

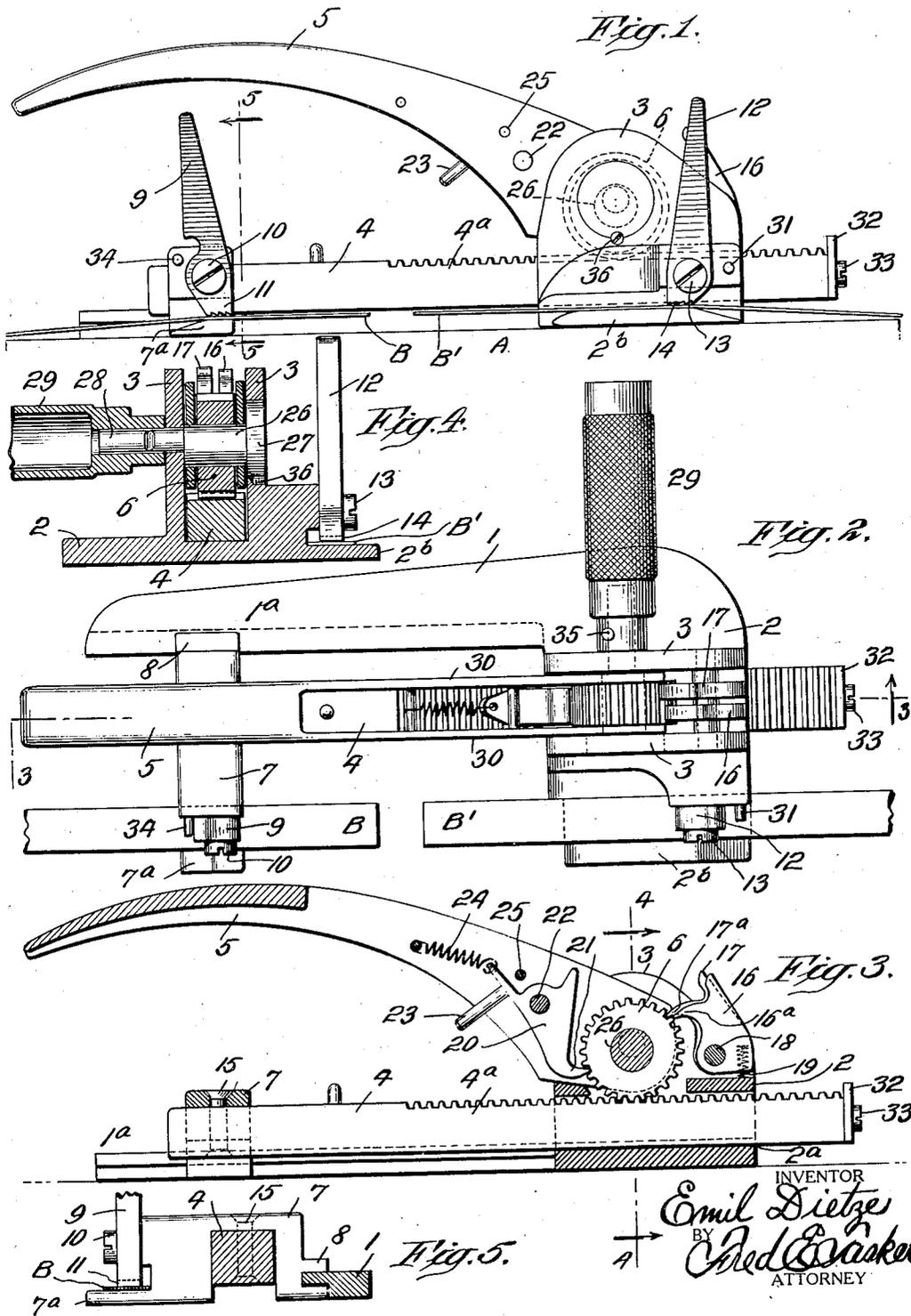
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TIGHTENER FOR PACKAGE BANDS, STRAPS, AND THE LIKE

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TIGHTENER FOR PACKAGE BANDS, STRAPS, AND THE LIKE.

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To all whom it may concern:

Be it known that I, EMIL DIETZE, a citizen of the United States, and resident of Richmond Hill, borough of Queens, in the county of Queens, city and State of New York, have invented certain new and useful Improvements in Tighteners for Package Bands, Straps, and the like, of which the following is a specification, reference being had therein to the accompanying drawing.

My present invention has reference to certain new and useful improvements in box-strap applying machines having for their object the stretching of straps or wires around boxes or packages of various kinds, in order that the metallic or similar band, or like device, may be drawn or pulled taut prior to the fastening of the ends, as well as maintaining such band or bands in position during the fastening thereon, it being necessary to bind these bands tightly around the package and hold them securely while the ends of the bands are being united by the attachment thereto through the medium of a press of a seal, sealing device, or other fastening or holding device, which will prevent any tampering with the package and any attempt to pilfer or rifle the contents of the same. The interlocking of the seal or fastening plate or the like, with the overlapping ends of the metallic band or bands is obtained with a minimum amount of labor and in a more secure and effective manner than is usual with other machines for a similar purpose. The invention, therefore, consists essentially, with this and other objects in view, in the construction, combination and arrangement of the various parts and in numerous peculiarities and modifications of the same, substantially as will be hereinafter described and claimed.

In the accompanying drawing illustrating my invention:

Figure 1 is a side elevation of my improved device for tightening straps, wires, etc., around boxes, bales and packages in order that the ends of said straps or bands may be interlocked securely by seals or sealing means.

Figure 2 is a top plan view of the same.

Figure 3 is a vertical longitudinal section on the line 3, 3, of Figure 2.

Figure 4 is a vertical cross section on the line 4, 4, of Figure 3.

Figure 5 is a cross section on the line 5, 5, of Figure 1.

Similar characters of reference designate corresponding parts throughout the different figures of the drawing.

The main frame 1 of the machine is simple, small, flat, and preferably skeleton-like, having a general Γ -shape and with an elongated horizontal bar 1^a serving as a straight guide in which a rack bar 4 slides, and having also an angular head 2 provided with parallel upright lugs 3, 3, which furnish bearings for the stationary pin 26; said head 2 having also a horizontal guide passage 2^a (see Figure 3) through which the rack bar 4 having rack 4^a reciprocates during the operation of the machine.

In the upright lugs 3 is a handle pivot 26 which carries the gear wheel 6 loosely mounted thereon, the teeth of which engage with the teeth 4^a of the rack bar 4 while the wheel 6 is revolvable under the influence of a dog 20 carried by the operating handle 5, said handle 5 having its inner end split or forked to provide parallel members 30, 30, which are perforated to allow the pin 26 to pass through them so that these members and also the handle 5 may thereby be loosely mounted on the pin 26 and be movable up and down thereon.

The stationary pin 26 has at one end a disc 27 set in a circular opening in one of the lugs 3 and held in any position to which it may be adjusted by means of the screw 36, while the other end of the pin 26 is formed integral with a pin section of smaller diameter 28 which passes through an opening in the other lug 3. On the pin member 28 and secured thereto by means of a screw or similar device 35 is a horizontal handle for holding the whole machine in the proper position during its work and manipulating it in the manner required for enabling it to perform its proper function. The pin section 28 is eccentric to the pin member 26 and also the disc 27 is eccentric to pin 26, the eccentricity in the relationship of these parts enabling a readjustment of the teeth of the gear wheel 6 with relation to the teeth 4^a of the rack member, not only in the original

assembling of these parts for use, but in taking up wear, etc., so as to allow the operation to be as accurate and certain as may be possible.

5 The dog 20 has a tooth 21 which is adapted to engage with the teeth of the gear wheel 6 and this dog is pivoted by means of a pin 22 between the parallel arms or members 30 of the operating handle 5, as clearly shown in Figure 3. A spring 24 is attached to one end of the dog 20 and also to the handle 5, the function of the spring being to pull the tooth 21 into engagement with the teeth of the gear wheel. Further, the dog 20 has a handle 23 by which the tooth 21 can be lifted out of engagement with the teeth of the gear wheel 6. In such lifting the spring-provided end of the dog strikes against a stop 25 to keep it from going back too far. On the side of the gear wheel itself, opposite to where the dog 20 is situated, I arrange a pair of retaining pawls, two or more, there being two shown in the present example of the invention, 16 and 17, the pawl 16 having a tooth 16^a and the pawl 17 having a tooth 17^a, which teeth 16^a and 17^a engage with the teeth of the gear wheel 6 and firmly hold the same from any backward rotation after it has gradually rotated in a forward direction by means of the action of the dog 20 resulting from a forward and downward movement of the handle 5. It will be also observed that these retaining pawls 16 and 17 are provided with springs 19 for keeping them pushed forward with their teeth in engagement with the teeth of the gear wheel 6 and that they are mounted upon a horizontal fixed pin 18 which is carried in the lugs 3, 3, at a suitable point adjacent to gear wheel 6 and above the rack 4.

It will be evident that when the handle 5 is elevated from the position shown in Figure 3 the dog 20 will slip idly over the teeth of gear wheel 6 and then, when the handle 5 is pressed forward and downwardly, the tooth 21 of dog 20 will engage one of the teeth of the gear wheel 6 and as the movement of the handle continues downward the gear wheel will be rotated and the result of such rotation, in view of the fact that the gear wheel is in engagement with the teeth 4^a of the rack 4, will be to horizontally move said rack. The gear wheel 6 will be held in each segment of its rotation, as just explained, by means of the retaining pawls 16 and 17, and a plurality of pawls is specified as employed in order that shorter segments of motion may be controlled and secured, it being evident, as indicated in Figure 3, that when one of the pawls engages between two teeth, the other pawl will be in contact with the outer edge of one of the teeth, so that half movements, or move-

ments equal to one-half of the space between two teeth will be caught and securely held, thus enabling the tightening of the metallic bands to be effected within a finer movement than if it were necessary to always revolve the gear wheel a full tooth.

The rack bar 4 carries a horizontal bar 7 having an angular groove 8 in one end thereof which loosely engages the straight edge 1^a of the frame 1, as clearly shown in Figures 2 and 5, such right-angled bar 7 being firmly secured to the rack 4 by means of a screw or similar device 15. Further, the rack has at one end a stop 32 secured by a screw 33 and at another suitable point may be provided with a pin or stop to limit its movement in the other direction, these stops easily striking against the ends of the guide channel 2^a as the rack is moved in one direction or the other.

In order to show the practical application of the machine for pulling the two ends of the strap toward each other and causing them to overlap each other and holding them while the seal or sealing device is being applied to the overlapped ends, I have indicated in outline at A a box or package around which passes a strap or band having its two ends B and B¹ shown closely contiguous to each other. The machine is applied to these two ends for the purpose of pulling them toward each other and causing them to overlap. In Figures 1 and 2 it will be seen how the machine is related to the two ends of the band. It should be further explained that the head 2 of the main frame is provided with a clamp 12 pivotally mounted thereon by means of a pivot 13; and the cross bar 7 which is carried by the rack 4 near its outer end is provided with a similar clamp 9 pivotally mounted thereon by means of a pivot screw 10. The lower end of clamp 9 has serrated teeth 11 and the lower end of clamp 12 has serrated teeth 14. The clamp 9 is designed to securely hold the end B of the strap between its teeth 11 and the foot or ledge 7^a of the cross piece 7, while the clamp 12 is designed to securely grasp and hold the other end B¹ of the strap between its teeth 14 and the foot or ledge 2^b of the head 2, all as clearly shown in Figure 1. When the machine has been so applied to the two ends of the strap and these two ends are securely grasped between the clamps, it can then be operated for the purpose of drawing the ends B and B¹ toward each other, it being noted that the clamps 9 and 12 are so applied to the ends B and B¹ that the clamping effect of such clamps on the ends will increase as the pulling operation proceeds instead of loosening as might be the case if they were otherwise applied. Contiguous to the clamp 12 is a pin 31 acting as a stop and near the clamp

9 is another pin 34 acting as a stop, against which the lever ends of these clamps drop when they are released from action.

I will now proceed to describe the operation of the machine in drawing the ends B and B¹ together after the various mechanical parts have been effectively related to these ends for the purpose, as I have just suggested. The clamps 9 and 12 are assumed now to be in the position shown in Figure 1. The manipulation of the handle 5 serves to pull one of the clamps toward the other and thus bring one of the ends of the band or strap toward the other until it finally overlaps the same. The handle 5 being in an elevated position at the time that the clamps are caused to engage the strap ends, it will then be depressed downwardly toward the main frame and as the dog 20 is in engagement with the gear wheel 6 during such downward movement of the handle, the result will be to rotate the gear wheel more or less and this will actuate the rack bar 4 more or less and draw the clamp 9 and the end of the strap carried thereby toward the other clamp and toward the other end of the strap, for this movement of the rack bar 4 will be toward the right when the parts are in the position shown in Figures 1 and 3. As the wheel 6 is thus rotated the holding pawls 16 and 17 will be slipping over the teeth of the same and firmly preventing any return rotation of the gear wheel, one of the pawls dropping behind each tooth as the wheel rotates while the next pawl rests for a moment on the end of the tooth and then drops behind it, and so on. When the lever 5 has been depressed as far as practicable it may then be elevated, for the dog 20 will slip idly over the teeth of the gear wheel during such lifting and then the handle 5 can again be depressed and the wheel given another impulse of rotation and this can be continued until the strap has been tightened as much as is desirable or possible and the ends thereof have been overlapped as much as is desired. The handle 5 may then be lifted far enough so that a seal press can be introduced beneath it for the purpose of applying a seal or sealing plate or some kind of sealing means to the overlapped ends of the strap for the purpose of firmly uniting them. Many forms of seal press for this purpose may be used and it may operate upon seals that are widely diversified in character, being sometimes lead, sometimes tin or other metal, etc. In so lifting the handle 5 to allow the seal press to be operated it should be observed that the lifting will not be far enough for the top edge of the dog 20 carried by handle 5 to strike against the pawls 16 and 17 and release the same, for it is necessary that these pawls should maintain their engagement with the

gear wheel until after the seal has been applied in order that there may be no loosening of the strap ends; but after the ends B, B¹, have been interconnected and it is desired to remove the tightener device from the band or strap, the handle 5 will be thrown upwardly and backwardly far enough so that the heel of pawl 20 will strike against the heels of pawls 16 and 17. The heels of these pawls 16 and 17 are so shaped that when the handle 5 is lifted up hard all the way and the heel of pawl or dog 20 is in engagement with the heels of pawls 16 and 17, these pawls 16 and 17 will disengage tooth 21 of pawl 20 from the gear 6. The pawl 20 then is brought to a stop by striking pin 25, and then the pawls 16 and 17 become disengaged from the gear by pawl 20 acting against same. After this the clamp levers 9 and 12 may be moved in a direction the reverse of that which gives their jaws clamping action, thereby releasing the same and allowing the machine to be removed from the strap. Then by laying hold of the rack bar 4 on the outer end thereof said bar, which has been previously pushed toward the right, can now be pulled freely toward the left in order that the gear wheel 6 may be in the position to act during its next operation upon substantially the full length of the rack 4^a during the pulling operation. A handle 23 enables the dog tooth 21 to be disengaged from the gear wheel 6 in order that the handle 5 may be moved as desired during the use of the device.

Many changes in the precise details of the construction and arrangement of the various parts may be made without exceeding the scope of the invention. It is not absolutely necessary that the stationary pin 26 on which the gear wheel 6 loosely revolves and on which the lever 5 swings should be eccentrically related to the pin section 28 and the disc 27, for it is obvious that these parts may be concentric and that a single pin in lieu of several sections may be employed and also that the pivoting of the gear wheel and the handle may be widely changed from that shown and described, it being only essential that the gear wheel should be so arranged with the rack bar that it can actuate the same under the impulses of rotation imparted thereto by the oscillation of the handle. Furthermore, in some constructions it may be found desirable to omit one or more of the retaining pawls, for the same result can be secured when the eccentric disc is employed by turning the handle 5 and after the removal of the screw 36 allowing the disc 27 to revolve in its bearing, the effect of which, due to this eccentric connection with the pin 26, will be to lift the teeth of the gear wheel 6 temporarily out of engagement with the rack 4^a, whereby the

latter will be set free and can be drawn back into position for the next operation. Further, there may be as many or as few of these retaining pawls as desired, arranged so as to engage a part of the gear teeth or the whole of the same or a fraction of the distance between two teeth, so as to actuate the movement of the gear wheel to a nicety and allow the drawing effect upon the parts of the strap to reach the maximum of efficiency, so that the strap will be positioned as tightly as possible around the bale, crate, or other package. Other changes in the proportions and relations of the parts may also be made and it is unnecessary to specify the same in detail.

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

1. In a tightener device for package straps, the combination with a pair of clamps, each consisting of a pivoted arm formed with a jaw, for engaging the adjacent end of a strap, of a frame on which one of the clamps is supported, a traveling bar sliding on said frame and carrying the other clamp, said bar having a rack, a gear wheel mounted in the main frame, and an oscillatable handle, together with a pivoted dog thereon engaging the gear wheel and having a heel projection, and retaining means for holding the gear wheel in its rotated position consisting of pawls located half a tooth of said gear wheel apart and having heel projections engaged by the heel of the dog device when the handle is lifted clear back for the purpose of releasing the pawls, together with a positive stop for the dog.

2. In a tightener device for package straps, the combination with a pair of clamps, each consisting of a pivoted arm formed with a jaw, for engaging the adjacent ends of a strap, of a frame on which one of the clamps is supported, a traveling bar sliding on said frame and carrying the other clamp, said bar having a rack, a gear wheel mounted in the main frame, and an oscillatable handle, together with a pivoted dog thereon engaging the gear wheel and having a heel projection, a positive stop for the dog, a spring connecting the dog with the handle, and retaining means consisting of pivoted spring pawls engaging the gear wheel and located half a tooth of said gear wheel apart and having heel projections engaged by the heel of the dog when the handle is lifted to release the pawls.

3. In a tightener device for package straps, the combination of a pair of clamps for gripping adjacent parts of a strap, and means for drawing these clamps toward each other to cause an overlapping of the strap sections, said means including a gear mechanism, a traveling bar carrying one of the clamps, an oscillatable handle, a dog pivoted to said handle and having a heel projection, a pair of pivoted retaining pawls engaging the gear mechanism and located half a tooth of said gear mechanism apart and having heel projections engaged by the heel of the dog device when the handle is lifted backwardly for the purpose of releasing the pawls, together with a positive stop for the dog.

4. In a tightener device for package straps, the combination of clamps adapted to be applied to parts of a strap, a frame on which one of the clamps is mounted, a bar sliding on the frame, a revoluble gear wheel, an operating handle for actuating the movable member, a pivoted dog on said handle having a heel projection, pivoted spring-provided retaining means consisting of a pair of pawls engaging the gear wheel and located half a tooth of said gear wheel apart and having heel projections engaged by the heel of the dog device when the handle is lifted during the releasing operation, together with a positive stop for the dog and spring means for keeping the dog normally in active relation to the other parts.

5. In a tightener device for package straps, the combination with a pair of clamps, each consisting of a pivoted arm formed with a jaw, for engaging the adjacent ends of a strap, of a frame on which one of the clamps is supported, a traveling bar sliding on said frame and carrying the other clamp, said bar having a rack, a revoluble gear wheel mounted in the main frame, and an oscillatable handle, a dog pivoted on said handle and having a heel projection, a pair of retaining pivoted pawls engaging the gear wheel and located half a tooth of said gear wheel apart and provided with springs and having heel projections, which latter are engaged by the heel of the dog device during the releasing operation when the handle is lifted all the way back, together with a positive stop for said dog.

In testimony whereof I hereunto affix my signature.

EMIL DIETZE.