

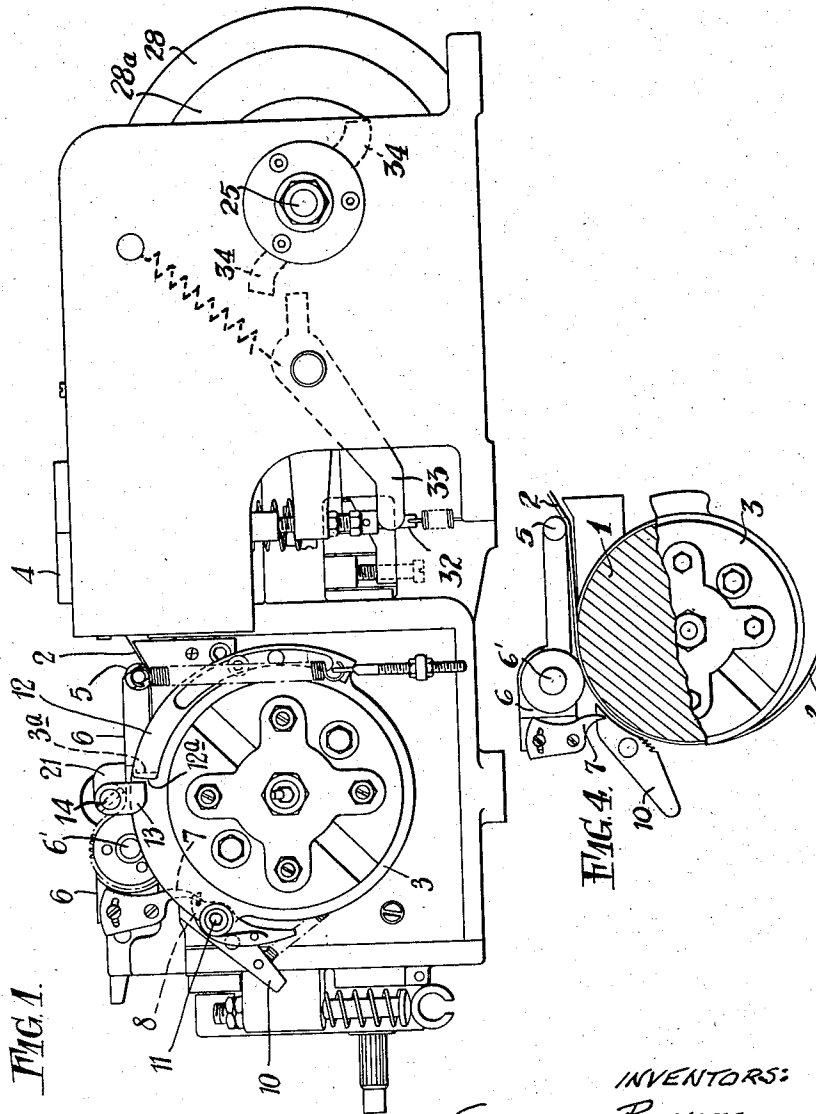
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S. PARKES ET AL
PACKAGING MACHINES

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3 Sheets-Sheet 1



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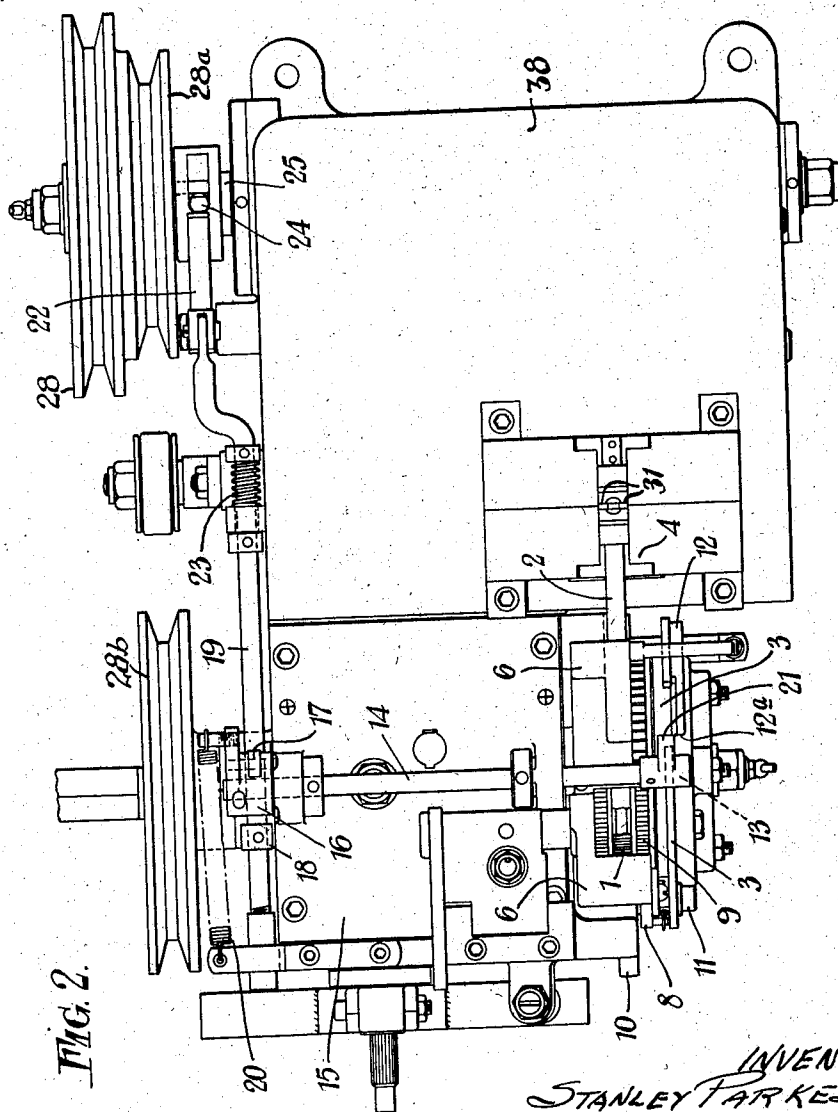


Fig. 2.

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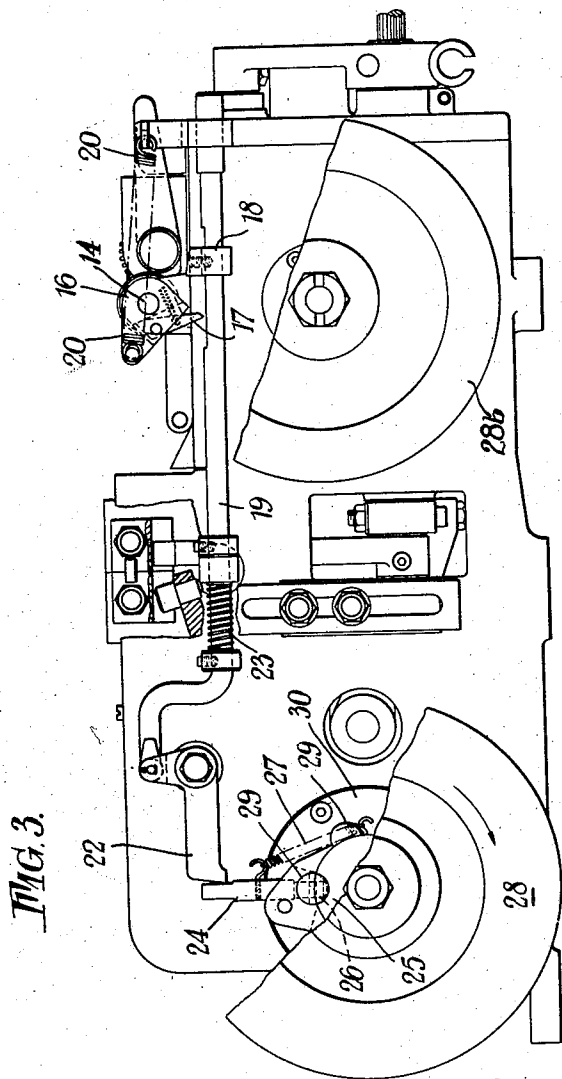
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PACKAGING MACHINES

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Application December 13, 1954, Serial No. 474,738

Claims priority, application Great Britain
December 16, 1953

2 Claims. (Cl. 100—29)

This invention relates to packaging machines of the kind in which a metal strand is tensioned around a package and is joined at its ends by power operated means.

The invention is especially concerned with the provision in such machines of mechanism by which the sealing or tying means is put into operation automatically.

According to the invention a packaging machine of the kind referred to is provided with means to apply an initial tension to the metallic strand, means operated by the attainment of this initial tension to initiate operation of a final tensioning mechanism and means triggered by the attainment of a pre-set movement of the final tensioning mechanism to initiate operation of the power operated strand joining means.

In the case of a machine using flat metal band both the initial tensioning and final tensioning may be applied by a power operated drum engaging the band and the attainment of the initial tension may be employed to put the triggering means into driving relationship with the drum.

A further feature of the invention lies in the mechanism employed to start the motion of the strand joining means. This comprises a gib applied to a collar on a spring loaded bar which controls a latch operating a rotary key between a rotating fly wheel and a normally stationary cam-shaft. The detent is operated by a cam carried by the tensioning drum when the final tension is achieved so as to shift the bar against spring pressure and engage the rotary key between fly wheel and camshaft.

In a preferred arrangement the pawls are restored to their initial position after a single revolution by the cam-shaft, and an over-centre spring arrangement is used to clear the gib from the collar on the bar. The position of the gib is restored to the operating side of the collar when the machine is next used, when a length of strand is fed out preparatory to securing a package.

The above and other parts of the invention are embodied in a preferred constructional form of mechanism for initiating a seal forming operation on a flat band type of packaging machine which will now be described in some detail by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a front elevation of a machine embodying the invention,

Fig. 2 is a plan view of the machine,

Fig. 3 is a rear elevation of the machine, and

Fig. 4 is a side view, partly in section, of the drum, band, and the means for pressing the band on the drum.

A flat band type of packaging machine is fitted with a drum 1 (Fig. 2) which is rotated in one direction to feed out band 2 and is rotated in the opposite direction to withdraw surplus band and tension a loop of it around a package.

A cam plate 3 carried concentrically with the drum 1 is adapted to be driven in unison with the drum upon the attainment of a certain degree of tension in the length of band extending from the sealing block 4 of the machine to the periphery of the drum 1. To achieve the driving

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engagement of the cam plate 3 with the drum an adjustably spring tensioned roller 5 journaled in a carrier 6, which is pivoted at 6' on the frame of the machine, said roller is applied to the surface of the band 2 and is arranged to rock the carrier 6 as the band becomes taut. The rocking movement of the carrier permits a hook 7 extending from its end to release a pawl 8 sufficiently to engage in ratchet teeth 9 carried by the drum 1.

This pawl 8 and a spring pressed gripper 10 are pivotally mounted on a carrier bolt 11 which is fixed in a hole in a lug extending from the cam plate. The cam plate carries a slidably mounted sector plate 12 at its outer periphery and the pawl 8, cam plate 3 and sector plate 12 move together in unison. The sector plate 12 moves through the arc of a circle (anti-clockwise on a tensioning movement, Fig. 1) and is shown just about to strike against a vertically dependent lever arm 13 rigidly attached to a shaft 14 carried on the top of the gear box 15. This gear box and other undesignated parts shown at the left hand side of Fig. 1 and Fig. 2 are described in pending application Serial No. 474,942, filed December 13, 1954.

Engagement of the gripper 10 with the band 2 ensures that the band will move in unison with the drum 1 without slipping, and engagement of the pawl 8 in the ratchet teeth 9 ensures that the cam plate 3 and sector plate 12 will also move in unison with the drum.

After this locking together of the parts 8, 3, 12 and 1 an anti-clockwise rotation of the drum derived either from its normal drive or through a step by step ratchet mechanism operated by an eccentric from the drum driving shaft, applies a final tensioning to the band 2 as described in our application, Serial No. 474,942, filed December 13, 1954. The degree of this tension can be pre-set by the adjustment of the position of the sector plate 12 on the cam plate 3, a measure of this tension being judged by the initial separation between the nose 12a of the sector plate and the operating surface of the dependent lever arm 13. The dependent lever 13 serves as a downwardly bent extension of the shaft 14 extending across the top of the gear box. The other end of this shaft 14 carries a block 16 in which is pivotally mounted a detent 17. When the block 16 is rotated by the engagement of the nose 12a of the sector plate 12 with the dependent lever arm 13, the detent 17 strikes a collar 18 which is carried on a spring loaded bar 19.

To ensure that the detent 17 will pass over the collar 18 on the spring loaded bar 19 a tension spring 20 is attached to the block 16 and on to a stationary part of the machine, and is so angled that with respect to the force exerted by the spring 20, the block 16 can only remain in equilibrium in one of two positions. One position is that in which the detent 17 has passed over the top of the collar 18 and the block 16 is at the end of its permitted rotary travel; the other position is that in which the block 16 is in the position such that the lever arm 13 has its operating surface in the vertical plane. The tension spring 20 does not permit the block to occupy any position between these two.

Rigidly attached to the vertically dependent lever 13 is a second lever 21 so arranged that when the machine is feeding out banding to tie a subsequent parcel (i.e. on a clockwise movement of the drum 1), the gripper 10, pawl 8, cam plate 3 and sector plate 12 moving with the drum a nose 3a on the cam plate 3 acts against that lever 21 and rotates the block 16 to the position in which the detent 17 is returned to the operating side of the collar 18.

The spring loaded bar 19 runs transversely of the machine body and is formed at one end so that it can be attached to a pivoted latch 22 carried by the body. The latch 22 is held in the horizontal position by the spring

23 loading the rod 19. A lever 24 engaged by the latch 22 is pivotally mounted in a bush secured to a camshaft 25: it is attached rigidly to a semi-circular key 26 and is also spring loaded by a spring 27 so that it has the tendency to rotate this key 26 and thus unite a driven fly wheel 28 with the cam shaft 25 by obtruding into one or another of keyways 29 formed in an internal bush 30. The flywheel 28 derives its motion through a belt drive and this motion is transmitted to the gear box 15 by a belt connecting pulleys 28a and 28b. Whilst the latch 22 is horizontal the lever 24 is not able to rotate the key 26 and so the fly wheel 28 rotates freely on the outboard end of the camshaft 25.

When sufficient tension has been attained in the band 2 the nose 12a of the sector plate 12 strikes the lever arm 13 and causes the detent 17 at the opposite end of the shaft 14 to strike against the collar 18 on the spring loaded bar 19. This raises the latch 22 and permits the lever 24 to rotate under the action of the spring 27 so that the semi-circular key 26 will key together the fly wheel 28 and the camshaft 25. The fly wheel and camshaft rotate together for one revolution in which time the detent 17 will have moved past the collar 18 on the spring loaded bar 19 and the latch 22 will have dropped under the action of its spring 23 so that the lever 24 now strikes against the latch 22 and rotates so as to move the key 26 back into a position in which the fly wheel 28 is free to turn on the camshaft 25. It is required that the camshaft 25 shall make a complete revolution during which time the band is united by means of a seal, and grippers holding the band have been retracted and the main gear box of the machine is put into the neutral running position.

The actual sealing operation is effected by a known sealing mechanism 33 and is performed by noses 31 carried at the head of a rod 32 operated by a lever 33 by one of a number of cams 34 on the camshaft 25. But any other of a number of known sealing mechanisms could be employed.

It will be understood that the invention is not restricted to the details of the specific embodiment described which may be varied without departing from the scope of the following claims.

We claim:

1. A packaging machine comprising a drum rotatable in one direction to feed a metal band around a package to form a loop, means for rotating the drum in the opposite direction to tension said loop, a cam plate carried coaxially with said drum and normally rotatable relative thereto, mechanism for joining the ends of the band, a camshaft for actuating said mechanism, a carrier pivotally mounted on the body of the machine, a spring tensioned roller journaled in said carrier and engaging the surface of the band, means for rocking the carrier, ratchet teeth on the drum, a pivotally mounted pawl engaging said ratchet teeth, means attached to said carrier for disengaging said pawl from the teeth, a gripper, said gripper and pawl being pivotally mounted on a lug extending from the cam plate, a sector plate adjustably mounted on the cam plate, said cam plate, sector plate and pawl being movable in unison in one direction of rotation of the drum, and a lever arm for triggering the operation of the camshaft and disposed in the path of movement of said sector plate to be actuated thereby when said cam plate is driven with said drum.

2. A packaging machine as defined in claim 1, including a second shaft, said lever arm being mounted on said second shaft, clutch means to engage a power drive with the camshaft, a block mounted on said second shaft, and a detent pivotally mounted on said block; said lever arm operating said detent, thus operating the clutch means.

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