs. 1 to 5, inclusive, I have shown a band illustrated in detail in Figs. 10, 11, and 12, consisting of a series of pivotally-connected links 17, being in construction substantially the same as the ordinary link band, the hinges of the links fitting within the grooves in the face of the pulley and by such engagement prevented from slipping and each link having on its upper surface a longitudinally-grooved block 18, suitably secured and forming a continuous grooved path on the top of the band. These blocks are preferably of metal and may be cast with the links or not, as preferred. The grooved path in the blocks receives the rope, cable, or other power-transmitting means and prevents it from coming in contact with the pulley or with the guides, which are similar to those above described and serve to direct the chain band across the face of the pulley when it is moving in one direction and prevent the band from running off the pulley when reversed. As shown in Fig. 7, I prefer to arrange the grooves 16 at a slight angle with respect to the axis of the pulley to compensate for the sliding of the band from one side to the other.

In Figs. 13, 14, and 15 I have shown a form of band similar to the one illustrated in Figs. 10, 11, and 12, except that the groove in the top of the band is a little deeper than in the one first described, the construction otherwise being substantially the same.

In Figs. 16, 17, 18, and 19 I have shown a band to be looped or wrapped around the pulley, consisting, preferably, of a leather strip 19, whereon a series of grooved sections 20, preferably metallic, are arranged, with a comparatively thin leather strip 21 fitting within the grooves in said sections and secured thereto and to the strap 19 by stitches passing therethrough, as shown in Fig. 19. I also prefer to provide short metal plates 22 on one side of this built-up band to be engaged by the guide-wheel to avoid wear of the flexible strips. This form of band is very economical of construction and is also durable and in some cases may be preferred to an all-leather or part metallic and leather band. It is sufficiently flexible to straighten and will also easily make the bend over the periphery of the pulley and across it, and, as shown, I have secured the different sections together by sewing, which I have found to be more flexible than riveting. In practice, of course, the metallic blocks with the plates or flanges on the side would be made in one piece.

In Figs. 20, 21, and 22 I have shown a band consisting of a grooved leather band or strap 23, provided on its under side with a thin metallic strip 24, having on one edge T-shaped parts 25, that are bent up around the edge of the leather strip and form bearing-surfaces for the guide-wheel 15. This form of band will be made in one piece similar to the one first described, with the addition of the metallic guard-strip.

In Figs. 23, 24, 25, and 26 I have shown a form of band made up of a series of longitudinal grooves and links 26, preferably of metal, connected by pivot-pins and having transverse ribs 27 on their under faces to enter correspondingly-shaped transverse depressions or notches 28 in the face of the pulley, as shown in Figs. 8, 9, and 26. The engagement of the ribs with the notches will, as in the case of the band shown in Figs. 6 and 7, prevent slippage on the pulley, and the under side of the band may be oiled, if preferred.

In Figs. 27, 28, and 29 I have shown a further modification in the construction of the band, which consists in providing an inner flexible strap 28, preferably of leather, and securing thereby by rivets or other suitable means a link band 30, on each link of which a grooved block 31, preferably metal, integral or not, as preferred, is mounted. These blocks when the ends of the chain and strap are united form a continuous grooved path for the rope or other power-transmitting means and have substantially the same functions as the leather band first described. To protect the edge of the strap 28 from wear, I may prefer to provide metallic plates 32, secured thereon, which pre-

vent the edge of the strap from being worn by engagement with the guide. The rope or other power-transmitting means may be wrapped around the drive-pulley and the driven pulley, and it may also be conducted from one driven pulley to another or to several pulleys before returning to the drive-pulley. On a threshing-machine I may wrap the rope around the cylinder-pulley and then around the wind-stacker pulley before running it back to the drive-pulley.

These various ways of arranging the rope on a series of pulleys will extend the possibility of use of the same, while its operation on a series of pulleys will be substantially the same as on one, and I have not thought it necessary to either extend the illustration or description for the purpose of showing the various ways in which my invention may be utilized.

I claim as my invention—

1. The combination, with a pulley, of an endless band loosely wrapped around the periphery of the same, means for directing said band across the face of the pulley, and an endless rope or cable also looped around said pulley and bearing upon said band.

2. The combination, with a pulley, of an endless band having a grooved face loosely wrapped around the periphery of said pulley, means for guiding said band across the face of the pulley, and an endless rope or cable having a number of wraps around said pulley corresponding to those of said band and fitting within the groove therein.

3. The combination, with a pulley, of a leather band having a grooved face wrapped around the periphery of the pulley, a guide directing said band across the face of the pulley, and an endless rope or cable also looped around said pulley and fitting within the groove in said band.

4. The combination, with a pulley having a flat periphery, of a band looped or wrapped around the peripheral face of said pulley, a power-transmitting means wrapped around said pulley and separated therefrom by said band, and a shoe provided between the sections or runs of said power-transmitting means and over which said band travels, substantially as described.

5. The combination, with the pulley, of an endless band wrapped around the periphery of the same, means for directing said band across the face of the pulley, a rope or cable looped or wrapped around said pulley and separated therefrom by said band, means for preventing said band from passing off the edge of the pulley when driven backward, substantially as described.

6. The combination, with a pulley, of power-transmitting means looped or wrapped around the periphery of the same, an antifriction-band interposed between said power-transmitting means and said pulley, and suitable guides for said band.

7. The combination, with the pulley 6, of a band 7 having a grooved face 8 loosely looped or wrapped around the same, suitable guides for directing said band from one side of the pulley to the other, and a rope or cable also looped around said pulley and separated therefrom by said band.

8. The combination, with a pulley having a flat face, of a band looped or wrapped around the same, a wheel 15 arranged to engage said band and direct it across the face of the pulley, a shoe 9 over which the band loosely passes to the other side of the pulley, a rope also looped around said pulley and separated therefrom by said band, belt-guides 10 provided upon each side thereof, and the guides 12 and 13 carried by said shoe.

9. The combination, with a pulley, of an antifriction-band wrapped around the periphery of the same, means for directing said band across the face of the pulley, and an endless power-transmitting means also looped around said pulley and bearing upon said band.

In witness whereof I have hereunto set my hand this 18th day of December, 1902.

EMIL L. WAGNER.

In presence of—
S. H. JUMPER,
L. C. MCDONOUGH.