United States Patent [19]

Kranz

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[54] DIE TEST STAND

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[73] Assignee: **Tension Envelope Corporation,** Kansas City, Mo.

[22] Filed: **Dec. 11, 1970**

[21] Appl. No.: **97,121**

[52] **U.S. Cl.** **83/344,** 83/346, 83/911

[51] **Int. Cl.**.....**B23d 25/02,** B26f 1/08

[58] **Field of Search**.....83/344, 346, 347, 349, 911

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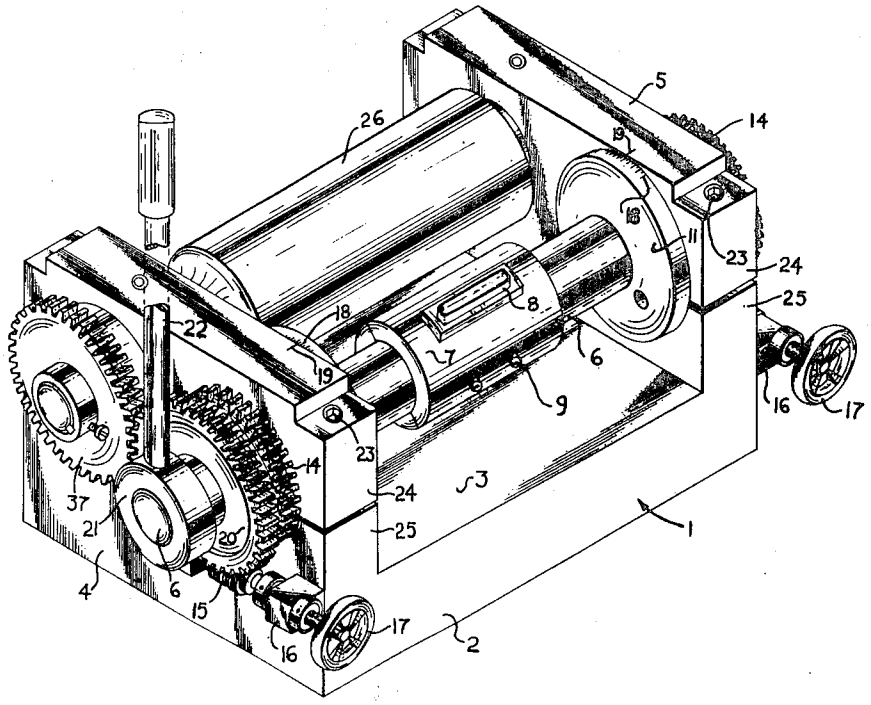
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[57] **ABSTRACT**

Dies for cutting windows in envelope blanks are set up on mounting sleeves to permit rapid placement in an envelope making machine without substantial machine down-time through use of a test stand having a mounting shaft and back-up roller simulating that of the machine. The mounting shaft is accurately adjustable in distance from a back-up roller and the back-up roller is selectively adaptable to rotate in synchronization with the mounting shaft or remain stationary depending upon the type of envelope machine to be simulated.

3 Claims, 5 Drawing Figures



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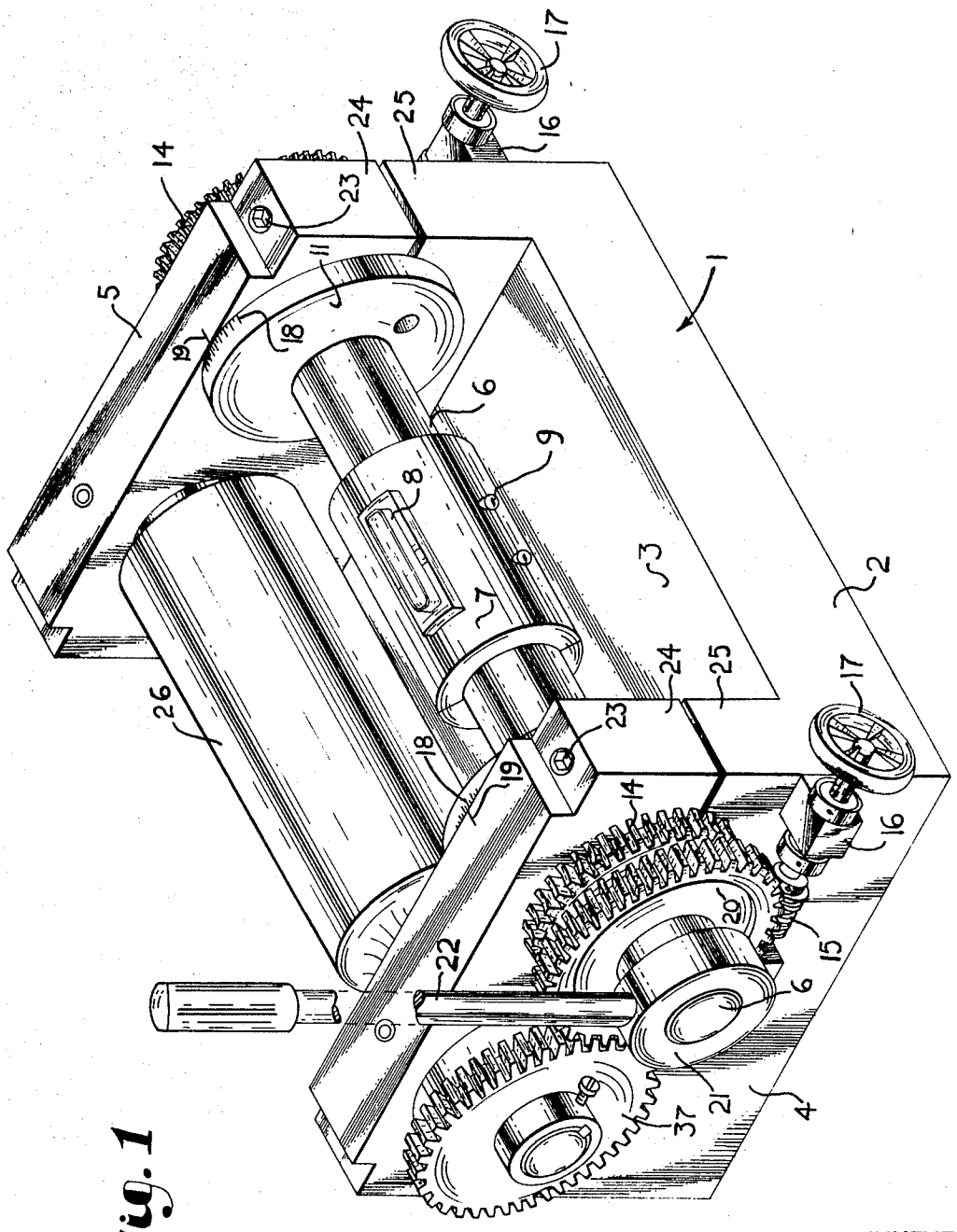


Fig. 1

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Fig. 2

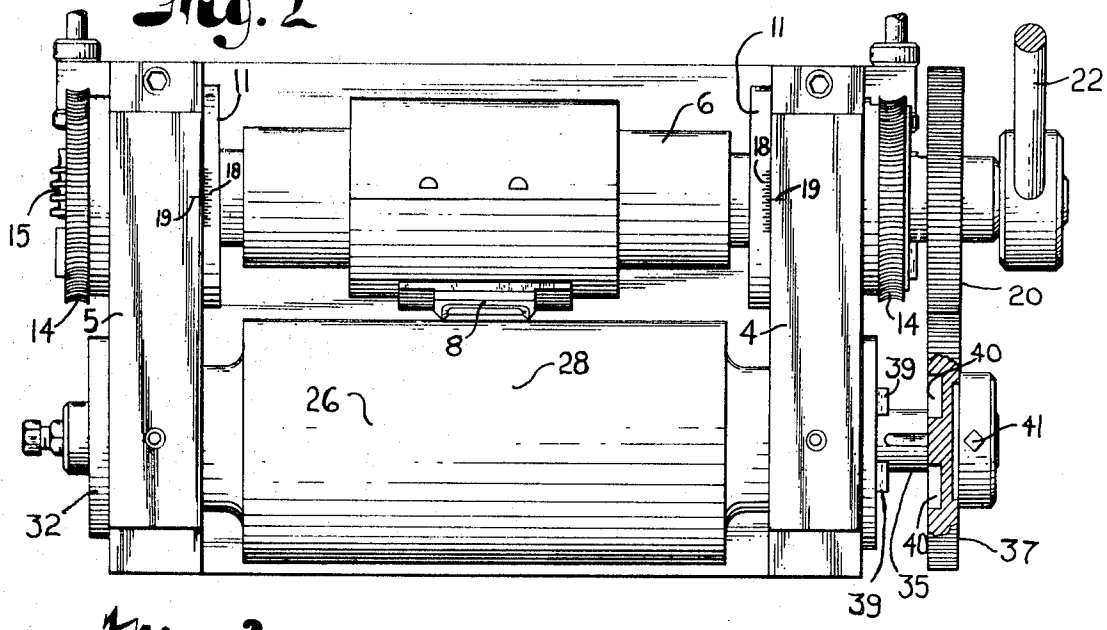


Fig. 3

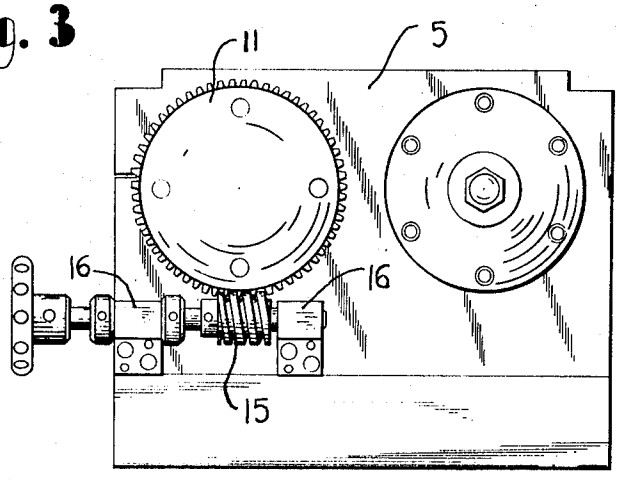
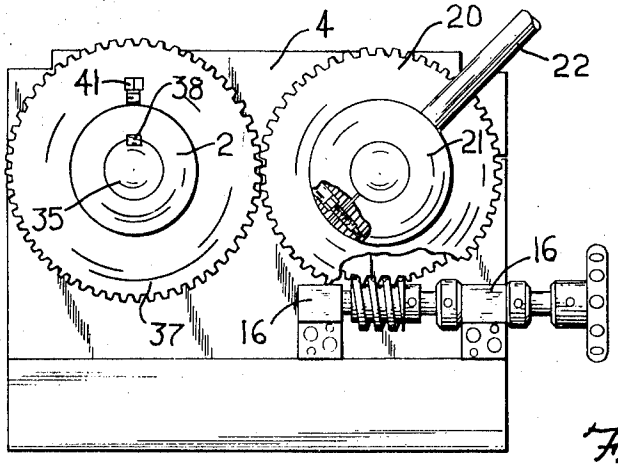


Fig. 4



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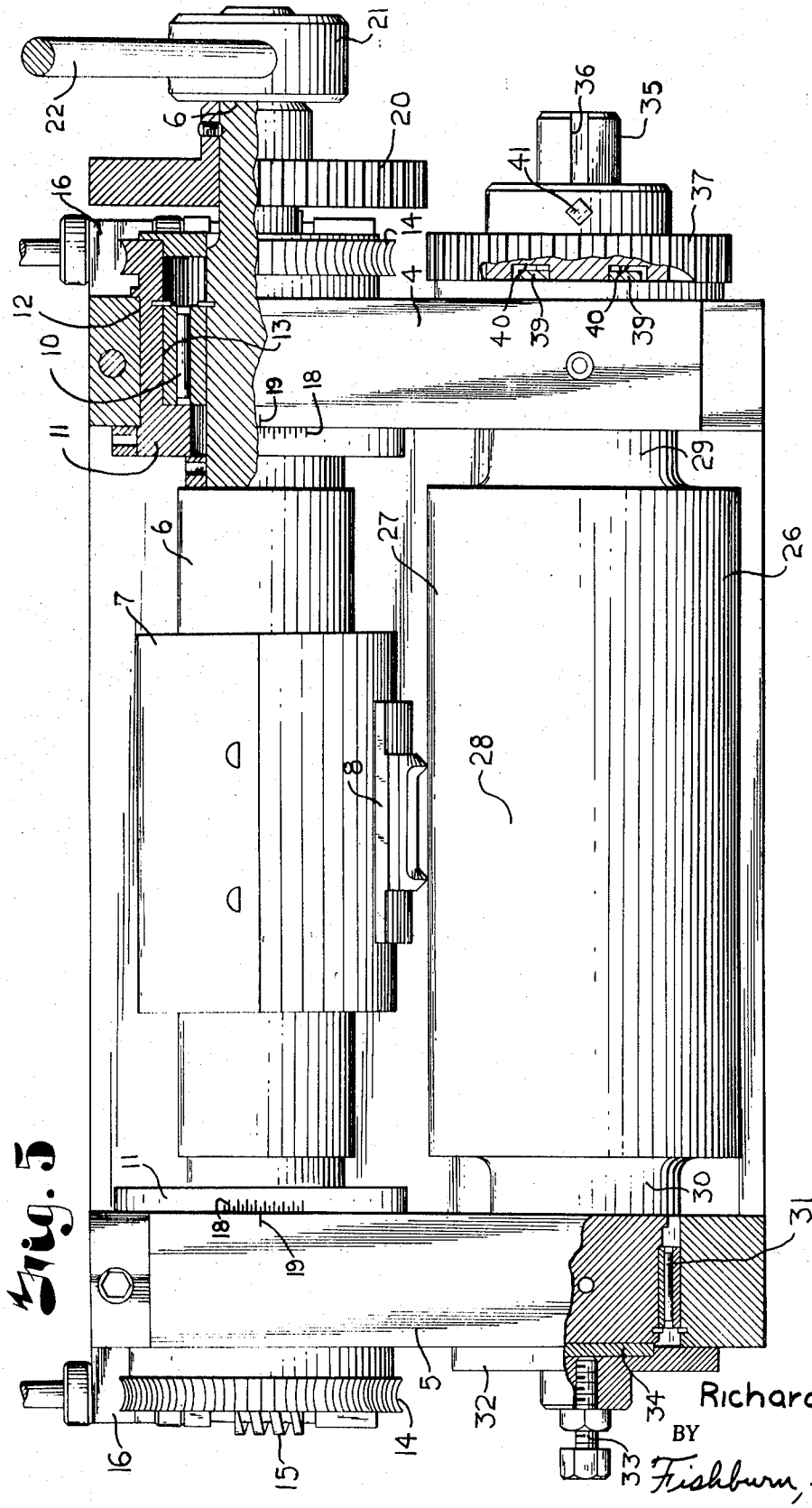


Fig. 5

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DIE TEST STAND

This invention relates to apparatus for reducing job set up time in rotary envelope making machines and more particularly to a die test stand for making off-machine sharpness and evenness determinations of envelope blank window cutting dies.

In the highly competitive field of envelope manufacture, it is economically of the utmost importance to keep the expensive rotary envelope machines in substantially continuous operation as much as possible. Thus, any procedure for reducing the time necessary for maintenance work or job change adjustments thereon is highly desirable.

One of the more time consuming operations in preparing a rotary envelope machine for a new production job is the mounting, adjustment and testing of a window cutting die for proper sharpness, cut depth and evenness. This normally requires a considerable amount of labor by highly skilled personnel and heretofore also required that the rotary machine be out of production during the adjustment.

This invention contemplates apparatus by which the die may be suitably adjusted and tested off the rotary envelope machine, and after adjustment, quickly installed on the machine.

It is, thus, the principal objects of the present invention to provide: a die test stand which closely duplicates the rotary envelope machine conditions; to provide such a device which is adaptable to test dies for machines having either a rotary die back-up cylinder or a stationary die anvil; to provide such a device which permits highly accurate and repeatable adjustment of the distance between the die mounting shaft and the back-up cylinder or anvil; and to provide such structure which is relatively simple in construction, convenient to use and well suited for its intended purpose.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a perspective view showing a die test stand embodying this invention.

FIG. 2 is a plan view of the die test stand showing the die in contact with the back-up cylinder and rotating therewith.

FIG. 3 is a side elevational view of the die test stand.

FIG. 4 is a side elevational view of the die test stand taken from the side opposite to that of FIG. 3.

FIG. 5 is a plan view of the die test stand on larger scale with portions broken away to show details of construction, the back-up cylinder being in locked position to simulate a stationary anvil.

Referring to the drawings in more detail:

The reference numeral 1 generally indicates a die test stand embodying this invention. The stand 1 comprises a heavy steel frame 2 having a base 3 and integral spaced-apart side walls 4 and 5 extending upwardly therefrom. A die collar mounting shaft 6 extends between and through the side walls 4 and 5 and is adapted to receive a die mounting collar 7 adapted to support a window cutting die 8 thereon. The collar 7 is split longitudinally into a pair of half-sections removably secured together about the mounting shaft 6 by means of suitable screw fasteners 9.

The mounting shaft 6 extends through suitable needle bearings 10 (FIG. 5) which are supported in a cage 11 rotatably received in the respective side walls 4 and 5. The external cylindrical surface 12 of the cages 11 are eccentric with respect to the internal cylindrical surface 13 thereof mounting the needle bearings 10. Thus, the rotation of the cage 11 about the axis of the mounting shaft 6 causes the mounting shaft to orbit slightly so that it changes position with respect to the side walls 4 and 5.

The cages 11 each include a worm gear 14 positioned on the outside of the respective side walls 4 and 5 and engaged with suitable screw worms 15 mounted for circumferential rotation in bearing blocks 16 secured to the respective side walls 4 and 5. The rotation of the screw worms 15 may be effected by hand wheels 17 secured to the shaft mounting the screw worms and projecting forwardly of the frame 2, FIG. 1.

The cages 11 have suitable position scales 18 thereon located in gauging relation to a mark 19 on the respective side walls 4 and 5 whereby the respective adjusting rotation of the cages 11 may be compared and thereby accurately synchronized.

The mounting shaft 6 on one side of the frame 2 extends outwardly beyond the worm gear 14 and receives thereon, in fixed relation, a spur gear 20. The mounting shaft 6 further extends beyond the spur gear 20 and has secured thereto a collar 21 supporting a handle 22. Thus, by moving the handle 22 in an arc about the axis of the collar 21, the shaft 6 is rotated about its axis and the spur gear 20 and die 8 rotate therewith. The cages 11, however, remain stationary unless rotated through the hand wheels 17.

To insure that the cages 11 do not move from a predetermined adjusted position except when desired, they are locked into rotational position through screws 23 which, upon tightening draw sections 24 and 25 of the respective side walls 4 and 5 together, thereby decreasing the diameter of the frame bore wall engaging the external cylindrical cage surface 12.

A back-up cylinder or anvil 26 extends between and through the side walls 4 and 5 parallel to and adjacent the die collar mounting shaft 6. The back-up cylinder 26 has a central cylindrical portion 27 having an external surface 28 which is designed to duplicate, in contour and position, the external surface of the back-up cylinder or anvil member on a rotary envelope making machine. Shaft portions 29 and 30 of the back-up cylinder 26 extend into the respective side walls 4 and 5 where they are rotatably engaged with suitable needle bearings 31. A cap 32 is mounted on the outside of the side wall 5 in coaxial relation with the shaft portion 30. The cap 32 threadedly receives a screw 33 which engages a plate 34 which is, in turn, urged against the end of the shaft portion 30 to adjustably remove end play of the back-up roller 26, thus increasing the accuracy of operation.

The shaft portion 29 extends through the side wall 4 terminating in a relatively small diameter projection 35 having a keyway 36 cut longitudinally thereinto. A spur gear 37 is axially slidably received on the shaft portion projection 35, but rotatably fixed thereto by means of a key 38, FIG. 4. The spur gear 37 is located to engage the spur gear 20 when the spur gear 37 is moved axially outwardly on the projection 35 to the position in-

dicated in FIG. 2. Thus, in the position shown in FIG. 2, the arcuate movement of the handle 22 results not only in the rotation of the cutting die 8 about the axis of the mounting shaft 6 but also a corresponding opposite rotation of the external surface 28 about the axis of the back-up roller 26.

For use in simulating a stationary anvil, however, there is provided a pair of stationary lugs 39 on the side wall 5 adapted to selectively align with sockets 40 extending into the rear face of the spur gear 37. By loosening the set screw 41 and sliding the spur gear 37 over the lugs 39, as shown in FIG. 5, the spur gear 37 is disengaged from the spur gear 20 and held rotationally stationary by the lugs 39. The external surface 28 of the back-up roller 26 thereby becomes a stationary anvil to simulate a corresponding member in a rotary envelope machine.

In operation, the die mounting collar is used to mount the die 8 on the shaft 6 in the same manner it is to be mounted on the rotary envelope machine, however, it is not necessary to take the rotary envelope machine out of service. The type of back-up for the die, that is a rolling back-up cylinder or stationary anvil, is selected by suitable positioning of the spur gear 37 and the die is adjusted and worked in the usual manner until it properly cuts a sheet of envelope blank paper which may be conveniently placed between the die and the external surface 28. Suitable adjustments of the distance between the axes of the shaft 6 and roller 26 to correspond to known distances in particular machines is accomplished by releasing the set screws 23 and rotating the hand wheels 17.

After proper adjustment of the die, it is only necessary to remove the die mounting collar 7 from the shaft 6 through release of the screw fasteners 9 and remount the collar, with the die thereon, about the corresponding shaft of the rotary envelope machine.

It is to be understood that while one form of this invention has been illustrated and described, it is not to be limited thereto except insofar as such limitations appear in the following claims.

What I claim and desire to secure by Letters Patent is:

1. A test stand for envelope blank cutting dies comprising:
   a. a rigid frame having spaced apart side walls,
   b. a collar shaft revolvably mounted on and extending between said side walls and adapted to receive a die mounting collar thereon,
   c. a back-up shaft extending parallel to said collar shaft and extending between and revolvably mounted on said side walls adjacent said collar shaft.
   d. a gear revolvably fixed to each of said shafts and adapted to mesh whereby said shafts revolve in opposite directions simultaneously,
   e. means for revolving said collar shaft, and
   f. means for disengaging one of said gears from the other and locking said back-up shaft revolvably whereupon said back up shaft is convertible to a stationary anvil.

2. The structure as set forth in claim 1 wherein:
   a. said means for disengaging said gears includes an axial sliding arrangement between the gear on said back-up shaft and said back-up shaft.

3. The structure as set forth in claim 2 wherein:
   a. said back-up shaft gear has sockets extending thereinto, and
   b. one of said side walls has fixed lugs projecting therefrom for selective extension into said sockets.

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