(No Model.) 2 Sheets—Sheet 1.

B. F. RADFORD.

BELT SHIFTER.

No. 483,620. Patented Oct. 4, 1892.

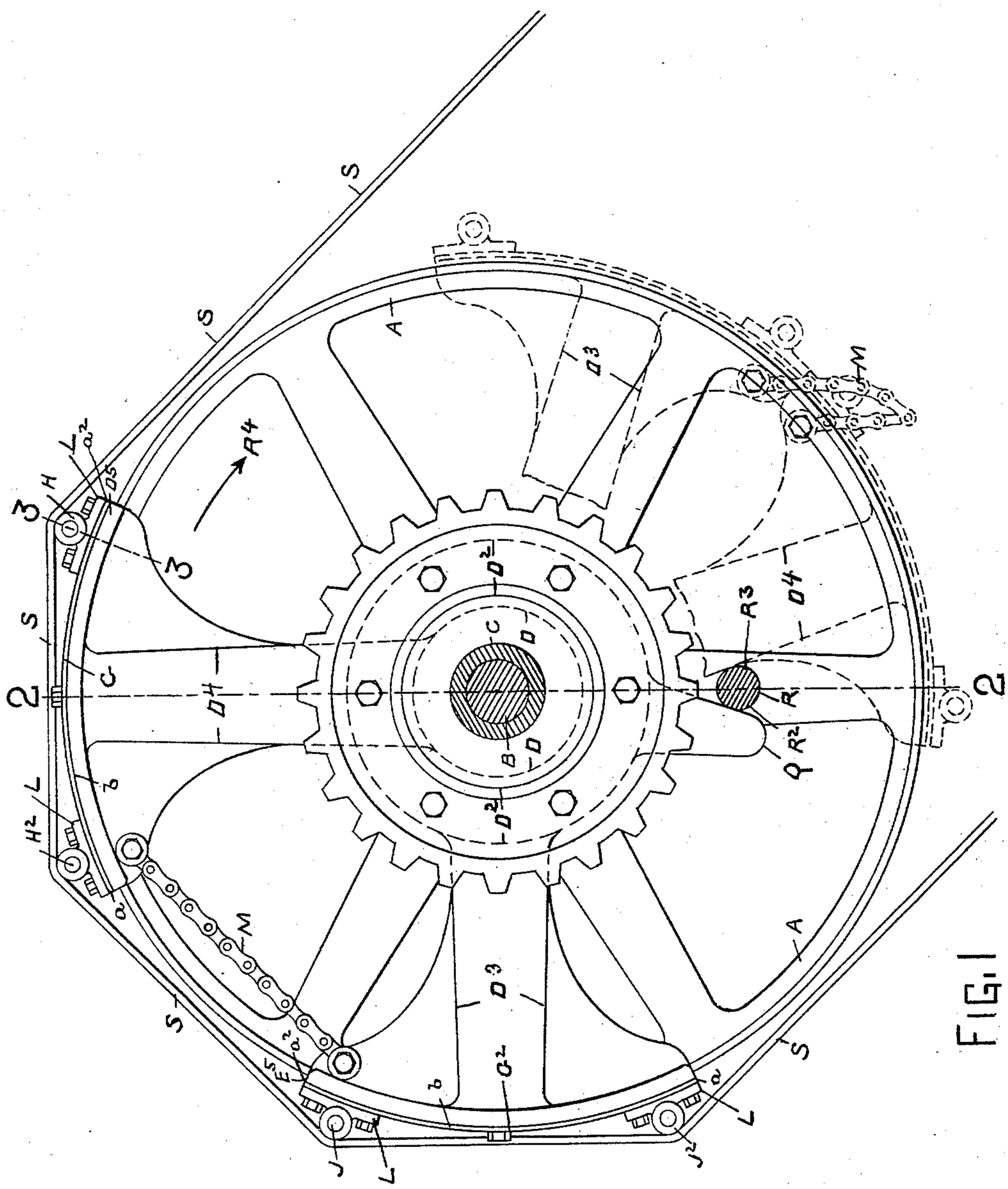

FIG. 1

WITNESSES

Marion E Brown

Frances M. Brown

INVENTOR

Benjamin F Radford

by his Attorneys

Brown Bros

(No Model.) 2 Sheets—Sheet 2.

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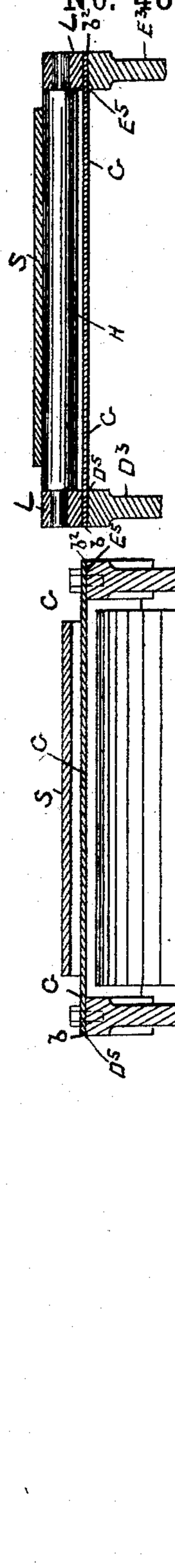

FIG. 3

FIG. 2

WITNESSES
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UNITED STATES PATENT OFFICE.

BENJAMIN F. RADFORD, OF HYDE PARK, MASSACHUSETTS.

BELT-SHIFTER.

SPECIFICATION forming part of Letters Patent No. 483,620, dated October 4, 1892.

Application filed June 15, 1891. Serial No. 396,376. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. RADFORD, a citizen of the United States of America, and a resident of the town of Hyde Park, in the county of Norfolk and State of Massachusetts, have invented a certain new and useful Improved Belt-Shifter, of which the following is a full, clear, and exact description.

This invention relates to the combination, with a pulley, its shaft, and a belt partially surrounding and to drive said pulley or said pulley to drive it, of mechanism substantially such as hereinafter described, whereby, without interference either with the running of the belt or pulley or shaft, or all, the belt can be moved either directly off and held from or allowed to come into contact with the pulley.

In the drawings forming part of this specification, Figure 1 is a vertical transverse section of the shaft and a side view of the pulley fastened on said shaft and of mechanism by which to raise and lower a belt (shown in edge view and broken off at its opposite ends) in relation to the periphery or edge of the pulley. This figure shows the belt as moved off and supported from the pulley and by mechanism which, in substance, constitutes this invention. This mechanism is also shown (dotted lines) out of position for said support and as lying between but away from contact with the opposite end portions of the belt, and in this position of the mechanism the belt would be on the pulley, although not so shown. Fig. 2 is a central longitudinal vertical section, line 2 2, Fig. 1. Fig. 3 is a transverse section in detail, line 3 3, Fig. 1.

In the drawings, A represents a pulley held on a horizontal shaft B, that at its opposite end portions turns in fixed bearing-sleeves C C, suitably supported in any well-known or other proper manner.

D D^2 and E E^2 are collars in pairs at opposite sides of the pulley, and those of each pair placed alongside of each other and each free to turn around on the stationary sleeves C C. Each collar has a radially-extending arm D^3, D^4, E^3, and E^4, respectively, and the outer end of each arm has a similar arc-shaped edge, the edges D^5 E^5 of arms D^3 E^3 only being shown, all concentric with and at equal distances from the axis and slightly beyond the periphery of the pulley, and all are of similar length, and at their opposite ends are equally distant from the central radial line of their respective arms. Said pairs of arc-shaped edges at the same side of the pulley are preferably in the same parallel vertical planes and, as shown, secured by a bend F, Fig. 2, of the several arms.

G G^2 are two plates, each from edge *a* to edge a^2 of an arc shape corresponding to that of the edges of the radial arms, as before explained. Each plate at its opposite ends *b* b^2 is suitably rigidly attached, the plate G to the edges of the radial arms D^3 E^3 and the plate G^2 to the edges of the radial arms D^4 E^4, and thus joined the plates lie across but each at a sufficient distance from the periphery of the pulley to always clear it when they by the swing of the radial arms, joined by them as described, are swung about the sleeves C C of the shaft B. The radial arms D^3 E^3 and D^4 E^4, respectively, and the plates G G^2, joining them, and all otherwise as explained, make, in substance, two similar frames, both capable of being swung about the sleeves of the shaft and in so swinging to have their respective plates G G^2 pass around but above the periphery of the pulley.

H H^2 and J J^2 are respectively two pairs of rollers, a pair to each of said swinging frames. These rollers are located one at each of the opposite ends, and they are severally parallel and extending from side to side of and across the periphery of the swinging frames. Each roller at its opposite ends is arranged to turn in bearing-blocks L, severally suitably secured to the swinging frames and all so that the periphery of the several rollers as the rollers are turned are beyond the bearing-blocks L and their several axes are in a common circle concentric with the axis of the pulley.

M is a chain connecting together the two swinging frames at one side and near the ends *a* a^2 of each which are toward each other. Only one chain M is shown, but two, preferably, are used, one on each side of the two swinging frames. If two chains are used, they should be of corresponding length, and the length shown is such that when the swinging frames are fully separated from each other their central planes are quartering as to the periphery of the pulley; but any length of chain is

proper so long as it will accommodate a location of the swinging frames to insure support by them of the belt out of contact with the pulley when they are brought to suitable position therefor.

N N^2 are similar rings, each suitably—as, for instance, by screw-bolts and screw-nuts—attached to the outer collars D^2 E^2 of the pairs of collars D D^2 and E E^2 at the opposite sides of the pulley. Each ring N N^2 at its outer edge has a series of equidistant sprocket or other suitable projections or teeth N^3 N^4, by which to make suitable mechanical connection, (not shown,) so as mechanically to secure a turn of said sprocket-rings and therethrough a corresponding turn of the swinging frame, of which they make a part, about the pulley and its shaft.

Q is a spur or prong radially projected from the outer collar D^2 at one side of the pulley.

R is a stationary horizontally-projecting stop-pin having suitable support. This stop-pin R is located below and in the same vertical axial plane of the pulley-shaft; and, furthermore, it is situated so as to make at one side R^2 an abutment for the spur or prong Q, before referred to, in one direction of swing of the swinging frame carrying said spur, and at its other side R^3 an abutment for the radial arm D^4, making part of the other swinging frame.

The swinging frames, their chain connection, the radial spur projection Q of one swinging frame, and the stationary stop-pin R, in combination with the shaft B, pulley A of said shaft, and belt S, partially surrounding the pulley, are severally such that with both swinging frames in position to support upon their rollers H H^2 the belt out of contact with the pulley and a swinging frame of one pair of swinging frames at rest by its spur Q, against the fixed stop R, (see full lines, Fig. 1,) by then suitably actuating the sprocket attachments and moving them in the direction of the arrow R^4, Fig. 1—that is, in a direction from the portion of the pulley surrounded by the belt toward the portion of the pulley lying between the opposite end portions of the belt—said swinging frame is first moved toward and brought into contact with the other swinging frame next forward of it, edge a^2 to edge a, during which the chain connecting the frames doubles up and depends, as shown, (dotted lines, Fig. 1,) and then the two swinging frames so joined move as one, until finally their movement is stopped by the then abutment of the radial arm of the then forward swinging frame against the side R^3 of the fixed stop-pin R. In this position of parts the swinging frames are disposed within the space between the opposite end portions of the belt, and thus they are moved from supporting the belt, and their removal, as is obvious, is gradual, and finally being completed the belt is in full contact with the pulley, either to run it or it to run the belt, as the case may be.

The swinging frames are replaced in the positions from which they were moved, as above explained, by moving the swinging frame having the sprocket-wheels N N^2 in the opposite direction to that of arrow R^4, Fig. 1, on which, when the chain connection of the swinging frames has become taut, the other swinging frame is carried along with it until, by the abutment of spur Q against the fixed stop R, the movement of the swinging frames is stopped and they are in positions quartering the periphery of the pulley and having their central radial lines at right angles to each other and that of one swinging frame coincident with the horizontal diametrical plane and that of the other swinging frame coincident with the vertical diametrical plane of the pulley, as shown, Fig. 1. The above-described movement of the swinging frames in its first stages secures a gradual ending in a complete lift of the belt from the pulley and disposition of it lengthwise upon the rollers of said swinging frames, either to then run or to remain at rest thereupon, according as the belt is arranged to act to drive or it is arranged to be driven by the pulley.

From the description given it is obvious that the placing of the belt into and out of running contact with the pulley is secured without the least interference with the movement either of the belt, the pulley, or the pulley-shaft. Again, it is obvious that with the belt in contact with the pulley the mechanism described by which to place the belt out of such contact, as explained, is disposed so as in no way to obstruct or to interfere either with the running of the belt, pulley, or pulley-shaft. Again, while it may be preferable to move the swinging frames by mechanical means (not shown, but which are manifest without being shown or described) engaged with the sprocket-tooth attachment of one of the swinging frames, yet they may be moved by hand. Furthermore, it is plain that many obvious and well-known means not deemed necessary to be shown may be applied to hold the swinging frames in either of their positions described and shown. Neither mechanism to operate the swinging frames through the sprocket-toothed attachment of one of them nor mechanism to hold either or both of the swinging frames in either of their positions described and shown form any part of this invention, and as mechanism suitable for either purpose not only are many, but are well known, it is not deemed necessary either to describe or to illustrate them.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a pulley, its shaft, and belt, of two separate frames each arranged to swing about the axis of said shaft and adapted to cross the periphery of said pulley and a chain connection of said swinging

frames end to end adapted to allow said frames to approach and to recede from each other, as described, for the purposes specified.

2. The combination, with a pulley, its shaft, and belt, of two separate frames each arranged to swing about the axis of said shaft and adapted to cross the periphery of said pulley, a chain connection of said swinging frames end to end adapted to allow said frames to approach and to recede from each other, a prong held on and projected from one of said frames, and a stationary stop located for said prong and for the other of said frames to abut thereagainst but on opposite sides thereof, as described, for the purposes specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

BENJ. F. RADFORD.

Witnesses:
ALBERT W. BROWN,
MARION E. BROWN.