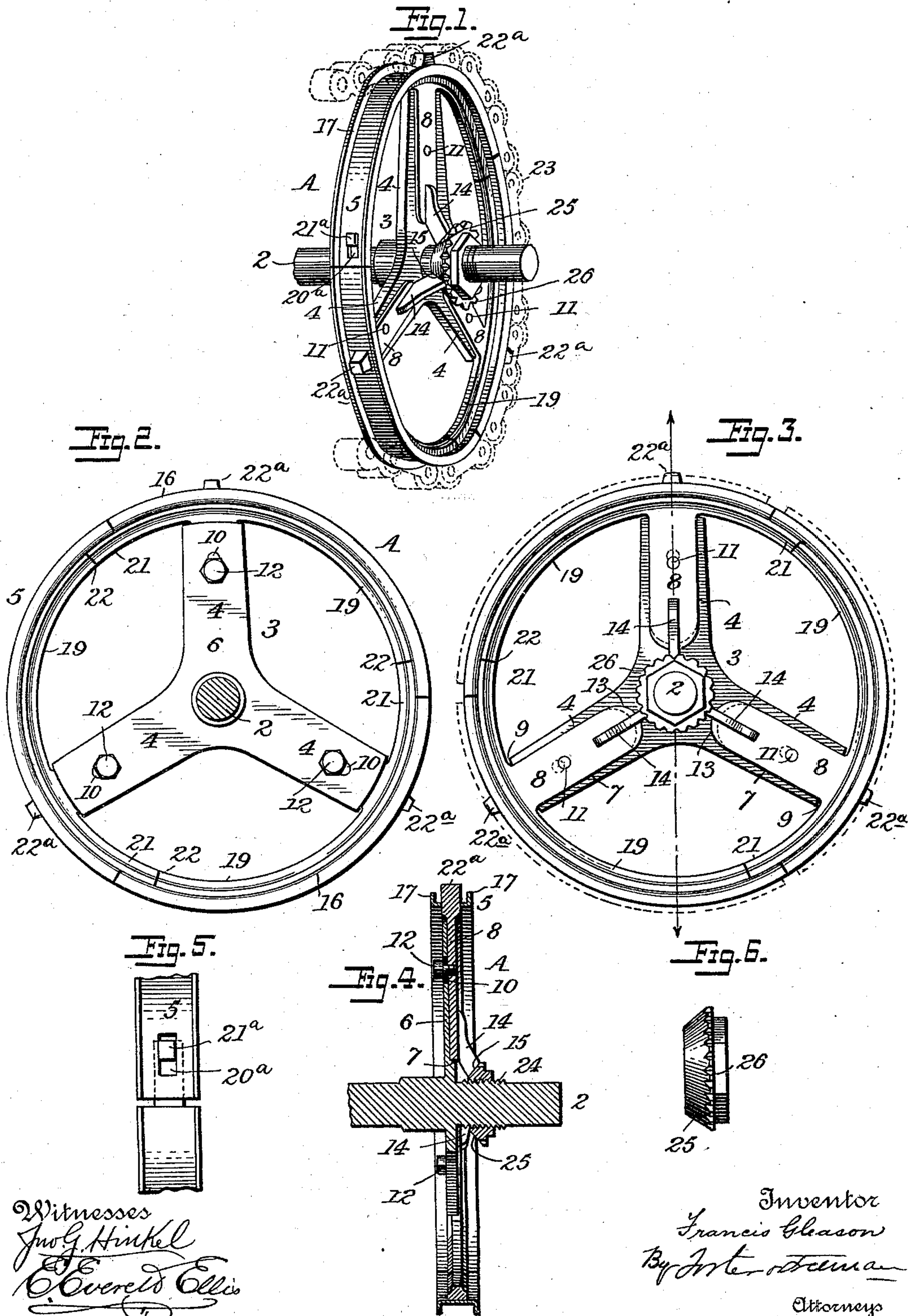


(No Model.)

F. GLEASON.
EXPANSIBLE SPROCKET WHEEL.

No. 547,378.

Patented Oct. 1, 1895.



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UNITED STATES PATENT OFFICE.

FRANCIS GLEASON, OF PHILADELPHIA, PENNSYLVANIA.

EXPANSIBLE SPROCKET-WHEEL.

SPECIFICATION forming part of Letters Patent No. 547,378, dated October 1, 1895.

Application filed March 24, 1894. Serial No. 504,985. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS GLEASON, a citizen of the United States, residing at Philadelphia, Philadelphia county, State of Pennsylvania, have invented certain new and useful Improvements in Sprocket-Wheels, of which the following is a specification.

This invention relates to certain new and useful improvements in sprocket-wheels; and it consists, substantially, in such features of construction and combinations of parts as will hereinafter be more particularly described.

The invention has for its general object the variations of speed of driven parts, as well as the compensation for wear and stretching of drive-chains.

The invention has for its further object to obtain an equal driving power from a less number of sprockets or teeth and at the same time to greatly reduce the friction between the wheel and drive-chain.

The invention has such other objects in view as will more fully hereinafter appear, when taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a sprocket-wheel embodying my several improvements. Fig. 2 is a view of the wheel, looking at one face thereof, the shaft being shown in section and the several segments of the wheel band or circle being in non-expanded relation to each other. Fig. 3 is a similar view to Fig. 2, looking at the opposite face of the wheel and showing more clearly the relative arrangement of the movable slides and their operating cone and nut. Fig. 4 is a transverse sectional view taken through one of the spider-ribs and its slide, said view also indicating the construction or transverse section of the wheel rim or circle. Fig. 5 is a detail view representing the movable connections between the several expansible wheel-segments, and Fig. 6 is a detail view indicating more clearly the construction of the adjusting cone or nut.

As ordinarily constructed sprocket drive-wheels are made up of different standard sizes, each particular size embodying a particular multiple of sprockets or teeth, those of the different sizes varying in numbers according to the variation of the size or circumference of the wheel, and it is well known that

with any particular sprocket drive-wheel there are in each revolution as many successive frictional touches of engagements with the drive-chain as there are teeth or sprockets on the wheel, and yet, owing to want of perfect relation between the drive chain and wheel, at no one time during the revolution of the wheel is there more than a very small fraction of the whole number of teeth or sprockets in actual working bearing or engagement with the links of said drive-chain. For instance, with an ordinary sprocket drive-wheel with eighteen teeth in its circumference, probably only two of such teeth would be in actual working engagement at any one time. I have found that practically all the driving effect required may be secured by the use of a wheel having only such a number of teeth, equidistantly arranged, as will give the actual working effect of those of the ordinary wheel. My wheel embodies other features of improvement and is so constructed as to readily compensate for wear and stretching of the drive-chain, as well as to vary the speed.

Referring to the drawings, A represents my improved sprocket-wheel as a whole, and 2 indicates the shaft to which said wheel is connected or otherwise secured. Said wheel is provided with a central spider 3, having three radial ribs or spokes, indicated at 4, which ribs or spokes are equidistant and terminate at their ends or extremities a little short of the felly portion of the wheel-segments, hereinafter more specifically referred to. The shaft 2 is, of course, concentric with the spider, as well as with the rims or wheel-circle 5, and the radial ribs or spokes 4 of the spider are flat on one of their faces, as shown at 6, while their opposite faces are formed with longitudinal channels or grooves 7, which receive and guide the radially-operating slides or expanders 8, through the medium of which the adjustment of the several segments of the wheel rim or circle are effected. The said slides 8 fit the grooves 7 quite snugly and are flush with the surfaces of the ribs in which they work, and normally these slides extend a little beyond the ends or extremities of the ribs or spokes of the spider, as indicated at 9. In each of the radial ribs or spokes of the spider is formed a slot 10, while in each of

the slides 8, at a point corresponding to the inner extremity of said slot, is a threaded hole or opening 11, which receives a threaded screw 12, which serves to tighten the slide in its position after it has been moved, as hereinafter more fully explained. It is evident that said slides will be securely held in their places of adjustment, since the heads of the screws rest or bear against the opposite sides of the ribs when the screws are tightened up by means of a small wrench or other suitable device. Preferably, in order to avoid angles in the grooves or channels in which the slides or expanders work, both the said slides and grooves are correspondingly rounded at their inner ends or extremities, (see 13,) and the said slides or expanders 8 are provided on their outer surfaces, near their inner ends, with projecting ribs or blades 14, which do not quite reach to the shaft 2 and the inner ends of which are beveled upwardly and outwardly, as indicated at 15. These blades or ribs co-operate with the adjusting cone and nut, hereinafter described, in effecting the outward adjustment of the slides, as well as the corresponding expansion of the segments of the wheel rim or circle. The said wheel rim or circle, as shown, is constituted of three separate expansible segments 16, each of which is provided with side flanges 17, so that when united in forming a continuous wheel or circle any slipping of the drive-chain is obviated. It will be understood, however, that said wheel rim or circle might be constructed of any other suitable form transversely.

As shown in the drawings, each corresponding slide and wheel-segment is made integral or in one piece, and the point of intersection or union thereof is nearer to one end of the segment than the other, the purpose of this being to lend additional strength to those parts of the wheel rim or circle which necessarily are rendered weaker, due to the severance thereof at equal points in the diameter of said rim.

The wheel portion of my expansible sprocket-wheel or pulley is composed of two parts—that is to say, the rim portion 16 and the felly portion 19—and the several segments are so formed that at one end of each segment the felly portion projects beyond the end of the rim portion at 21, while at the other end thereof the rim portion projects beyond the felly portion at 22. Thus the projecting ends of the felly portions serve to receive and support the projecting ends of the rim portions in such manner as to provide a very strong rim as a whole. The projecting portions of the rim referred to, it will be observed, are formed or provided with slots 20^a, which receive small lugs or projections 21^a on the corresponding projecting portions of the wheel-felly, which construction is resorted to for the purpose of obtaining a per-

fect movable connection between the segments. From the construction shown it will be seen that the extent of expansibility of the wheel rim or circle is necessarily limited by the length of the slots referred to; but it is evident that in wheels of large diameter these slots may be made as long as desired, and thus give quite a range of expansibility in wheels of this class.

From the construction shown and described it will be seen that the projecting ends of the felly portions of the segments are brought beneath the overlapping portions of the rim, which, in the disposition of the radial ribs and slides are such as to be close to the movable joints and serve to make the wheel quite strong and capable of sustaining all the uses required of it. It will be understood that, instead of making the corresponding segments and slides integral or in one piece with each other, they may be constructed separately and then joined together in any suitable or secure manner; but preferably the construction shown is that which is employed practically. It will be observed, also, that in line with the radial spokes or ribs of the spider, and equidistant from each other, I employ three sprockets or teeth 22^a, which, as hereinbefore stated, furnish substantially the same driving power or working capacity as a wheel of the same size embodying a greater number of teeth. As will be observed by reference to the perspective view in the drawings, two out of three of these teeth or sprockets 22^a are always in actual working bearing or engagement with links of the drive-chain 23, while the third tooth serves to instantly take up such engagement or bearing immediately as or before the tooth preceding it is released from the chain. Thus the sprockets or teeth are practically isolated from each other, in that all of the intermediate teeth, as ordinarily employed in sprocket drive-wheels, are dispensed with, and there is not that frictional and useless engagement of the links of the chain with teeth which are inactive or passive while the actually-working teeth are in effective engagement. The said sprockets or teeth, as is evident, could be formed at the ends of the slides and be made to extend through openings in the rim-segments; but preferably the said slides, together with the teeth and segments, are all made in one piece or integral, as shown.

Referring back to the shaft 2 of the wheel, it will be observed that the same is screw-threaded at that part indicated by the numeral 24, while fitting and working upon the screw-threaded portion is a combined cone and nut 25, which constitutes the device by which the expansion or adjustment of the wheel-segments are effected by means of a suitable wrench or other device for turning the same. This combined cone and nut 25, it will be seen, is of such shape and dimen-

sions as to enter between the beveled edges of the projecting ribs or blades 14 and the shaft 2, so that as the cone is screwed up it will act as a wedge and serve to move the slides outwardly and radially and thus expand the wheel-segments. It will be observed that the said cone 25 is formed or provided with a notched or milled edge 26, which facilitates the unscrewing of the same from the shaft after it has been once loosened by means of a wrench or other suitable device. Normally the position of the segments of the rim of the wheel is such that the said segments will be closely joined, and then, whenever it is desirable to expand the segments, whether due to stretching or wear of the drive-chain, it is simply necessary to screw the cone up on the shaft 2, when the effect will be, as hereinbefore described, to separate the segments and to take up any slack in the drive-chain. By giving to the segments a very large or unlimited degree of expansibility, it will of course be understood that considerable variation in speed in the parts driven by the wheel could be effected. The screws 12 are of course loosened prior to the adjustment of the cone 25, and then after the adjustments have been effected the said screws of course are again tightened up, and in this way the wheel-segments are made firmly set to any position to which they may be adjusted.

From the foregoing description it will be seen that my improved sprocket drive-wheel embodies very simple yet effective devices in its construction, and it will further be seen that the adjustment of its several parts can be very quickly made and with very little difficulty and labor.

In the particular adjustment or expansibility of my improved wheel hereinbefore set forth, it will be observed that as the adjustments are effected both the pitch-line of the teeth, as well as the pitch of the wheel circle or band, will be simultaneously and correspondingly altered or changed.

It will be understood, of course, that in the details of construction of the several parts a great many immaterial changes could be adopted, and hence I do not wish to be understood as limiting myself to the precise details of construction and arrangements of parts shown and described.

It will be seen that a sprocket-wheel as above described is practically a wheel having the distance from center to center on the pitch-line of the teeth several times greater than

the pitch of the chain that is intended to run thereon.

What I claim is—

1. A sprocket wheel comprising a rim and felly divided into a number of segments with the felly portions projecting at one end beyond the rim portions, and the rim portions projecting at the other end beyond the felly portions, sprocket teeth on the rim arranged equi-distant at such points that two or more links will lie between the teeth when they are engaged by the chain, and means for expanding the segments, substantially as described.

2. A sprocket wheel comprising a rim and felly divided into a number of expansible segments with the felly portions projecting at one end beyond the rim portions and provided with lugs, and the rim portions projecting at the other end beyond the felly portions and slotted to receive the lugs, sprocket teeth arranged upon the rim equi-distant at such points that there are two or more links between the teeth when engaged by the chain and means for expanding the segments, substantially as described.

3. A sprocket wheel comprising a rim and felly divided into a number of segments with the felly portions projecting at one end beyond the rim portions, and the rim portions projecting at the other end beyond the felly portions, teeth upon the rim, slides joined to the segments and provided with the ribs or blades beveled on their inner ends, and an adjusting cone working against said beveled ends, substantially as shown and for the purpose described.

4. A sprocket wheel comprising a rim and felly divided into a number of segments with the felly portions projecting at one end beyond the rim portions, and the rim portions projecting at the other end beyond the felly portions, teeth upon the rim, the spider having radially disposed ribs provided with channels, slides working in said channels and joining or connecting with their respective segments nearer to one end thereof than the other, and an adjusting cone or nut, all substantially as shown and described.

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

FRANCIS GLEASON.

Witnesses:

A. HEATON MINNICK,
CHARLES DANIELLY.