(No Model.)

J. M. HETHERINGTON.

APPARATUS FOR TRUING THE FLEXIBLE BENDS OF CARDING ENGINES.

No. 322,288. Patented July 14, 1885.

FIG. 2.

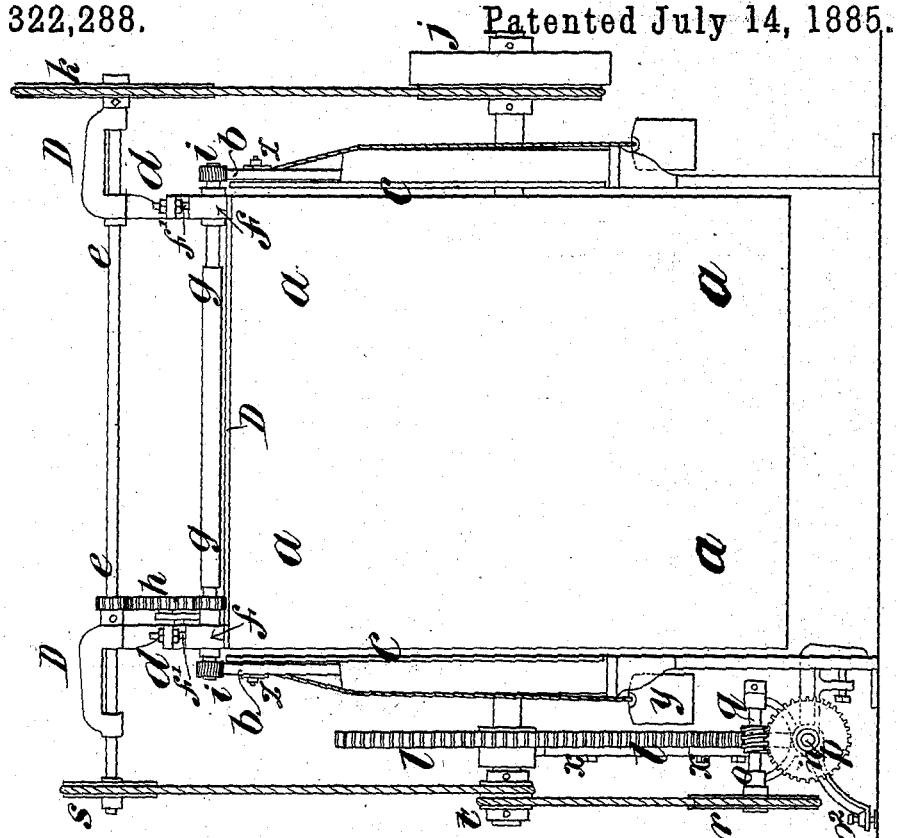
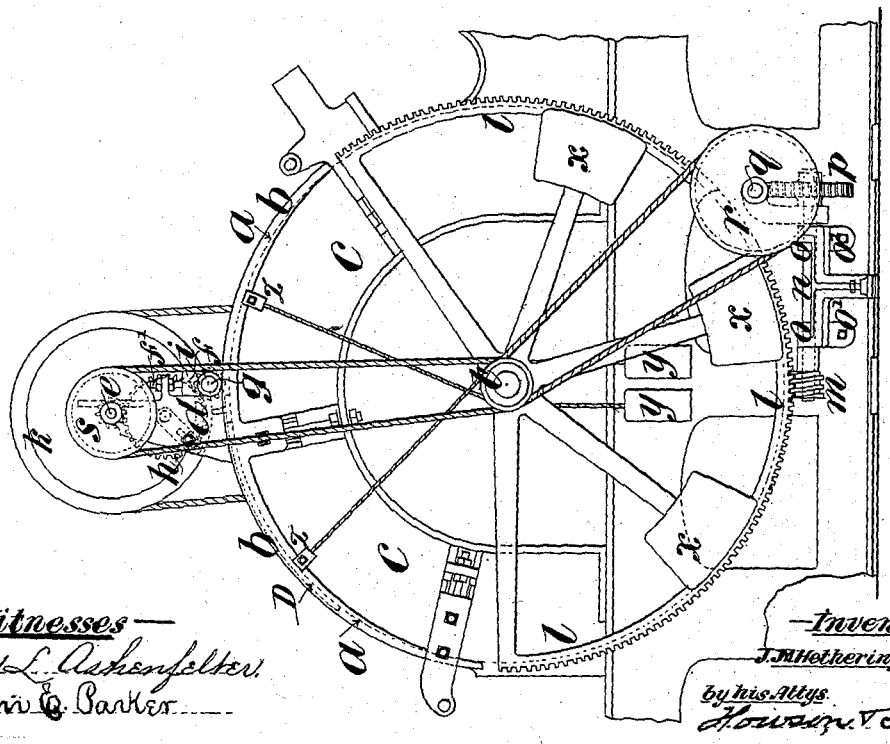


FIG. 1.



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UNITED STATES PATENT OFFICE.

JOHN MUIR HETHERINGTON, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

APPARATUS FOR TRUING THE FLEXIBLE BENDS OF CARDING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 322,288, dated July 14, 1885.

Application filed September 18, 1883. (No model.) Patented in England January 29, 1883, No. 471.

To all whom it may concern:

Be it known that I, JOHN MUIR HETHERINGTON, a subject of the Queen of Great Britain and Ireland, and residing at Manchester, county of Lancaster, England, have invented certain Improvements in Apparatus for Truing the Flexible Bends of Carding-Engines, (for which I have obtained a patent in Great Britain, No. 471, January 29, 1883,) of which the following is a specification.

My invention has reference to revolving flat carding-engines, and relates particularly to the "flexible bends" which carry the traveling chain of flats. It is of importance that the peripheries of these bends should be exactly concentric with the circumference of the carding-cylinder, and they are usually "trued up" by a turning-lathe or other tool, and finished to a size of circle rather larger than that through which the flats should traverse. When in position the ends of the flexible bends are sprung inward by pinching-screws, so as to cause the bends to approximate as closely as possible to the required size of working-circle. Owing, however, to inequalities in their formation, it frequently happens that the elasticity of the bends is unequal, and consequently a periphery or working-surface truly concentric with the axis of the main cylinder cannot be obtained, this defect causing rapid deterioration of the clothing and preventing the machine from doing its duty properly. I obtain a periphery truly concentric with the circumference of the main cylinder by means of cutters or grinders, which are caused to move in curved paths, which are concentric with the central axis, and to true up the peripheries or working-surfaces of the flexible bends.

In the accompanying drawings, Figure 1 represents a side elevation of part of a carding-engine. Fig. 2 is a back or end elevation of the same.

The carding-engine is represented in its incomplete condition before the chain of flats and the doffer and certain other parts have been mounted in position. In the said figures *a* is the main cylinder, and *b b* are the flexible bends, which are secured to the upper curved side frames, *c c*, as is usual. Upon the cylinder I mount a bracket, D, which in the example is formed with a base-plate, which is curved to sit upon the cylinder, and is adapted to be temporarily screwed or secured thereto. Upon this base-plate are cast or fixed end standards, *d d*, which carry a shaft, *e*. A bearing-block, *f*, is fitted to slide upon the face of each standard, and in the two blocks is mounted to revolve a cutter-shaft, *g*, which is connected by means of gearing with the shaft *e*. An intermediate spur-wheel, *h*, gears with wheels fixed on the two shafts, and is adjustable in position to provide for the varying distance of the cutter-shaft from the shaft *e*. The bearing-blocks *f* are adjustable upon the standards by means of screws *f'*, so that the cutter-shaft can be set nearer to or farther from the cylinder. Upon each end of the cutter-shaft is fixed a rotatory cutter, *i*, which is adapted to true up the curved face of the flexible bend. The shaft *e* receives a revolving motion from a band-pulley which is attached to a strap-pulley, *j*, which is loosely mounted upon one axle end of the main cylinder, and receives motion from a convenient source. The said band-pulley drives a pulley, *k*, which is fixed upon one end of the shaft *e*. Upon the other axle end of the cylinder is temporarily fixed a worm-sector, *l*, with which gears a worm, *m*, which is upon a shaft, *n*, which is mounted to revolve in a frame, *o*. The said frame is formed with screw-clamps *o'*, whereby it can be readily secured to the under framing of the engine, and the frame is also partly sustained and steadied by means of an arm, o^2, which is provided with a screw-foot, which can be adjusted to take a firm bearing upon the floor. Upon one end of the shaft *n* is fixed a worm-wheel, *p*, with which gears a worm upon a cross-shaft, *q*, which revolves in bearings in the frame *o*, and is provided with a band-pulley, *r*. Upon the shaft *e* is fixed a band-pulley, *s*, which drives a double-grooved band-pulley, *t*, which is loosely mounted upon one of the axles of the card-cylinder; and a band mounted in the second groove in the said pulley drives the band-pulley *r*, so that the shaft *n* is rotated, and a slow rotatory movement is imparted to the sector *l*, and, as a consequence, to the cylinder *b*. The double pulley *t* is interposed between the pulleys *s* and *r* in order to permit of the movement of the for-

mer partly around the axis of the main cylinder without interfering with the action of the bands, as will be well understood.

The action of the apparatus is as follows: The bracket D having been fixed on the cylinder and the frame *o* secured to the engine-framing, the sector and pulleys mounted on the axle, and the connections established, the cutter-shaft is adjusted so that the said shaft shall be exactly parallel with the face of the cylinder and the cutters be in position to act upon the faces of the bends, the wheel *h* being adjusted to gear with two wheels on the shafts *e* and *g*. The pulley *i* is then set in motion, so as to drive the other parts of the apparatus, and the cylinder revolves slowly, carrying forward the cutters onto the ends of the two flexible bends. The movement of the cylinder continuing, the cutters are carried from end to end of the flexible bends, facing and truing up the surfaces upon which the flats slide, and rendering them truly concentric with the axis of the main cylinder.

If required, the operation may be repeated—as, for example, the cutters may be set to take a finishing cut, and one of the bands, *u*, having been crossed, the direction of motion of the cylinder will be reversed, so that the cutters will traverse back again to the starting-point.

Grinders or emery-wheels may be substituted for the cutters, either to effect the entire operation or to finish the surfaces of the bends.

When the apparatus is intended to be used in truing up the bends of old engines having covered cylinders, so that the bracket D could not be secured to the cylinder, two arms carrying the cutter-shaft and the driving-shaft *e* are substituted for the bracket D. These arms are clamped upon the axles of the cylinder, one upon each side of the framing.

The shaft *e* is mounted to revolve in bearings formed in or fixed to the upper ends of the arms. Other means for revolving the cylinder may be adopted, and if the bracket D were suitably counterbalanced the cylinder might be turned by hand, especially in cases wherein emery-grinders would be used. In Fig. 1 the bracket D is counterbalanced by the sector *l*, which is provided with adjustable weights *x*.

In order to provide for the effect which the weight of the flats may have in altering the curvature of the flexible bends, I prefer to load the bends during the truing operation to an extent about equal to the weight of the flats which would rest upon the bends. In the drawings, weights *y y* are suspended by means of cords, which are attached at the points *z* to the bends.

The framing to which the bends are secured for the truing operation need not in all cases be the framing of the engine on which they have to be permanently fixed, as the bends might be trued upon a special framing and be removed therefrom to be fixed in position on the carding-engine framing.

I claim as my invention—

1. The herein-described apparatus for truing the flexible bends of carding-engines, said apparatus consisting of a frame adapted to be applied to the cylinder and carrying an adjustable rotating shaft with a cutter at each end to dress the bends as the truing apparatus revolves, all substantially as described.

2. The herein-described apparatus for truing the flexible bends of carding-engines, said apparatus consisting of a bracket, D, adapted to be secured to the cylinder, in combination with a shaft, *g*, having cutters *i i* to dress the flexible bends, the shaft being adapted to adjustable bearings in said bracket, and with a shaft, *e*, geared to the shaft *g*, and adapted to receive motion from a pulley on the axle of the carding-engine.

3. The bracket D, adapted to be mounted on the cylinder of the carding-machine, and provided with a shaft, *g*, having rotary cutters to true the bends, in combination with the sector *l*, and worm *m*, and the bracket *o*, adapted to be secured to the frame, band-pulleys *s*, *t*, and *r*, and the shaft *e*, to transmit motion to the cylinder and cutters, all substantially as set forth.

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

JOHN MUIR HETHERINGTON.

Witnesses:
EDWARD K. DUTTON,
DAVID FULTON.