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GASKET CUTTER

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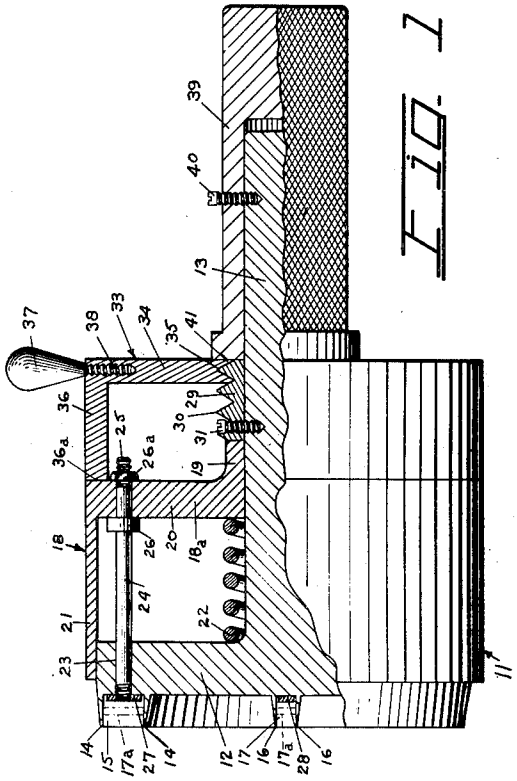


Fig. 1

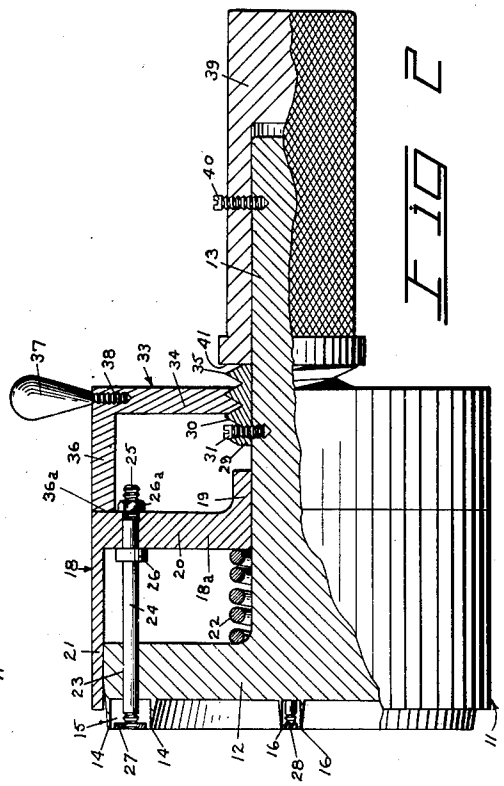


Fig. 2

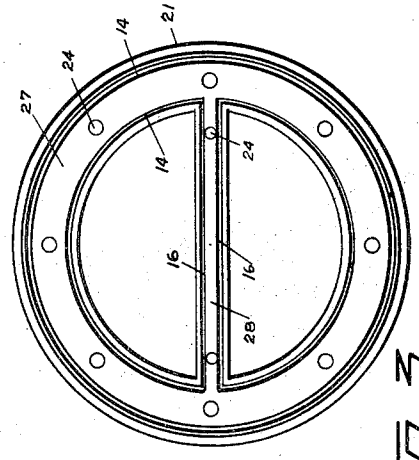


Fig. 3

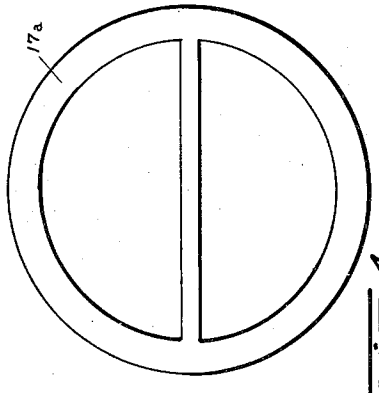


Fig. 4

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GASKET CUTTER

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6 Claims. (Cl. 164—33)

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The present invention concerns a tool for cutting gaskets from thin sheet material, and particularly concerns a tool for cutting gaskets which are suitable for use on lubricating oil pumps.

In cutting gaskets or washers from thin sheet material a tool suitable for a stamping operation or a rotary cutting operation is desirable. For performing the cutting operation it is necessary that the gasket be ejected from the tool and to this end it is advantageous to have an ejecting mechanism that will exert equal pressure on all portions of the gasket face to prevent tear or deformation of the gasket which would arise from unequal local stresses during the ejection. The ejecting mechanism should be adapted for manual operation so that ejection of the gasket can be controlled and the gasket can be observed during ejection to insure against misfunctioning of the mechanism and tearing of the gasket. To insure ease of operation of the ejecting mechanism a high mechanical advantage should be in favor of the operator, and to insure maximum precision of operation of the ejecting mechanism there should be precise control of the degree of movement of the ejecting mechanism.

The present invention achieves these advantages in a cutting tool having a bedplate upon which the cutting edges are formed, the tool having an ejecting mechanism which reciprocates relative to the cutting bedplate. A rotary, screw-mounted actuator manually actuates the ejector mechanism.

An object of this invention is a cutting tool suitable for a gasket stamping operation.

Another object is a tool of the type described having a mechanical ejector for removing the gasket from the tool after the cutting operation.

Another object is a cutting tool having an ejector mechanism that provides uniform ejecting pressure on all portions of the gasket face to prevent tearing or deformation of the gasket that might arise if unequal local stresses were present during the ejecting operation.

Another object is to provide an ejecting mechanism adapted for manual operation so that ejection of the gasket from the tool can be controlled and the gasket can be observed during ejection to insure no misfunctioning of the mechanism or tearing of the gasket.

Another object is to provide a cutting tool having a screwing motion of the actuator for the ejector to insure higher mechanical advantage in favor of the operator with consequent ease of operation and also to insure control over the degree

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of movement of the ejector with consequent maximum precision of operation.

Further objects and advantages of this invention, as well as its construction, arrangement and operation, will be apparent from the following description and claims in connection with the accompanying drawings, in which,

Fig. 1 is a side elevation, partly in longitudinal section, of a preferred form of the invention, with the ejector in non-operating position.

Fig. 2 is a view similar to Fig. 1 with the ejector in operating position.

Fig. 3 is an end elevational view as seen when viewing Fig. 1 from the left thereof.

Fig. 4 is a plan view showing a gasket of the type cut by the tool of Figs. 1 and 2.

A preferred form of cutting tool forming the present invention comprises a stamping tool having a cutter 11 provided with a disc-shaped bedplate 12 formed integrally with a cylindrical supporting shaft 13. Formed on the face of bedplate 12 are a pair of concentric circular cutting edges 14 forming a channel 15 therebetween and a pair of spaced centrally disposed cutting edges 16 forming a channel 17 therebetween. Cutting edges 14 and 16 are designed during the cutting operation to define a gasket 17a having a shape such as shown in Fig. 4. Gasket 17a is shown in phantom lines in Fig. 1. Although the illustrated form of cutting tool is designed to cut a gasket by stamping, the tool can be used to perform a rotary cutting operation in making gaskets of circular or other suitable shape in which case the centrally disposed cutting edges 16 are eliminated.

An ejecting mechanism 18 removes the gasket from channels 15 and 17 after the cutting operation. Ejector 18 comprises a carriage 18a having hub 19 mounted for axial reciprocation upon shaft 13, a radially extending flange portion 20 integral therewith, and an integrally cylindrical portion 21 extending toward bedplate 12 and adapted for sliding engagement with external periphery of bedplate 12. A compression spring 22 is disposed between bedplate 12 and ejector flange 20 for constantly urging ejector 18 away from bedplate 12.

Mounted in ejector flange 20 and extending through openings 23 in bedplate 12 are rods 24, each provided with a threaded extremity 25 and an enlarged portion 26 adjacent thereto that abuts against one face of flange 20. A locknut 26a is screwed on each rod 24 against the other face of flange 20 to lock rod 24 rigidly to flange 20. The opposite extremity of each rod 24 extends through opening 23 into channel 15. An ejector plate 27 having the same shape as channels 15 and 17 (Fig.

3) is threadedly secured to the ends of rods 24 within channels 15 and 17. Ejector plate 27 is provided with a central portion 28 disposed within channel 17 and this portion of the ejecting plate is mounted upon suitably located rods 24 (Fig. 3).

After the cutting operation when gasket 17a is disposed in channels 15 and 17 and it is necessary to eject the gasket, ejector 18 can be reciprocated toward the left as seen in Fig. 1 against the action of spring 22 into the position shown in Fig. 2 to cause ejecting plate 27 to move to the left and eject gasket 17a from channels 15 and 17.

Mounted upon shaft 13 is a collar 29 having an externally threaded portion 30 and secured in place by set screw 31. The end of collar 29 adjacent ejector hub 19 serves as a stop for ejector 18 to limit the movement thereof toward the right as seen in Fig. 1.

Mounted for rotation on collar 29 is an actuator 33 having a radially extending flange portion 34 provided with internal threads 35 adapted for engagement with external threads 30 on collar 29. Integral with flange portion 34 is an axially extending cylindrical portion 36 having a contact rim 36a which extends into abutting engagement with ejector flange 20. A handle 37 is screwed into actuator 33 as indicated at 38. Handle 37 can be grasped by an operator to effect the rotation of actuator 33 upon collar 29 and such rotation through the medium of threads 30 and 35 causes actuator 33 to move axially to the left as seen in Fig. 1, with the result that ejector 18 is forced to the left into the position shown in Fig. 2 whereby ejecting plate 27 clears channels 15 and 17 of any gasket therein. Ejector 33 can be designed so that one complete rotation thereof causes movement from the position shown in Fig. 1 to the position shown in Fig. 2.

Mounted upon the end of shaft 13, remote from bedplate 12, is a shank 39 secured in place by means of a setscrew 40. The extremity of shank 39 adjacent actuator 33 is enlarged to form a stop portion 41 for limiting movement of actuator 33 to the right as seen in Fig. 1. Shank 39 can be designed to adapt the cutting tool for use as a hand tool, or if desired, for use by insertion in a power unit such as a compressed air operated rotary tool holder.

Operation of the device is as follows. The tool is conditioned for a cutting operation by manually rotating actuator 33 on threads 30 and 35 into abutment with stop 41. In this position, actuator 33 and ejector 18 are disposed in their extreme right-hand positions as seen in Fig. 1 and ejector plate 27 is disposed in the bottom of channels 15 and 17. The tool can then be used to perform a stamping or rotary cutting operation upon a thin sheet of material (not shown) and upon being withdrawn from the sheet of material the freshly cut gasket 17a is disposed within channels 15 and 17.

Ejection of the gasket 17a from channels 15 and 17 is then effected by manually rotating actuator 33 upon threads 30 and 35 to cause movement thereof to the left into the position seen in Fig. 2 whereby reciprocation of ejector plate 27 is effected into the position seen in Fig. 2 with the result that ejector plate 27 forces gasket 17a out of channels 15 and 17.

Changes can be made in the above-described example of this invention without departing from the spirit and scope thereof as set forth in the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. A tool for cutting gaskets from thin sheet material comprising a cutter having a bedplate, cutting edges formed on one face of said bedplate and defining a channel between said edges, a shaft integral with said bedplate and extending therefrom in the side opposite said edges; an ejector having a carriage mounted for longitudinal reciprocation on said shaft including a series of rods mounted rigidly on said carriage and extending through said bedplate into said channel, and an ejector plate in said channel mounted on said rods; resilient means urging said carriage away from said bedplate; and an actuator mounted for screwing action relative to said shaft to effect longitudinal movement thereof, said actuator having a portion adapted to contact said ejector whereby screwing action of said actuator can effect longitudinal movement of said ejector including said ejector plate.

2. A tool for cutting gaskets from thin sheet material comprising a cutter having a circular bedplate, cutting edges formed on one face of said bedplate and defining a channel between said edges, a cylindrical shaft integral with said bedplate and extending axially therefrom on the side opposite said cutting edges; an ejector having a carriage comprising a hub mounted for longitudinal reciprocation on said shaft, a radial flange integral therewith and spaced from said bedplate, and a cylindrical portion extending from the periphery of said flange into sliding engagement with the periphery of said bedplate, a series of rods rigidly mounted at one end in said flange in circumferentially spaced relation and slidably extending through said bedplate into said channel, and an ejector plate in said channel threadedly mounted on the ends of said rods; a compression spring between said bedplate and said carriage for urging said carriage away from said bedplate so that said ejector plate is urged toward the bottom of said channel; a collar having external threads rigidly mounted on said shaft adjacent said hub in the side away from said spring, said collar serving as a stop to limit movement of said carriage under the influence of said spring; an actuator for said ejector comprising a radially extending flange portion having internal threads and mounted upon said collar in spaced relation from said ejector flange, an integral axially extending cylindrical portion having a rim adapted to contact said ejector flange, and a handle integral with said actuator whereby said actuator can be rotated to cause axial movement thereof to effect axial movement of said ejector including said ejector plate.

3. A tool comprising a cutter having cutting edges defining a space therebetween, an ejector in the space between the cutting edges, said ejector being mounted for free sliding longitudinal movement relative to said cutter, and an actuator adjustable longitudinally along said cutter into contact with said ejector so that said ejector can be moved in one direction by adjusting said actuator in contact with said ejector in such direction or by freely sliding said ejector in such direction independently of said actuator.

4. A tool comprising a cutter having cutting edges defining a space therebetween, an ejector

in the space between the cutting edges, said ejector being mounted for longitudinal sliding movement relative to said cutter, an actuator adjustable longitudinally along said cutter and adapted to contact said ejector and limit movement of said ejector in one direction, and resilient means for urging said ejector into contact with said actuator and for yielding by permitting movement of said ejector in the opposite direction under the influence of said actuator or independently of said actuator.

5. A tool comprising a cutter having a cutting edge, an ejector mounted on the cutter adjacent said cutting edge, said ejector being mounted for free sliding movement relative to said cutter toward and away from said edge, and an actuator adjustable along said cutter into contact with said ejector so that said ejector can be moved in one direction by adjusting said actuator in contact with said ejector in such direction or by freely sliding said ejector in such direction independently of said actuator.

6. A tool comprising a cutter having a cutting edge, an ejector mounted on the cutter adjacent

said cutting edge, said ejector being mounted for free sliding movement relative to said cutter toward and away from said edge, and an actuator screwed on said cutter and adjustable by a screwing along said cutter into contact with said ejector so that said ejector can be moved in one direction by screwing said actuator in contact with said ejector in such direction or by freely sliding said ejector in such direction independently of said actuator.

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