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2,546,069

EJECTOR MECHANISM FOR CUTTING CYLINDERS

Filed April 28, 1948

2 Sheets-Sheet 1

Fig. 1.

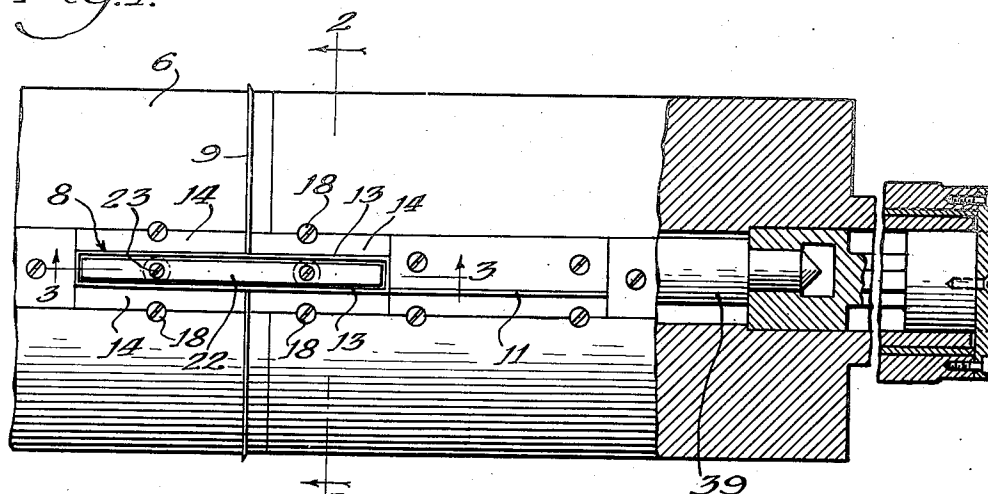
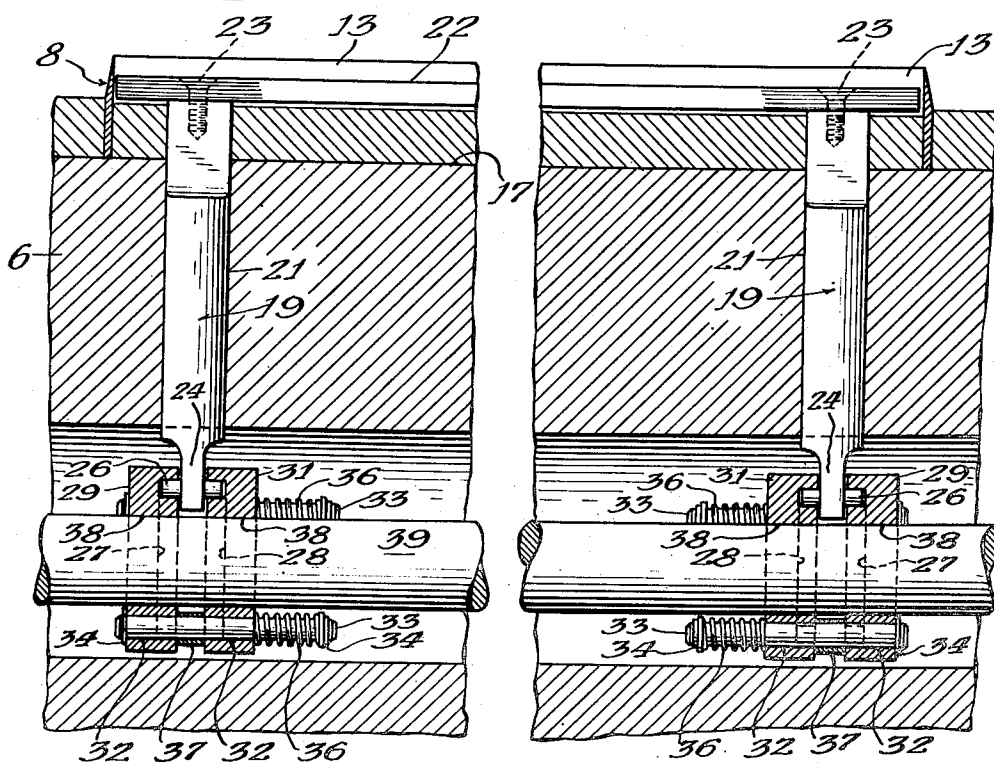


Fig. 3.



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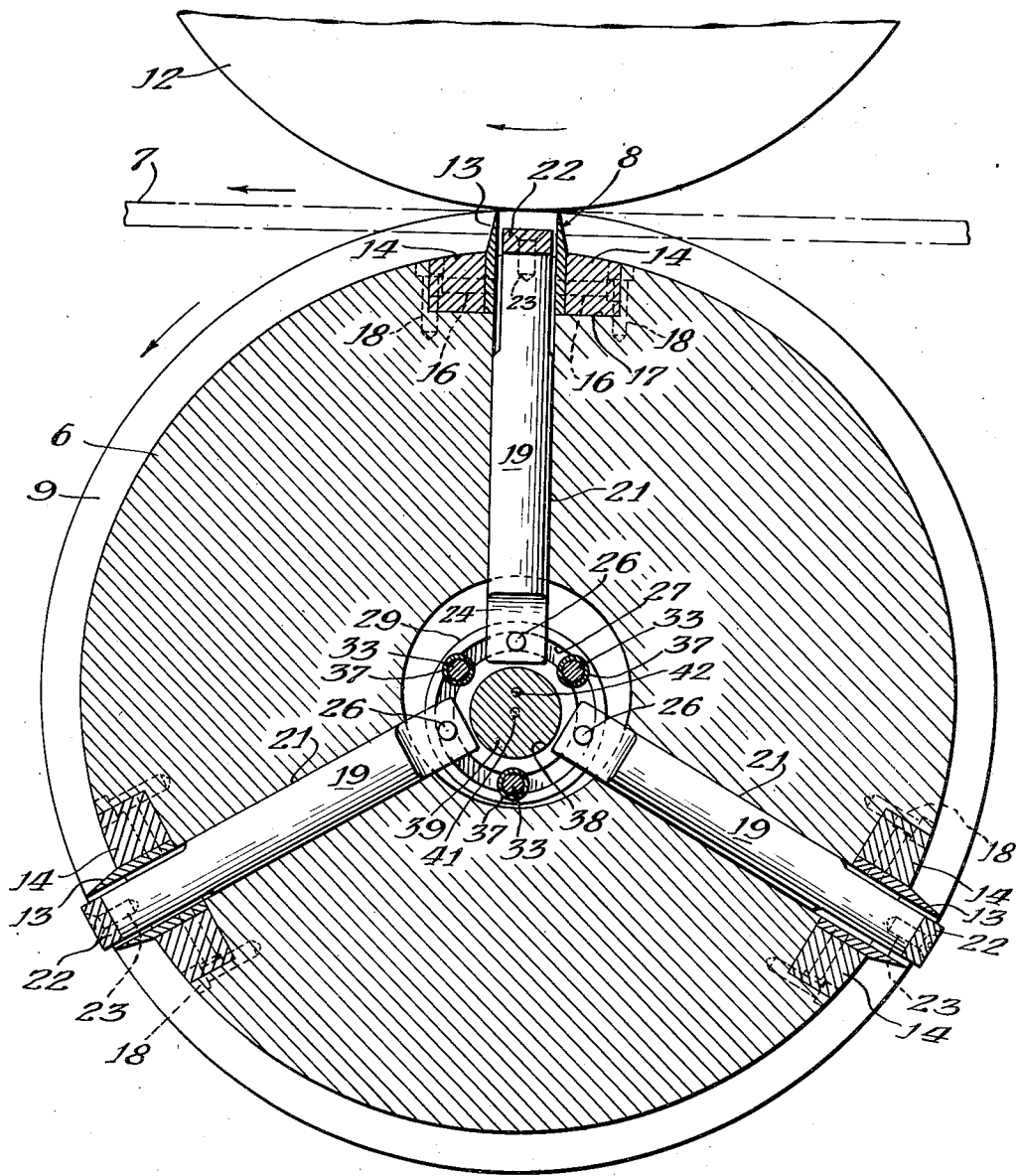
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Fig. 2.



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UNITED STATES PATENT OFFICE

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EJECTOR MECHANISM FOR CUTTING CYLINDERS

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2 Claims. (Cl. 164—28)

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This invention relates to improvements in ejector mechanisms for cutting cylinders of the type commonly employed in the manufacture of roofing strips.

In manufacturing roofing strips of the type slotted along one edge at spaced intervals to form tabs adapted to simulate shingles when the roofing strips are laid in courses upon a roof, relatively long sheets of felt or other fibrous material is saturated with asphalt or other bituminous material and then directed between a cutting cylinder and an anvil cylinder to form transversely extending cut-out slots and also to cut the sheet material longitudinally to form a plurality of shingle strips. In forming the transversely extending cut-out slots, the cut-out blanks are pressed inwardly within the confines of the cut-out knife and must be ejected prior to subsequent cut-out operations of the knife.

While various types of ejector mechanisms have heretofore been provided for use in ejecting cut-out portions from the knives employed in slotting sheet roofing material, it is an object of the present invention to provide an ejector mechanism which is relatively simple and inexpensive in construction and which will not readily get out of order.

This invention further contemplates the provision of an ejector mechanism in which a plurality of ejector plungers are radially disposed within bearing apertures provided on the cutting cylinder, the inner ends of the ejector plungers being engaged by a collector ring which is mounted upon a shaft having its axis offset from the axis of the cutting cylinder. During rotational movement of the cutting cylinder, the ejector plungers are forced outwardly and then inwardly through the bores provided in the cutting cylinder to eject blanks of roofing material from between the cut-out knives.

This invention further contemplates the provision of a collector ring formed in two parts which are held in operative engagement against opposite sides of the ejector plungers by means of compression springs. To remove or replace the ejector plungers from the cylinder, it is only necessary to spread the collector rings against the resistance offered by the compression springs.

This invention embodies other novel features, details of construction and arrangement of parts which are hereinafter set forth in the specification and claims, and illustrated in the accompanying drawings, wherein:

Fig. 1 is a plan view showing one end of a cut-

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ting cylinder provided with an ejector mechanism embodying features of this invention.

Fig. 2 is a transverse fragmentary sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary longitudinal sectional view taken along the line 3—3 of Fig. 1.

Referring now to the drawings for a better understanding of this invention, the ejector mechanism is shown as applied to a cutting roll 6 of the type commonly employed in cutting asphalt shingles from flexible strip material 7, the cutting roll being provided with the usual slot-forming knives 8, circumferential knives 9, and longitudinal knives 11 to coact with an anvil roll 12 in cutting shingles from the strip material. The cutting roll 6 and anvil roll 12 are journaled for rotational movement in suitable bearings and driven by any suitable means.

Each slot-forming knife 8 comprises several blades 13 which are secured to spacing blocks 14 by means of cap screws 16, the spacing blocks being secured in a recess 17, formed in the periphery of the cutting roll, by means of cap screws 18. During rotational movement of the cutting roll 6, the slot-forming knives 8 cut blanks from the strip material 7 to form the tab portions of the asphalt shingles. It will be apparent that the blanks thus cut from the strip 7 become wedged in position between the blades 13 and should be removed prior to subsequent cutting operations.

The ejector mechanism for removing the cut-out blanks from between the blades 13 of the cut-out knives 8 is shown as comprising a plurality of plungers 19 mounted for reciprocable movement in radially disposed bearing apertures 21 formed in the cutting roll 6. It is contemplated that one or more plungers 19 may be provided to eject a blank from between the blades 13 of each knife 8, depending upon the length of the cut-out knife. As illustrated in the drawings, a pair of plungers 19 may be associated with each slot-forming knife 8, the outer ends of the plungers being detachably connected to a knock-out bar 22 by means of cap screws 23. If desired, each plunger 19 may be provided with a knock-out bar welded or otherwise secured to its outer end.

The inner ends of the plungers 19 are flattened at 24 and provided with crosspins 26 for engagement in annular grooves 27 and 28 formed in opposing faces of a pair of collector rings 29 and 31, respectively.

A plurality of pin receiving apertures 32 are formed in the collector rings 29 and 31 to receive connecting pins 33. Retainer rings 34 are

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secured to opposite ends of each of the pins 33 to hold the collector rings 29 and 31 in assembled relation. To yieldably resist movement of the collector rings 29 and 31 away from each other, compression springs 36 are mounted on the ends of the pins 33, the collector rings being normally disposed in predetermined spaced relation by means of spacing tubes 37 mounted upon the pins 33.

The collector rings 29 and 31 are formed with bearing apertures 38 to receive a shaft 39 having its axis 41 offset from the axis 42 of the cutting roll 6. The outer ends of the shaft 39 are journaled in suitable bearings arranged to hold the shaft in eccentric relation with respect to the cutting roll.

In the operation of the ejector mechanism in ejecting blanks from between the blades 13 of the slot-forming knives 8, it will be noted that the collector rings 29 and 31 serve to hold the plungers 19 against radial movement with respect to the shaft 39. During rotational movement of the cutting roll 6, the knock-out bars are disposed inwardly from the cutting edges of the blades 13 of the slot-forming knives 8 when the latter are disposed in cutting engagement against the anvil roll 12. As each slot-forming knife 8 moves out of cutting engagement with the anvil roll, the knock-out bar associated therewith is caused to approach the cutting edges of the blades 13, thus ejecting a blank of material outwardly from between the blades.

It is an important feature of the present invention to provide an ejector mechanism in which the several parts are arranged and controlled to provide minimum wear and resultant long life. In other forms of ejector mechanism, it has been common practice to employ cam surfaces, compression springs and other means for imparting reciprocable movement to the plungers. It has been learned that cam surfaces are subject to severe wear, the compression springs are subject to breakage and further that it is difficult to provide a suitable number of ejector plungers within a limited space by employing such cam surfaces and compression springs. It will be noted that the present construction permits the use of a relatively large number of ejector plungers disposed either radially or longitudinally along a cutting roll.

A further important feature of the present invention resides in the provision of an ejector mechanism in which the several plungers may readily be mounted upon or removed from the cutting cylinder 6. This is accomplished by merely spreading the collector rings 29 and 31 to permit the ends of the pins 26 to be disengaged from the grooves 27 and 28. By first removing the block 14 and slot-forming knife 8 from the cutting roll, it will be noted that the plungers 19 may be rotated 90° about their longitudinal axis to cause spreading of the collector rings 29 and 31, after which the plunger 19 may be withdrawn from its bearing aperture 21.

While this invention has been shown in but

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one form, it is obvious to those skilled in the art that it is not so limited but is susceptible of various changes and modifications without departing from the spirit and scope of the claimed invention.

I claim as my invention:

1. In an apparatus of the character described, a cutting roll formed with intersecting axial and radial bores, an anchor shaft eccentrically positioned within the axial bore of the cutting roll, a plunger having a cylindrical body portion slidably mounted within the radial bore of the cutting roll, a collector ring concentrically journaled on said anchor shaft, said collector ring comprising two collars formed with opposing concentric annular recesses and with pin receiving apertures, a cross pin provided on the inner end of said plunger and engaged within said annular recesses, connecting pins slidably mounted in said apertures, and compression springs mounted on said connecting pins to yieldably resist parting movement of said collars responsive to rotation of said plunger about its longitudinal axis.

2. In an apparatus of the character described, a cutting roll journaled for rotational movement and formed with intersecting axial and radially disposed bores, a slot-forming knife provided on the periphery of said roll at the outer end of said radial bore, a plunger having a cylindrical body portion slidably mounted within said radial bore for movement relative to said knife, the inner end of said plunger body being cut away on diametrically opposed sides to provide a relatively thin tongue, a cross pin mounted transversely on and having its ends projecting from opposite sides of said tongue, the length of said cross pin being less than the diameter of said plunger and disposed to permit the plunger and cross pin to be withdrawn as a unit from said radial bore, an anchor shaft eccentrically positioned within the axial bore of said roll, a collector ring concentrically journaled on said anchor shaft, said collector ring comprising two collars formed with opposing concentric annular recesses to receive the ends of said cross pin, said collars being formed with apertures to slidably receive a plurality of connecting pins disposed parallel to said cross pin, and compression springs mounted on said connecting pins to yieldably resist parting movement of said collars responsive to rotation of said plunger about its longitudinal axis.

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