J. H. RYALLS.

REVERSING MECHANISM FOR THE BAND CYLINDERS OF SPINNING MULES.

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1,082,912. Patented Dec. 30, 1913.

Fig. 1.

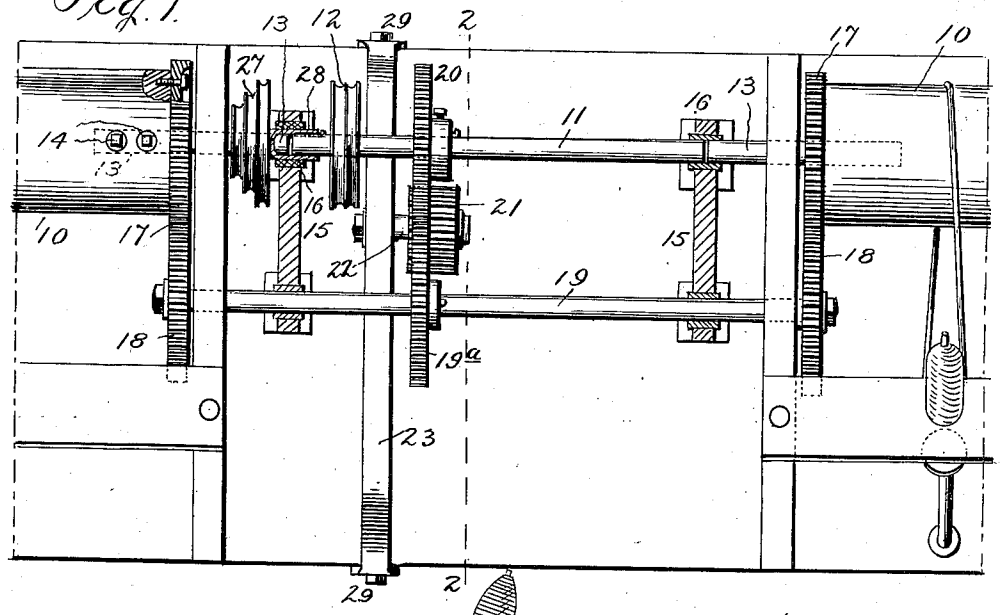
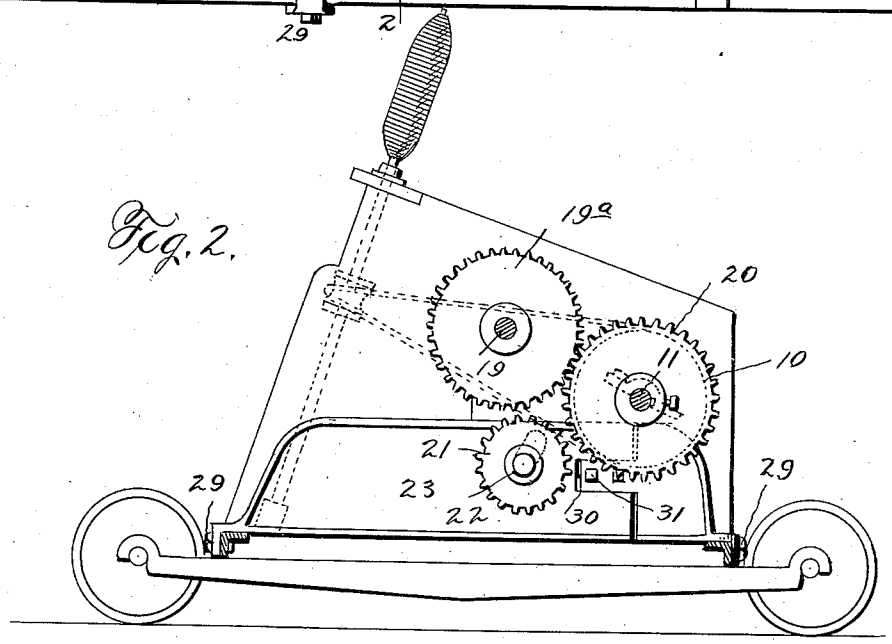


Fig. 2.



WITNESSES

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REVERSING MECHANISM FOR THE BAND-CYLINDERS OF SPINNING-MULES.

1,082,912. Specification of Letters Patent. Patented Dec. 30, 1913.

Application filed July 12, 1910. Serial No. 571,656.

To all whom it may concern:

Be it known that I, JOHN H. RYALLS, of Charlottesville, in the county of Albemarle, and in the State of Virginia, have invented a certain new and useful Improvement in Reversing Mechanism for the Band-Cylinders of Spinning-Mules, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to the same subject as that of my United States Patent No. 942,752, dated December 7, 1909, and the object of my invention is to make certain improvements whereby, speaking in a general way, the life of the mechanism shall be lengthened, its efficiency increased and the handling of the parts for taking down and assembling the same rendered easier and quicker, and to these ends and others that will be hereinafter described, my invention consists in the reversing mechanism constructed substantially as hereinafter specified and claimed.

A spinning-mule ordinarily contains 420 spindles and sometimes as many as 600 spindles, each spindle being revolved by a band or belt running from the band cylinder to a pulley on the spindle. It is essential to reverse the direction of the revolution of the spindles. This reversal of direction of the spindles when performed by hand means the lifting of each spindle out of its step bearing, and the removal and reapplication to the spindle whirl of the band and it is to enable such removal and reapplication of the band of the spindle that the spindle is lifted out of its step bearing. The time required to do this work by hand in a spinning-mule of 420 spindles is so great as to be a serious loss, and besides this, the removal and replacing of the spindle in its step bearing injures the bearing, which is of brass, by the striking there-against of the spindle end, resulting in burs against which the spindle in its revolution rubs and results in such friction as to wear out the bearing. Again in changing the bands by hand they are slackened, the result being that bad thread is produced, which if suitable for use at all is available only for selvage, and this means often a serious loss.

Referring to the accompanying drawings—Figure 1 is a top plan view with parts in section illustrating a reversing mechanism embodying my invention; and Fig. 2 a vertical section thereof on line 2—2 Fig. 1.

In the embodiment of my invention illustrated in the drawings, the spinning-mule is of ordinary construction having as usual band-cylinders 10, arranged in axial alinement and spaced apart, and extending between them is a shaft composed of three alining sections, a middle section 11 to which is secured a band pulley 12, by which power is taken to revolve said middle section, and two end sections 13, each end section 13 being extended partially into the cylinder and the latter secured rotatably thereto by set screws 14. The middle shaft section is supported at both ends by bearings in the machine frame 15, and the same bearing that serves for one end of the middle section also serves as the bearing for the contiguous cylinder shaft section, and said bearings 16 have removable caps, by the removal of which the middle shaft section can be very easily taken out and as easily replaced without the necessity of disturbing the cylinders, and this is one of the important advantages of the divided shaft arrangement. Where a single continuous shaft is used, to separate and assemble the parts involved, the sliding of the cylinders endwise off the shaft, and said cylinders ordinarily are over 40 feet long.

At the end of each band cylinder is a spur gear 17 with which meshes a like gear 18 on a counter shaft 19, which counter shaft is adapted to be geared to the power shaft 11 by trains of gears, to be described, which at will may be arranged to revolve the counter shaft in either direction, and thus revolve the band cylinders in either direction according to the direction in which the spindles are to be revolved to suit the requirements of the case. The gear 17 is secured to its cylinder 10 by bolts, so that the power to revolve the cylinder is applied directly from the gear to the cylinder instead of from the gear to the cylinder shaft and from the latter to the cylinder. It has been found that by applying the power to the cylinder shaft to drive the cylinder as the set screw connection between said shaft and cylinder was the medium through which the power was applied, such back lash as was inevitable from the change of direction of revolution would soon result in the set screws cutting around the shaft, and this, of course, is avoided by my present construction, and from the present construction other important advantages result in that

the power being applied at or near the periphery of the cylinder, a much longer leverage is obtained than in the former construction so that there is a large saving of power.

The gearing for transmitting motion from the power shaft to the counter shaft comprises a spur gear 19^a, keyed to the counter shaft, a spur gear 20 keyed to the power shaft but adapted to be moved axially along the same, to move it either into or out of mesh with the spur gear 19^a on the counter shaft, and an intermediate idler gear 21 whose face is sufficiently broad to enable it to mesh with both the gears 19^a and 20, when they occupy the different planes that they do when the gear 20 on the power shaft is moved to take it out of mesh with the gear 19^a. The broad-faced idler gear 21 is mounted on a stud shaft or gudgeon 22, which at one end passes through a slot in a standard 23 beneath the power and counter shafts, the direction of the slot being such that the stud shaft may be moved along the same and carry the broad-faced gear into or out of mesh with the gears 19^a and 20. By locating the broad-faced gear below the power shaft and counter shaft, no arm or extension of the standard 23 is necessary, but the shaft of said broad-faced gear is supported by the body part of said standard, and thus a rigid steady support is provided that is not subject to vibration or torsion such as is the case with an arm or extension. At this point it is proper to call attention to another important advantage of the divided shaft. It will be seen that with a long continuous power shaft extending through the band cylinders when the band cylinders have their direction of revolution opposite that of the power shaft, the latter and the band cylinders thus running in opposite directions, a great deal of friction will result in consequence of the opposite directions of the rotation of the cylinders and the power shaft upon which the cylinders have their bearing. By the divided shaft all this is obviated because the power shaft section does not pass through the cylinders, but they are supported by their shaft section 13 whose direction of revolution changes with the change of the direction or revolution of the band cylinders.

In order to provide for the usual variable speed motion which required a constant direction or revolution of its pulleys, I mount the usual cone pulley 27 so that though it is located around one of the cylinder shaft sections 13, it will nevertheless, revolve independently of said cylinder shaft section. I do this by providing said cone pulley with an elongated hub or sleeve 28, which extends through the contiguous bearing 16, and key it to the near end of the power shaft section 11, so that said pulley or sleeve is journaled in that particular bearing 16, and the contiguous cylinder shaft section 13, has its bearing in said hub or sleeve.

The standard 23 has at each end a suitable clamping bolt 29 by which to attach it to the ordinary frame of the spinning-mule, and to allow for variations in different machines, said standard is made extensible and contractible, as by being formed of two sections having a complementary tongue and slot connection 30 with bolts or screws 31 for securely holding said two sections at a desired length.

What I claim is—

1. In a reversing mechanism for spinning-mules, the combination of alining band cylinders, a power shaft situated between and wholly outside said cylinders, cylinder shafts separate from the power shaft, a counter shaft, a gear connection between said counter shaft and each of said cylinders, and a reversing gear connection between said counter shaft and said power shaft.

2. In a reversing mechanism for spinning-mules, the combination of band cylinders spaced apart and in alinement, a shaft secured to each of said cylinders and projecting therefrom, a power shaft situated between and in alinement with said cylinder shafts and rotating independently thereof, and a reversing gear connection between said power shaft and said cylinders.

3. In a reversing mechanism for spinning-mules, the combination of band cylinders spaced apart and in alinement, a shaft secured to each of said cylinders and projecting therefrom, a power shaft situated between and in alinement with said cylinders and rotating independently thereof, a reversing gear connection between said power shaft and said cylinders, and a power transmitting pulley connected with said power shaft into which one of said cylinder shafts passes.

4. In a reversing mechanism for spinning mules, the combination of band cylinders spaced apart and in alinement, a shaft secured to each of said cylinders and projecting therefrom, a power shaft situated between and in alinement with said cylinder shafts and rotating independently thereof, a bearing for the adjacent ends of the power shaft and the cylinder shafts, and a reversing gear connection between said power shaft and said cylinders.

In testimony that I claim the foregoing I have hereunto set my hand.

JOHN HURLEY RYALLS.

Witnesses:
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L. M. PERRY.