April 10, 1928. 1,665,323

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APPARATUS FOR TENSIONING AND SEALING METAL BANDS AROUND PACKING CASES AND OTHER PACKAGES

Filed Feb. 17. 1926 2 Sheets-Sheet 1

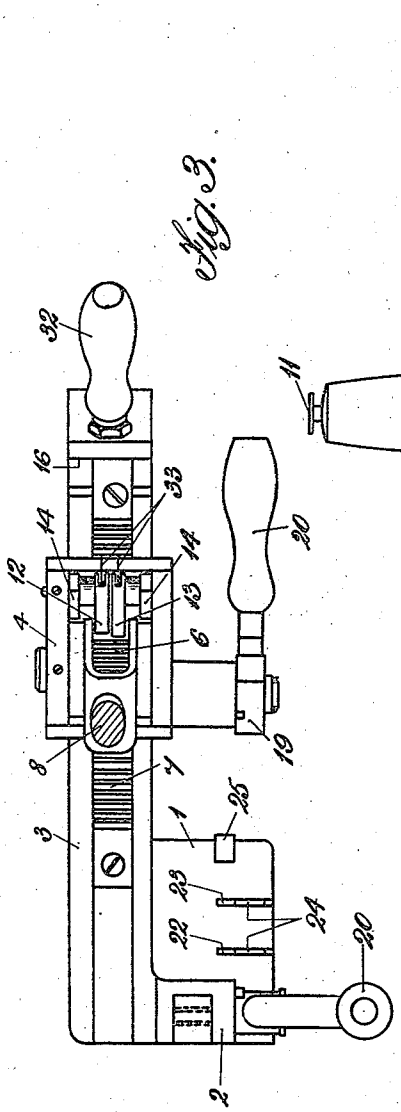


Fig. 3.

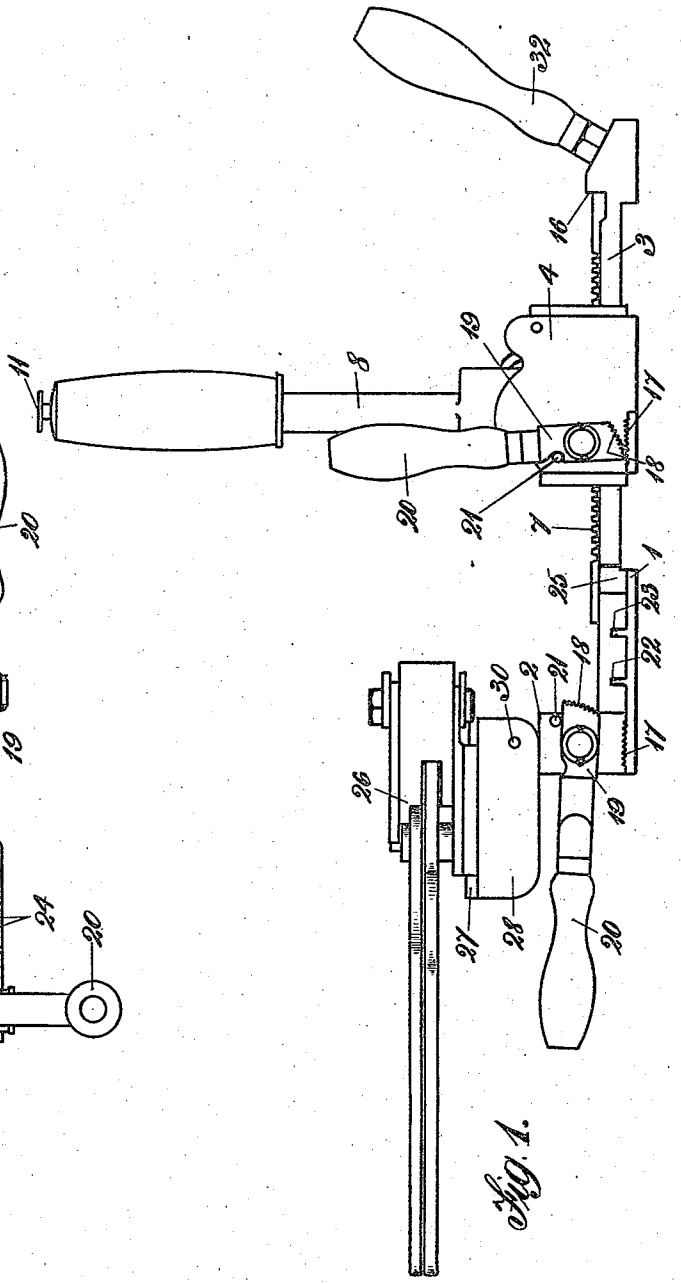


Fig. 1.

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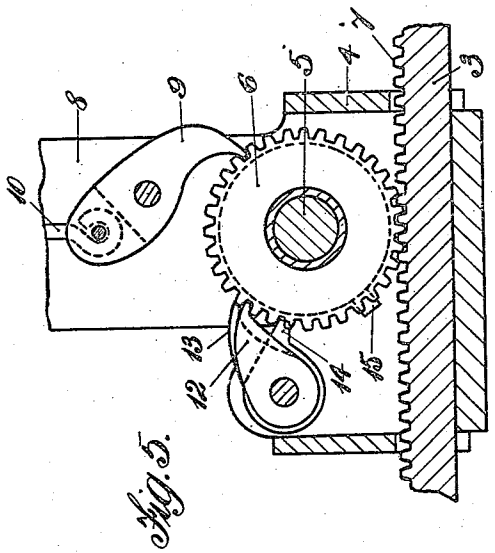


Fig. 5.

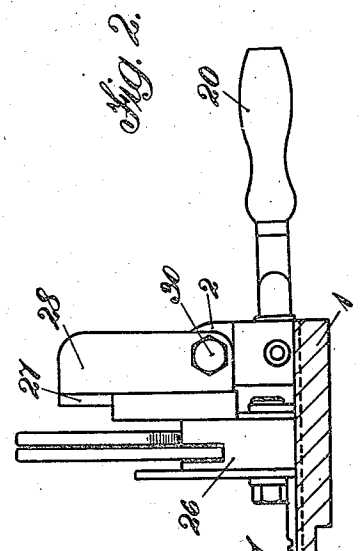


Fig. 2.

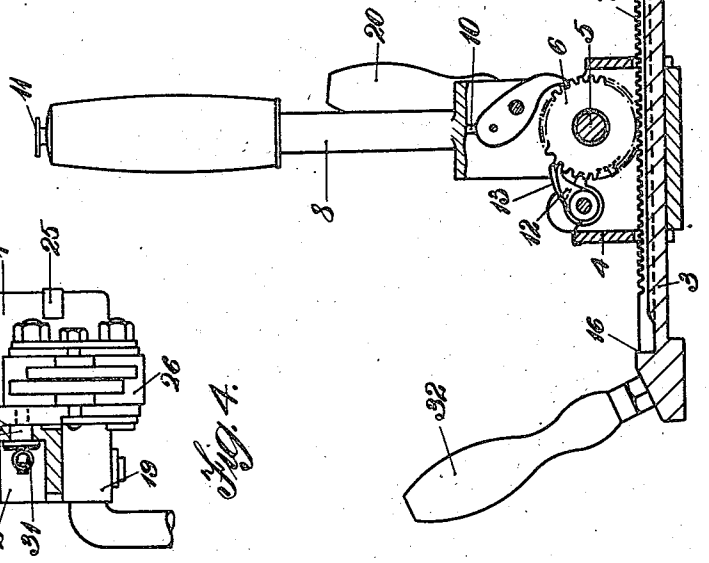


Fig. 4.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TENSIONING AND SEALING METAL BANDS AROUND PACKING CASES AND OTHER PACKAGES.

Application filed February 17, 1926, Serial No. 88,945, and in Great Britain April 9, 1925.

This invention relates to apparatus for tensioning and sealing metal bands around packing cases and other packages.

Apparatus according to this invention comprises a fixed band gripping jaw and movable band gripping jaw adapted to be fed towards the fixed jaw to tension the band, and sealing mechanism movably mounted to swing in the same plane as the band so that it can be moved into position to seal the overlapping ends of the band after tensioning. The tensioning is effected by any mechanical arrangement suitable for causing objects to approach in straight line such as a rack and pinion and ratchet lever and the sealing mechanism, which is preferably of the kind described in Patent No. 1,474,207, is conveniently pivoted over one gripping jaw on an axis transverse to the direction of the band and also slidable in a direction perpendicular to the pivot axis, so that for sealing the mechanism is swung round over the overlapping ends of the band and then slid down so as to move in proper position in relation to the band.

Means are provided for holding the overlapping ends of the band in such a position that an effective joint can be made with a sealing strip by means of the sealing mechanism without it being necessary for the operator to hold the overlapping ends in position or for him to feed the band through the sealing strip. These means can take the form of one or a plurality of guide pieces attached to the base plate, or with a thick base plate of suitable raised portions left by cutting away portions of the plate. Alternatively guide pieces can be attached to either or both jaw carriers or gripping pawls. It may be found desirable to use some combination of the foregoing methods to achieve satisfactory results.

However accurately the band gripping jaws are made there is a danger of the projecting ends getting distorted either so that an edge is no longer in one plane or so that one edge of one projecting end is at a different height to the other edge of that projecting end. In either case there is a danger of the joint being improperly made. Perpendicular surfaces are used to prevent the first form of distortion. They may be placed on the inner side of the band on either or both sides of each pawl gripping device or on each side of the band. In the latter case the outside guide pieces must be movably mounted to allow of the apparatus being removed after the joint has been made. Such movable guide pieces may be rigidly attached to the gripping pawls or they may be spring mounted. The second form of distortion of the projecting ends is overcome by pressing the sealing plate of the sealing mechanism on the top side of the upper projecting end of the band and forcing both projecting ends down until the bottom surface of the lower projecting end is brought into contact with the horizontal surface of one or more guide pieces.

The sealing strip may be inserted in the jaws of the sealing mechanism prior to the latter being brought into action. It may be found more convenient to place the sealing strip over the overlapping ends in which case vertical surfaces perpendicular to the edge of the band are used. These are so placed that when the seal is placed in position, the jaws of the sealing mechanism can only be brought down centrally over it.

It is important that the projecting ends of the band shall not be raised unnecessarily high in order that the reduction in tension shall not be excessive on the removal of the apparatus; but that they shall be high enough to allow for the free rotation of the projecting edges of the sealing strip during the operation of wrapping them round the band.

An embodiment of the invention is shown by way of example in the accompanying drawings, in which—

Figure 1 is a front view of the apparatus with the sealing mechanism in the out of use position.

Figure 2 is a rear view, partly in section of the apparatus with the sealing mechanism in the operative position.

Figure 3 is a plan view of the apparatus, with the sealing mechanism removed.

Figure 4 is a detail plan view, partly in section, of the sealing mechanism, and

Figure 5 is a detail view, partly in section, on an enlarged scale, of the ratchet mechanism.

The apparatus comprises a base plate 1 provided with an upstanding bracket 2 and carries by one end a guide member 3. A carriage 4 is slidably mounted on the guide member 3 and carries on a spindle 5 a pinion 6 meshing with a rack 7 cut in or secured to the guide member 3. A bifurcated hand lever 8 is also pivoted on the spindle 5 and carries a pivoted pawl 9 arranged so that the lever can turn the pinion 6 in such a direction as to feed the carriage 4 towards the bracket 2. The pawl 9 is normally pressed against the pinion 6 by the action of a spring (not shown) on a rod 10 which passes through the hand lever 8 and terminates in a knob 11 which on depression causes the pawl to be lifted out of engagement with the pinion. The carriage 4 is provided with a pair of pawls 12, 13, pressed by springs 33 against the pinion 6 so as to hold the carriage 4 in the position to which it has been fed by the hand lever. The pawls 12, 13, are of different lengths their operative ends being a half (or one-and-a-half, or two-and-half etc.), tooth pitches apart, in other words for a given spacing, the teeth may be made twice as strong as for a single pawl. This arrangement may be modified by the provision of more than two pawls with their operative ends suitably spaced. The pawls 12, 13, are provided with shoulders 14 which are engaged by projections 15 on the hand lever when it is moved to the end of its movement, thus lifting the pawls 12, 13 out of engagement with the pinion and allowing the carriage to be slid back to the outer end of the guide where it is checked by a shoulder 16.

Band gripping jaws are provided on the bracket 2 and the carriage 4. These jaws are of the usual construction, consisting of a fixed serrated surface 17 and a curved serrated surface 18 on a pivoted member 19 provided with a handle 20, the contours of the serrated surfaces being arranged so that the tension of the band automatically tightens the grip. Stops 21 prevent the serrated surfaces from being accidently jammed and damaged. The jaws are arranged in line and at equal distances from the guide 3 so that when the hand lever 8 is operated the ends of a metal band gripped in the jaws will be fed towards one another in alignment.

Upon the base plate 1 are a pair of guides 24 at a distance apart equal to the length of the seal. The guides project above the surface of the base plate so that the overlapping ends of the band form a bridge of sufficient height to permit the jaws of the sealing mechanism to wrap the sealing strip round the band while the sealing operation takes place. The length of the guides is greater than the width of the band and they are stepped at 22 and 23 (Figure 3) so as to centre the ends of the band and to allow the sealing jaws to pass over them and make a proper joint even if there is a tendency for the projecting ends of the band to be out of the central position. The perpendicular stop 25 also aids in centering the band.

The stepped ends 22 and 23 of the guides 24, beyond the width of the band, ensures the sealing strip being properly centred in the sealing jaws longitudinally of the band, since this prevents the unclosed sealing strip from sliding along the band. The sealing strip may either be placed in position on the band and the sealing mechanism brought down on to it, or it may be held in the jaws of the sealing mechanism before they are brought down on to the band. One of the guides may be made slightly higher than the other to ensure that one end of the band passes above the other when tensioning is effected. In an alternative construction where a thick base plate is used, the guides may be formed by removing portions of the base plate. The guiding surfaces are adapted to regulate the height of the projecting ends of the band so that clearance below the band is left for the rotation of the projecting edges of the sealing strip in the operation of wrapping the ends of the band. The sealing mechanism 26 which is preferably of the kind described in prior Patent No. 1,474,207 of Nov. 13, 1923, is slidably carried on guides 27 on a bracket 28 and held on the bracket by a headed pin 29 passing through a slot in the bracket. The bracket 28 is pivoted to the bracket 2 by a horizontal pin 30 transverse to the band and is shaped so that it can move through 90° from a horizontal position to a vertical position. When in the vertical position (Figures 2 and 4) the sealing mechanism can be slid down into the operation position against the action of a spring 31. Sealing is effected by the movement of the jaws 26 transverse to the band as fully described in the above patent. When the sealing mechanism is folded into the horizontal position, as in Fig. 1, it aligns with the sealing band and can be placed in a narrow clearance on the end of a packing case.

The procedure in tensioning and sealing a band around a package may be as follows. The carriage 4 is moved out to the outer end of the guide member 3 and the apparatus stood on the packing case or other package.

The end of the band drawn from a coil is passed round the package and gripped in the jaw on the upstanding bracket 2 with a sufficient length standing out to span the gap for the sealing jaws. The band is then gripped in the second jaw and tensioned by operating the hand lever 8 and the band cut from the coil. A seal is then placed in position. Finally, the sealing mechanism 26 is moved into position and the ends of the band sealed. During the operation of sealing the machine is held by the handle 32. The gripping jaws may then be released and the apparatus removed.

What I claim is:—

1. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a second band clamp slidable on said base, means for causing said slidable clamp to be fed towards said fixed clamp, guiding means for maintaining the ends of the band in correct lateral position for sealing and of such a height as to allow of the projecting edges of the sealing strip being wrapped around the overlapping ends of the band before the operation of deformation and sealing mechanism mounted adjacent to one of said clamps so as to enable it to be moved down on to the band.

2. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a second band clamp slidable on said base, means for causing said slidable clamp to be fed towards said fixed clamp, notched guides on said base member adapted to receive and laterally guide the ends of the band and of such a height as to allow of the projecting edges of the sealing strip being wrapped around the overlapping ends of the band before the operation of deformation and sealing mechanism mounted adjacent to one of said clamps so as to enable it to be moved down on to the bands.

3. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a second band clamp slidable on said base, means for causing said slidable clamp to be fed towards said fixed clamp, a guide member pivoted to said base on a pivot transverse to the plane of the metal bands adjacent to one of said clamps, and sealing mechanism slidably carried on said guide member.

4. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a second band clamp slidable on said base, means for causing said slidable clamp to be fed towards said fixed clamp, guiding means for maintaining the ends of the band in correct lateral position for receiving the seal strip, a guide member pivoted to said base on a pivot transverse to the plane of the metal bands adjacent to one of said clamps, and sealing mechanism slidably carried on said guide member.

5. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a rack thereon, a carriage slidable on said base, a band clamp on said carriage, a pinion pivoted on said carriage meshing with said rack, a lever pivoted on said carriage, ratchet means connecting said lever with said pinion, and sealing means positioned on a vertical guide embodied in said apparatus and pivotally connected with said base member for movement into a plane parallel to the metal bands.

6. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a rack thereon, a carriage slidable on said base, a band clamp on said carriage, a pinion pivoted on said carriage meshing with said rack, a lever pivoted on said carriage, ratchet means connecting said lever with said pinion, a plurality of pawls pivoted on said carriage having their operating ends bearing on said pinion spaced apart at fractional lengths of the pinion tooth pitch, and sealing means pivoted adjacent to one of said clamps.

7. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a rack thereon, a carriage slidable on said base, a band clamp on said carriage, a pinion pivoted on said carriage meshing with said rack, a lever pivoted on said carriage, ratchet means connecting said lever with said pinion, pawl means on said carriage adapted to prevent reverse rotation of said pinion, a stop on said lever adapted to disengage said pawl means when in its extreme position, and sealing means pivoted adjacent to one of said clamps.

8. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a rack thereon, a carriage slidable on said base, a band clamp on said carriage, a pinion pivoted on said carriage meshing with said rack, a lever pivoted on said carriage, ratchet means connecting said lever with said pinion, a plurality of pawls pivoted on said carriage having their operating ends bearing on said pinion spaced apart at fractional lengths of the pinion tooth pitch, an operating rod in said lever for disengaging said ratchet means, a stop on said lever adapted to disengage said pawls when in its extreme position, notched guides on said base member adapted to receive and guide the ends of the band, a guide member pivoted adjacent to one of said clamps, and

sealing mechanism slidably carried on said guide member.

9. Apparatus for tensioning and sealing metal bands around packages comprising a base member, a fixed band clamp thereon, a second band clamp slidable on said base, means for causing said slidable clamp to be fed towards said fixed clamp, a guide member pivoted to said base member adjacent one of said clamps, a sealing mechanism slidable on said guide member and means for retracting said mechanism on said guide, said sealing mechanism being movable on said pivot from a vertical plane into a plane parallel with the metal bands.

In testimony whereof I have signed my name to this specification.

ARTHUR CHARLES PAYNE.