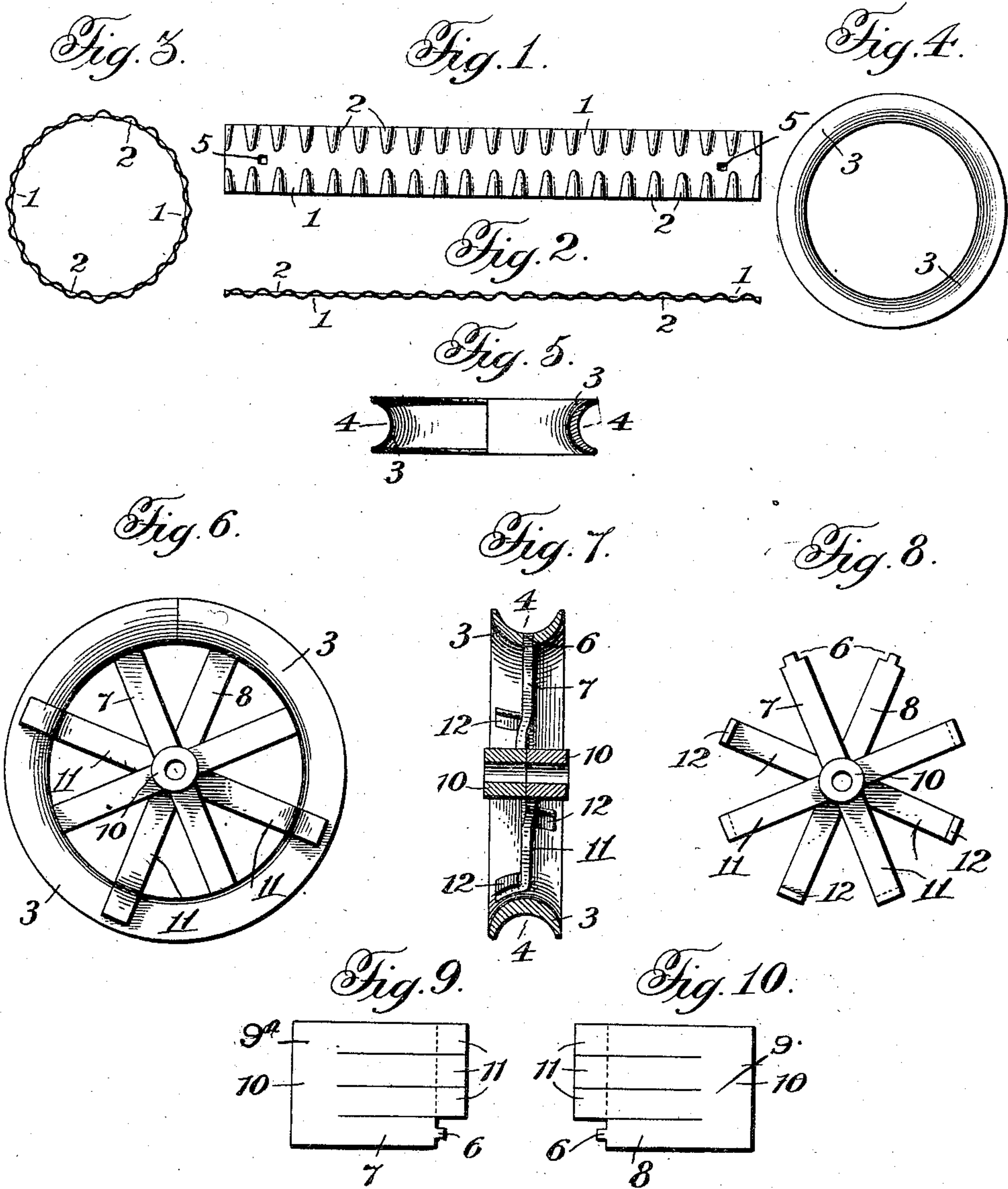


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W. LIVINGSTONE.
MANUFACTURE OF METAL PULLEYS.
APPLICATION FILED JAN. 4, 1904.



Witnesses:
Jas. Hutchinson.
William F. Hall.

Inventor:
William Livingstone.
By Atty. Munk Attorney

UNITED STATES PATENT OFFICE.

WILLIAM LIVINGSTONE, OF FLUSHING, NEW YORK.

MANUFACTURE OF METAL PULLEYS.

SPECIFICATION forming part of Letters Patent No. 782,509, dated February 14, 1905.

Application filed January 4, 1904. Serial No. 187,697.

To all whom it may concern:

Be it known that I, WILLIAM LIVINGSTONE, a citizen of the United States, residing at Flushing, New York, have invented Improvements in the Manufacture of Metal Pulleys, of which the following is a specification.

This invention relates to the manufacture of metal pulleys, and has special reference to a simple and practical method of producing sheet-metal pulleys of the type designed for sash-cord and analogous purposes.

A special object of the invention is to provide a novel method of forming a concaved or peripherally-grooved pulley or wheel-rim wherein the peripheral side flanges of the pulley or wheel are uniformly and strongly formed throughout without the formation of weak places at any point and without danger of edge-cracking, which would ordinarily be due to the stretching of the metal side flanges when the blank is shaped into its circular form.

A further object is to provide a novel method of forming a pulley-rim in conjunction with a sheet-metal spoke and hub formation for retaining the rim in its circular or wheel form.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts which will be hereinafter more fully described, illustrated, and claimed.

The essential feature of the invention involved in the rim formation is necessarily susceptible to structural change; but a preferred embodiment of the invention is shown in the accompanying drawings, in which—

Figure 1 is a plan view of a sheet-metal blank from which the pulley-rim is to be made and representing the first step in the process.

Fig. 2 is an edge view of the crimped or corrugated blank, showing the projection of the crimps or corrugations equally above and below to the thickness of the blank. Fig. 3 is

a view illustrating the third steps of the process, wherein the blank is bent into its circular form. Figs. 4 and 5 show the rim complete with the crimps or corrugations pressed out to supply the necessary material for the formation of the concave or groove. Fig. 6

is a side view of the completed rim, showing a sheet-metal spoke-spider adapted thereto for making a complete pulley and for holding the ends of the rim together. Fig. 7 is a vertical sectional view of the completed rim shown in Fig. 6. Fig. 8 is a plan view of the complete spoke-spider set up. Figs. 9 and 10 are plan views of the reversely-related duplicate spider-blanks which are preferably employed in the formation of the pulley-hub and spokes.

Like reference-numerals designate corresponding parts in the several figures of the drawings.

In carrying out the invention the first step in the process resides in preparing a sheet-metal blank 1, from which the complete rim is to be formed. The length of this blank is equal to the circumference of a circle whose diameter is that of the complete rim at the inner side of the groove or concave less the thickness of the metal. The distinctive feature of the present invention resides in forming this blank strip with a surplus side edge portion to supply the necessary material for the formation of the peripheral flanges producing the annular groove or concave. This surplus edge portion is preferably provided for by crimping the longitudinal edges of the blank by a regular series of uniform corrugations 2, disposed transversely of the blank and projecting a short distance inwardly from the side edges toward the longitudinal center thereof. These corrugations 2 produce a crimped edge, and the same extend equally above and below the thickness or central portion of the blank, as plainly indicated in Fig. 2, and the sinuous lines formed by the corrugations 2 are equal in length to the circumference of a circle whose diameter is that of the pulley-rim from outside to outside of its annular groove or concave. The crimped or corrugated blank strip is next bent into circular form with its ends abutting together, and the blank then appears as shown in Fig. 3. The rim structure is then completed by pressing out the crimps or corrugations 2 to supply the necessary material for the formation of the peripheral side flanges 3, thereby producing the annular groove or concave 4, as shown in Fig. 5. This figure is an edge sectional view of the

completed pulley-rim, and Fig. 4 shows the completed rim in elevation.

It will be seen from the foregoing that it is only by reason of providing the surplus edge portions through the medium of crimps, corrugations, or the like that it is possible to construct the blank in the first instance so as to take care of the greater diameter of the peripheral side flanges 3 without danger of cracking, breaking, or otherwise weakening the rim through the production of the annular groove or concave 4.

Contiguous to each end of the rim-blank 1 and between the opposite rows of corrugations or crimps 2 the said blank is pierced by the sockets or openings 5, which respectively receive the holding-tenons 6 of the retaining-spokes 7 and 8, carried, respectively, by the separate twin spoke-spider blanks 9 and 9^a. This provides an arrangement wherein what may be termed a "duplex" spoke-spider provides means for holding the ends of the rim in closed abutting relation.

In Figs. 9 and 10 the separate twin spoke-spider blanks 9 and 9^a are illustrated, said blanks being exact duplicates, but placed in reversed relation, so as to make the one right and the other left. Each of these blanks is slitted lengthwise to within a distance equal to half the length of the hub-section 10 to provide strips of equal width, three of which, 11 11 11, are of equal length, while the fourth, 7 and 8, respectively, are somewhat shorter and provided with the tenons 6 aforesaid. The unslitted portions of the blanks 9 and 9^a are rolled into tubular form, producing the hub-sections 10, whose inner ends are brought together, as shown in Fig. 7, and the arms 7, 8, and 11 are bent up at substantially right angles and are formed with outer terminal deflections 12, engaging at the under side of the pulley-rim, it being observed that the deflections 12 of the separate spider-blanks respectively engage against opposite side por-

tions of the rim, while the retaining-spokes 7 and 8 are held interlocked with the rim in the manner explained.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. The process of making sheet-metal pulleys or like metal forms consisting in forming a blank strip with surplus side edge portions equaling in length the circumference of a circle whose diameter is that of the rim from outside to outside of its groove, bending the strip into circular form, and shaping the surplus edges to produce the groove.

2. The process of making sheet-metal pulleys or like metal forms consisting in first crimping the longitudinal edges of the blank strip to expand said side edges, bending the strip into circular form, and pressing out the crimps.

3. The process of making sheet-metal pulleys or like metal forms consisting in first expanding the longitudinal edges of the blank by providing the same with a regular series of corrugations projecting equally above and below the blank and extending a short distance inwardly from the edges thereof, bending the blank into circular form, and pressing out the crimps.

4. The process of making a pulley-rim of concave cross-sectional shape from a blank strip, which consists in providing the marginal edge portions of the strip with a series of corrugations of gradually-decreasing depth from the edges of the strip toward the center of the same, bending the corrugated strip into circular form and then pressing out the corrugations, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM LIVINGSTONE.

Witnesses:

PAUL NEUHUT,

EDMUND HANCOCK.