



# UNITED STATES PATENT OFFICE.

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## BELT-TIGHTENING TOOL.

SPECIFICATION forming part of Letters Patent No. 693,182, dated February 11, 1902.

Application filed November 13, 1900. Serial No. 36,407. (No model.)

*To all whom it may concern:*

Be it known that I, HEMAN WARD STONE, Jr., a citizen of the United States, residing at Morris, in the county of Stevens and State of Minnesota, have invented a new and useful Belt-Tightening Tool, of which the following is a specification.

My present invention relates to a novel belt-tightening tool designed with special reference to the tightening of elevator-belts, but equally applicable for the tightening of other forms of belts or of binders of various classes.

The object of the invention is to produce a tool of inexpensive construction embodying a lever the manipulation of which will cause the ends of the belt or binder to be drawn up and automatically retained during the readjustment of the lever, which when operated to further tighten the belt will at the beginning of its movement effect the automatic release of the belt ends and at the opposite limit of its movement will automatically reestablish the connection to prevent loosening of the belt while the lever is being readjusted for further operation.

To the accomplishment of the object stated and others subordinate thereto, as will hereinafter more fully appear, the invention consists in the construction and arrangement of parts to be hereinafter described, illustrated in the accompanying drawings, and defined in the appended claims.

In said drawings, Figure 1 is a perspective view of my tool, showing the parts in the positions they assume at the beginning of the operation. Fig. 2 is a longitudinal sectional view of the subject-matter of Fig. 1, illustrating in dotted lines the positions of the parts after the tightening-lever has been moved a sufficient distance to effect the disconnection of the belt-plates. Fig. 3 is a view similar to Fig. 2, showing the lever after it has been swung a sufficient distance to advance the plates and tighten the belt and showing in dotted lines the manner in which the upper plate moves into engagement with the lower plate to prevent slacking of the belt while the lever is being readjusted for a repetition of the tightening operation. Fig. 4 is a detail perspective view of the male belt-plate. Fig. 5 is a sectional view of a slightly-modified form of my device, in which the stud

when engaged with the female plate is disposed in such angular relation thereto as will permit its disengagement by the movement of the lever from a position approximately at right angles to the plate.

Referring to the numerals employed to designate corresponding parts throughout the views, 1 and 2 indicate the ends of the belt which is desired to be tightened by the use of my tool. The tool comprises three elements—a pair of belt-plates 3 and 4, preferably in the form of elongated metal straps, and the tightening lever 5. The plates 3 and 4 are provided at their outer ends with apertures 6 for the reception of the bolts 7, by means of which the plates are secured to the belt at suitable distances from the point at which it is desired to make the joint or permanently connect the ends of the belt. The normal positions of the plates at the beginning of the operation is such that their inner ends overlap somewhat, as shown in Fig. 1 of the drawings, to enable the retaining-stud 8 of the male plate or member 3 to fit into one of a series of openings 9<sup>a</sup> 9<sup>b</sup> 9<sup>c</sup>, &c., piercing the female plate 4 in spaced relation. In order to elevate the plate 3 somewhat above the face of the plate 4 for the purpose of separating the fulcrum and load points of the lever, as will hereinafter appear, the plate 3 is of slightly angular form, and its inner end is curved toward the plate 4, as indicated at 10, in order that its end edge will constitute a bearing-face 11, resting flat upon the face of the plate 4 and permitting the retaining-stud 8, which extends from the center of the face 11, to be disposed in a plane substantially at right angles to the plates in order that it may engage the openings. At a point somewhat removed from its inner extremity the plate 3 is provided with a longitudinally-disposed slot 12, through which is passed the reduced bearing end 13 of the lever 5. This bearing end is bounded by a straight smooth bearing-face 14, at one end of which is disposed a shoulder 15 and at the opposite end a bearing hook or beak 16, the concavity 17 of which is merged in an inclined edge face 18, between which and the bearing-face 14 the reduced end of the lever is defined.

As shown in Fig. 1, the belt-plates are secured by the bolts 7 to opposite end portions

of the belt, and the retaining-stud 8 is passed into the aperture 9<sup>a</sup>. The bearing end of the tightening-lever 5 is then passed into the opening 9 in the plate 4. The forward end 19 of the slot 12, located a short distance in the rear of the opening 9, will now become the secondary bearing-point of the lever 5, the primary bearing-point of which is formed at the connection between the beak 16 and plate 4. With the parts in this position the bearing-face 14 of the lever will be disposed at an obtuse angle to the plate 4, as shown in Fig. 1 of the drawings. If now the upper end of the lever is grasped by the operator and moved to the position indicated in dotted lines in Fig. 2, the first effect of such movement will be to advance the plates in opposite directions sufficiently to relieve the tension upon the retaining-stud 8, which tension will now be sustained by the lever, and the stud being free will as the lever is moved forward become disengaged from the opening 9<sup>a</sup> to permit further movement of the lever—as, for instance, to the position indicated in full lines in Fig. 3—to draw or tighten the belt sufficiently to advance the retaining-stud 8 to a position over the next opening 9<sup>b</sup>. In this position the angular relation of the bearing-face 14 with respect to the direction of strain imposed upon the plate 3 will be just the reverse of the angular position assumed by said face at the beginning of the operation. Therefore further movement of the lever will urge the plate 3 toward the plate 4 and will cause the bearing-stud 8 to pass into the opening 9<sup>b</sup>. A connection having now been established between the two plates, the belt will be retained against slacking, and the lever may be disengaged from the opening 9 and engaged with the opening 9<sup>a</sup>, which, as we have seen, has just been vacated by the retaining-stud 8. Thus the initial movement of the lever first automatically effects the disengagement of the belt-plates, then urges the plates in opposite directions to take up the slack, the shoulder 15 constituting a stop for preventing undue separation of the plates, and finally automatically effects the reengagement of the plates to retain the belt against slacking while the lever is being readjusted for a repetition of the operation.

I have described my device as applied for the tightening of conveyer or other belts of analagous classes; but it is evident that the device might be used with equal facility in drawing up and securing the ends of metallic bands or ties of various kinds, in which case the peculiarities of construction which have been defined as characteristic of the plates 3 and 4 would be imparted to the ends of the band, the operation of tightening being identical with that heretofore described. For this reason I wish the term "plates" employed in the claims to be understood as comprehending either a pair of separate plates designed for attachment to the ends of the band to be tightened or the ends of the band itself, it

being immaterial whether the plates are separate from or integral with the band which is to be tightened.

In Fig. 5 I have illustrated a slightly-modified form of my device, in which the stud is disposed at such an angle as will permit its disengagement to be effected by the initial movement of the lever from a position substantially at a right angle to the plates, and it is obvious that instead of the lever assuming this right-angular position at the beginning of its movement it might be adapted with equal facility to extend approximately at right angles to the plates at the completion of its movement, in which event the male plate might be moved laterally by hand to effect its reengagement with the female plate.

It will appear from the foregoing that I have invented a simple, inexpensive, and effective tool by means of which a belt, band, binder, or the like may be tightened to any desired extent without other manipulation than such as is necessary to operate a tightening-lever; but while the present embodiment of my invention appears at this time to be preferable it is obviously susceptible of many changes, modifications, and variations respecting both the form and arrangement of the parts. I therefore desire to reserve to myself the right to effect such variations of the illustrated embodiment of the invention as may be suggested by experience and experiment, so long as they are fairly embraced within the scope of the protection prayed.

What I claim is—

1. A belt-tightening device comprising a pair of plates, one of which engages the other to hold the same against relative movement, and a single member for effecting the release of the plates, for moving them in opposite directions, and for effecting their reengagement at a different point.

2. A belt-tightening device comprising a pair of plates, one of which directly engages the other to hold the same against relative movement, and a tightening-lever directly engaging each of said plates to move them laterally for the purpose of effecting their disengagement, to thereafter move the plates longitudinally to tighten the belt, and finally, to effect the reengagement of the plates at a different point.

3. A tightener comprising a pair of plates provided with cooperating retaining means, and a tightening-lever having terminal engagement with one plate and provided with a plain bearing-face engaged by the other plate, whereby the movement of the lever from one angular position will effect the disengagement of the plates and will thereafter move the plates in opposite directions, and in a reverse angular position will cause one of the plates to advance along the inclined bearing-face to effect the reengagement of the plates at an advanced point.

4. A tightener comprising a female plate provided with a series of openings, a male

plate provided with a lateral projection designed to engage said openings, and also provided with a slot, and a tightening-lever passed through the slot and having a plain bearing-face sustaining the strain upon the male plate and provided with a terminal beak engaging an opening in the female plate, whereby the initial movement of the lever will cause the male plate to recede from the female plate to effect the withdrawal of the projection, and whereby the reengagement of said projection is effected by such movement of the lever as will establish a reverse angular relation of the bearing-face to cause the male plate to approach the female plate.

5. A tightener comprising a female plate provided with a series of openings, an angular male plate provided with a curved end having a retaining-stud extending toward the female plate, said male plate being provided with a slot, and a tightening-lever provided with a terminal beak engaging an opening in the female plate and having a plain bearing-face opposed to the end wall of the slot of the male plate and terminating in a shoulder designed to limit the movement of the male plate in one direction.

6. A tightener comprising a pair of plates provided with cooperating retaining means, a tightening-lever arranged to move the plates both laterally and longitudinally to cause the tightening of a belt and to effect the dis-

engagement and reengagement of the retaining means, and means carried by the lever for limiting the lateral movement of one of the plates.

7. The combination with a pair of plates, of a tightening-lever designed to constitute the sole tightening member and provided with a beak for engagement with one of said plates, and with a plain bearing-surface terminating in a shoulder designed to limit the lateral movement of the other plate.

8. A belt-tightening device comprising a pair of plates disposed for direct engagement with each other, and a tightening device engaging one plate and having a plain face in engagement with the other plate, said face being disposed at an angle to cause said last-named plate to slide upon said face to effect the disengagement of the plates during the initial movement of the device, and said face being disposed at a different angle during the final movement of the tightening device to cause the reengagement of the plates at a different point.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HEMAN WARD STONE, JR.

Witnesses:

R. A. STONE,  
H. H. WELLS.