April 13, 1954 L. ROCKSTROM 2,674,942

PRINTER SLOTTER ROLLER ADJUSTMENT

Filed Jan. 10, 1951 3 Sheets-Sheet 1

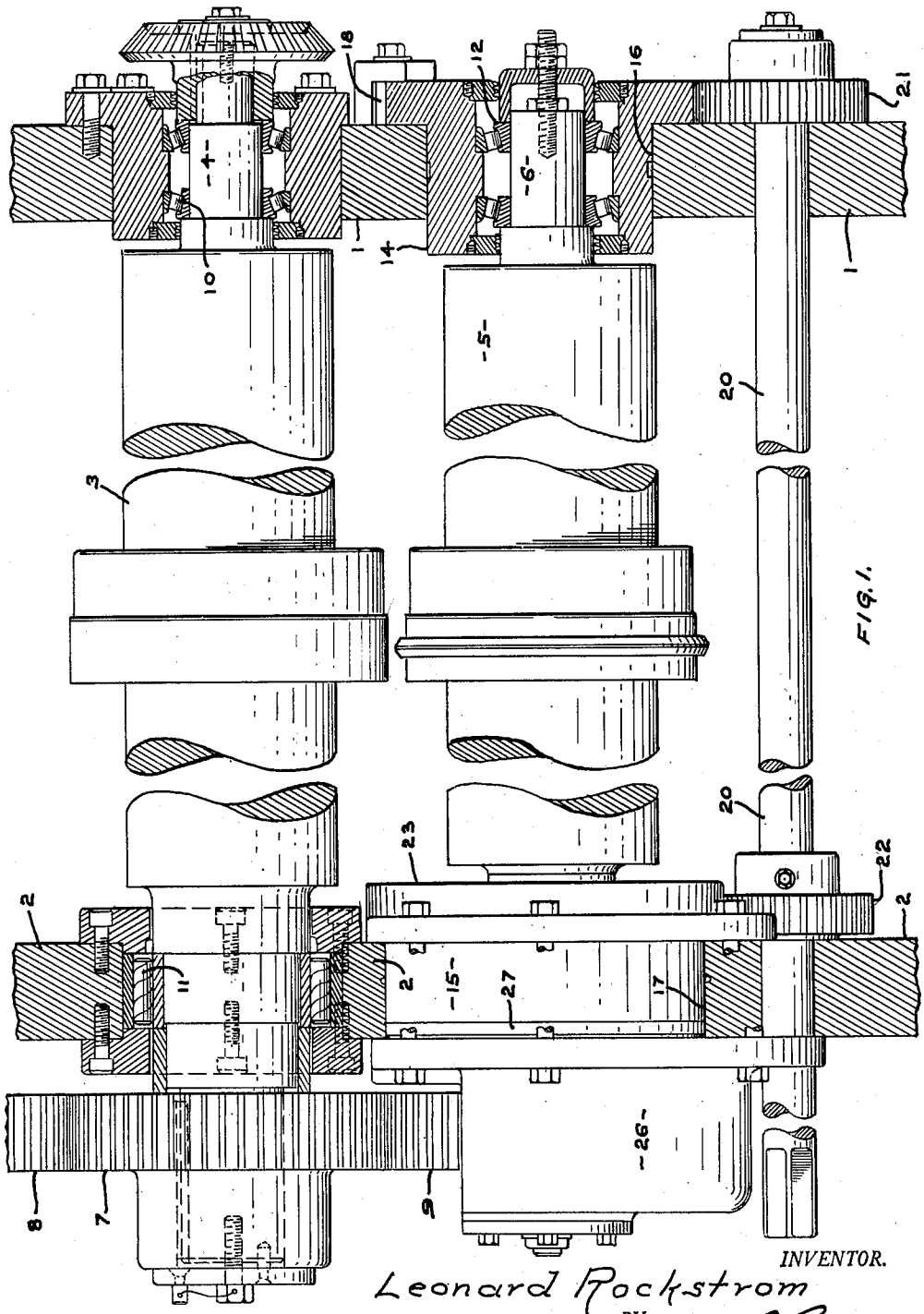


FIG. 1.

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PRINTER SLOTTER ROLLER ADJUSTMENT

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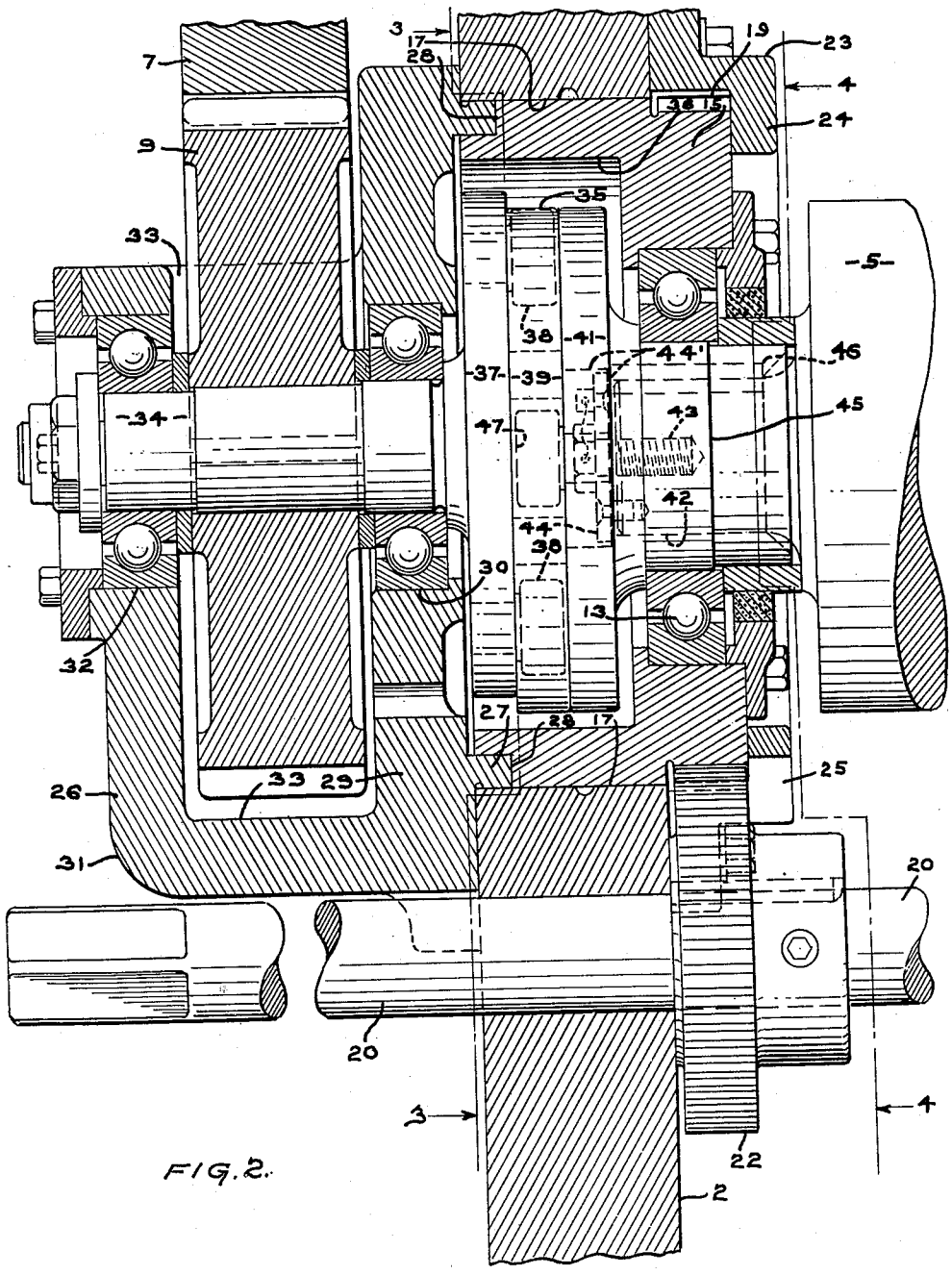


FIG. 2.

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PRINTER SLOTTER ROLLER ADJUSTMENT

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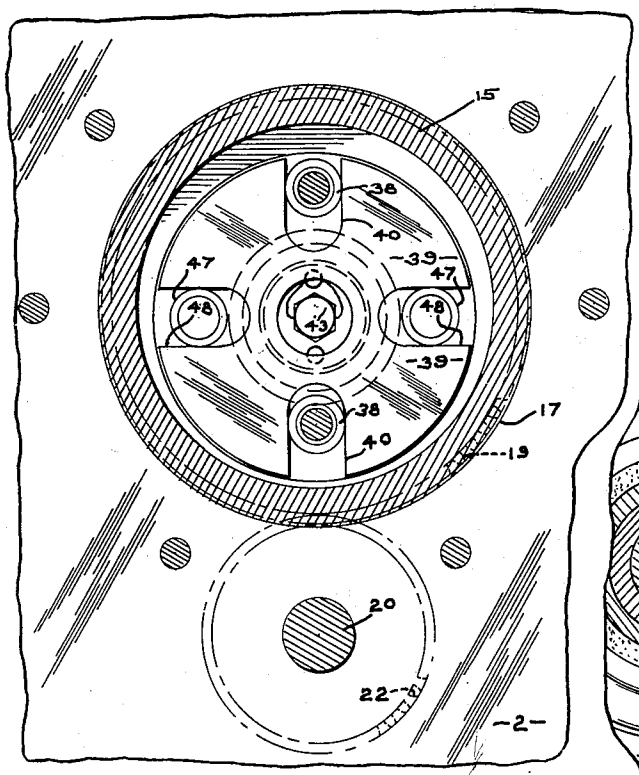


FIG. 3.

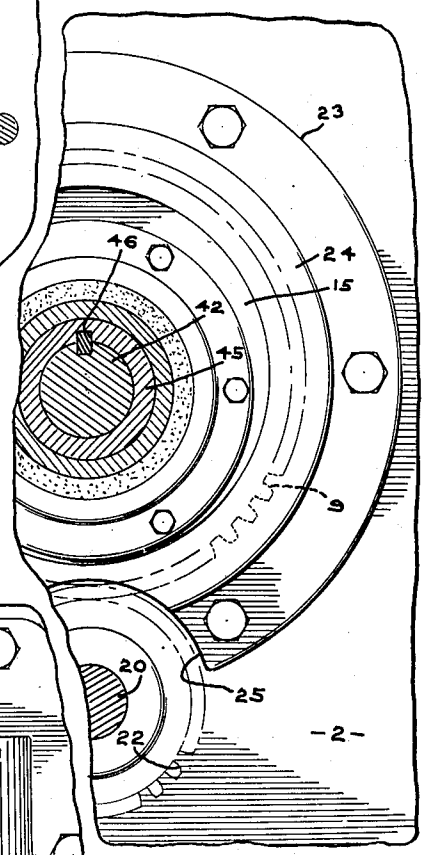


FIG. 4.

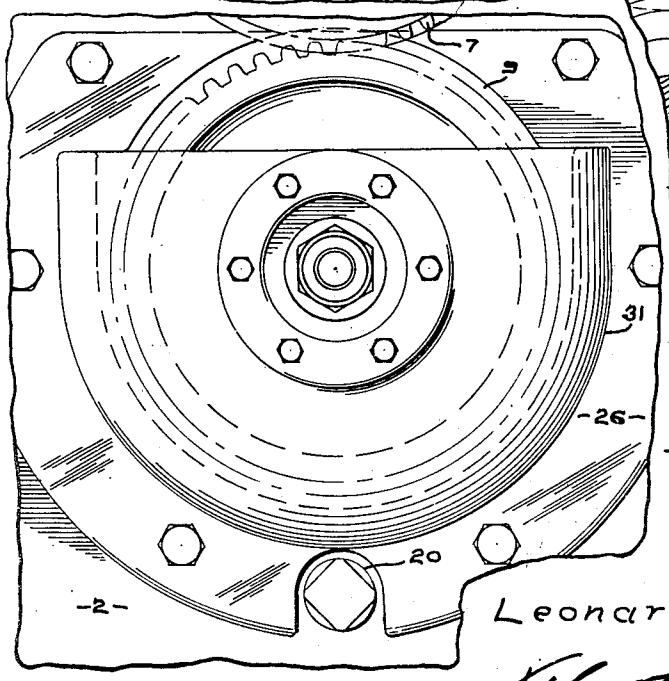


FIG. 5.

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UNITED STATES PATENT OFFICE

2,674,942

PRINTER SLOTTER ROLLER ADJUSTMENT

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Application January 10, 1951, Serial No. 205,237

9 Claims. (Cl. 101—247)

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This invention relates to printer slotters used for printing and slotting carton blanks, usually of corrugated board, the same being in the nature of an improvement on the roll shaft adjustments described and claimed in United States Patent No. 2,191,988, granted to Henry B. Greenwood and United States Patent No. 2,259,441 granted to Thomas S. Fitchett.

In response to the demand for machines of increased capacity, even beyond those described in the above patents, the operating speeds of the machines have been extensively increased and for the same reason the number of blanks supported on the machine for feeding and hence the weight of the pile of blanks supported at the feed end has also been increased. These blanks, before they reach this machine, are cut to the desired length, and they are fed to the rollers of the printer slotter by a recriprocating feed which is mounted on the printer slotter frame and on account of the high speeds employed, the feed reciprocates at a correspondingly high speed, imparting to each blank an acceleration from zero to approximately one thousand feet per minute, this acceleration being necessary to raise the speed of the blanks to the surface speed of the rollers.

Because of the practice of using in the boxes and similar products made from the blanks passing through these machines, corrugated board of various thicknesses, it is necessary to provide an adjustment of the pressure rolls to accommodate them to the different thicknesses of board.

An important object of the present invention is to provide for the adjustment of the rollers to accommodate the machine to different thicknesses of material and at the same time to avoid any weakening of the frame which is incident to the adjustment of the bearings according to certain previous practices and to do this to better advantage than in the patents above cited.

While the inventions of the previous patents above cited provide for the shifting of the rollers in the adjustment of the machine to different thicknesses of material, avoiding weakening of the frame and shifting of gears relatively to each other and avoiding the change of contact of the gears with the consequent friction and grinding action, the construction disclosed in the first-mentioned previous patent has the disadvantage that a separate outstanding support for the gears driving the pressure rollers, one being driven from the other, has been found necessary, thus increasing the width of the machine.

The last-mentioned patent while avoiding the

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necessity for additional outside support for the gears still is not entirely satisfactory. In particular the construction is still somewhat cumbersome and wide, the shaft being so long on the driven side of the roll as to permit excessive deflection thereof, resulting in undesirable wear and strain on the bearings.

The present invention relates to a mounting in which the additional outside support for the gears is eliminated, the construction is greatly simplified, long shafts are avoided, the overall width of the machine is further reduced and space economized without in any way reducing the length of the rollers or the capacity of the machine.

As the printer slotter construction to which the adjustment of the present application is applied corresponds directly to that shown in Figure 1, of Patent No. 2,191,988, further illustration of the machine as assembled is unnecessary, the roller adjustment of the present application being applied to the same rollers to which the adjustment of the said previous patent is applied. The present adjustment may also be applied to whatever rollers in this type or other types of roller machines may require adjustment transversely to their axis, to vary the grip of the rollers.

The invention further provides for the adjustment of both ends of one roller of each pair uniformly and simultaneously. The device of this invention keeps the gears permanently in perfect mesh and maintains this relation of the gears so that the gears always turn on a true pitch line and for this reason have no back lash or lost motion. Also a uniform angular relation of the rollers to and with the gears by which they are driven is maintained even though the centers of the rollers are shifted relatively to these gears in making the adjustment. Because the uniform speed of the drive is maintained, the uniform angular speed of the rollers is likewise maintained, this being a condition which is most desirable to satisfactory operation of the machine.

In the accompanying drawings forming a part hereof is illustrated a machine embodying the invention in the preferred form.

In the drawings:

Figure 1 is a fragmentary section through the axes of a pair of creaser rollers.

Figure 2 is a partial enlarged sectional view of the mounting structure on the drive side.

Figure 3 is a partial vertical transverse sectional view along the line 3—3 of Figure 2.

Figure 4 is a partial vertical transverse sectional view along the line 4—4 of Figure 2.

Figure 5 is an enlarged partial end elevational view of the bearing support.

Referring to the drawings, each numeral is used to indicate the same or similar parts in the different figures, the construction shown comprises right and left side frames 1 and 2, also upper anvil roller 3 mounted on a shaft 4 and lower creaser roller 5 on shaft 6, the shaft 4 having secured thereto the gear 7 which may be driven from the printer cylinder gear through idler 8. This gear 7 on the shaft of the upper anvil roller meshes with and drives a gear 9 having connection to the lower roller in a manner to be described.

In the form of the invention shown, the shaft 4 of the upper roller is mounted in suitable bearings 10 and 11 in the side frames 1 and 2, respectively, and the bearings 12 and 13 for the shaft of the lower adjustable roller are mounted in rotatable tubular carriers or eccentrics 14 and 15 and which fit rather closely in circular seats or bearings 16 and 17 in the side frames 1 and 2, respectively. The bearings 12 and 13 are eccentrically mounted in said carriers 14 and 15 in order that the rotation of the said carriers in their respective bearings or seats 16 and 17 may provide for adjustment of the roller 5 to and from the roller 3. In this way the full strength of the frames is maintained with a relatively reduced weight of material as compared to certain of the previous arrangements which provide for adjustment of the rollers by means which weaken the frames as above defined.

The eccentrics or carriers 14 and 15 are provided with gear teeth 18 and 19 and there is an adjusting shaft 20 mounted in the frames below the roller 5 or in any convenient position, the adjusting shaft being provided with pinions 21 and 22 secured thereto and having teeth meshing with the gear teeth 18 and 19 on the respective carriers, whereby these carriers or eccentrics may be turned uniformly, giving a uniform and equal adjustment of the respective ends of the roller or more particularly of their bearings at the respective ends thereof, thus maintaining the roller grip uniform throughout the length of each pair of rollers, one of which is adjusted as described.

An important feature of the invention resides in the mounting of the carrier 15 so that teeth 19 thereof on the drive side of the machine are on the inside of side frame 2 and the pinion 22 on the drive side is inside of side frame 2 closely adjacent thereto to rotate the carrier. The pinion 21 on the other side of the machine is shown as mounted as usual on the outside of side frame 1. A flanged plate 23 is mounted on the inside of side frame 2, the flange 24 engaging the carrier 15 on its inner vertical face adjacent teeth 19 and having a semi-circular recess 25 at the bottom thereof for pinion 22, Figure 4.

Mounted in the circular bearing or seat 17 on the outside of side frame 2 is a bearing mounting 26 having a circular flange 27 projecting into the seat 17, carrier 15 having groove 28 in its outer periphery receiving said flange 27. The bearing mounting comprises an inner plate 29 carrying the flange 27 and having an inner circular bearing 30 and an outer cup-shaped extension 31 having an outer circular bearing 32. The cup-shaped extension 31 provides a space 33 for drive gear 9 which is mounted on a stub shaft 34 in bearings 30 and 32.

The stub shaft 34 drives the creaser shaft 6 in any suitable manner as by the floating coupling 35 to be described.

Because of the mounting of teeth 19 of carrier 16 inside of side frame 2, it is possible to mount floating coupling 35 within the bearing seat 17, in the central hollow space 36 of the carrier 15.

The stub shaft 34 carries a disc 37 rotatable within carrier space 36 and having rollers 38 mounted thereon engaging floating plate 39 of floating coupling 35, by diametrically opposite slots 40, Figure 3. A second disc 41 is secured to reduced shaft portion 42 of shaft 6 by any suitable means as screw 43 passing through plate 44 in a shouldered recess 44' in the disc 41 and disc 41 has a hub 45 keyed at 46 to the shaft 42 to rotate the shaft with the disc. The disc 41 carries rollers 47 engaging floating plate 39 by diametrically opposite slots 48 disposed substantially at right angles to slots 40.

Important accomplishments of the invention are that the construction is made much more rigid and less liable to failure, and it is also simplified so that it can be built and assembled at a smaller cost and the overall dimension of the machine as measured at right angles to the axis of the rollers is considerably reduced.

It should be understood that this adjustment is intended to be applied to all of the various rollers to which the corresponding adjustment in the first above cited patent is applied as shown in said patent and to other rollers in this and similar machines.

It is important to note that as the shaft 6 of the creaser rollers moves up and down in order to accommodate corrugated board of different thicknesses or the like, the position of its driving gear is not changed and it should also be noted that the angular relation between the shaft 6 and the gear is constant and there is no relative shifting of the shaft 6 or creaser roller relatively to the anvil rollers 3 due to the adjustment, reference being had to relative change of angularity.

Important advantages are increased compactness, simplicity, cheapness, reduced dimension, and reduced liability to failure and consequent reduction of service expense in the operation of the machine.

There has been described specifically and in detail a single embodiment of the invention in order that the manner of constructing, applying, operating and using the same may be fully understood, however, the specific terms herein are used descriptively rather than in a limiting sense, the construction being capable of considerable variation in its application to the purpose in hand, and the scope of the invention is pointed out in the claims.

What is claimed as new and is desired to be secured by Letters Patent is:

1. In a printer slotter, a pair of co-operating rollers adapted to engage the opposite sides of a sheet to be fed by the application of gripping pressure thereto to advance the sheet, one of said rollers having a shaft, bearings therefor at the opposite ends of said shaft, the said printer slotter having continuous side frames with circular seats therein, rotary carriers one for each of said bearings mounted in said circular seats in said side frames, said carriers being rotatable in said seats about an axis which is parallel to but eccentrically spaced from the axis of said bearings, a bearing support including a plate rigidly secured to the outside of one of said frames and mounted in one of said side frame

circular seats, a bearing on said bearing support concentric with said seat, a drive gear for said roller mounted on said bearing on said bearing support and outside and closely adjacent said plate, and a floating coupling within the carrier adjacent the plate providing a laterally variable driving connection from said gear to said roller shaft.

2. In a printer slotter for corrugated board and similar box blanks having pairs of rotary members comprising pull rollers, printing cylinders and slotting rollers and the like between the members of which pairs the blanks are passed under pressure, the members of each pair being arranged in parallel, said printer slotter having continuous side frames having circular seats therein, means whereby one member of some of said pairs is mounted for adjustment and is adjusted toward and from the other member of said pair, comprising a pair of rotary carriers for each adjustable member mounted in said circular seats in said side frames, bearings eccentrically arranged on each said carrier rotatably supporting the opposite ends of said adjustable members, a bearing support including a plate rigidly secured to the outside of one of said frames and mounted in one of said side frame circular seats, a bearing on said bearing support, a drive gear for each adjustable member mounted on said bearing support bearing outside and closely adjacent said plate and in approximate alignment with the axis of its corresponding driven member, means within the carrier adjacent the plate for transmitting the torque and motion from the drive gear to its said corresponding member maintaining the angular relation between the gear and said corresponding member constant, gear teeth in said eccentric carrier adjacent the drive gear on the periphery of the carrier and within said side frame supporting said adjacent carrier for rotating the carrier.

3. In a printer slotter for corrugated board and similar box blanks having pairs of rotary members comprising pull rollers, printing cylinders and slotting rollers and the like between the members of which pairs the blanks are passed under pressure, the members of each pair being parallel, said printer slotter having continuous side frames having circular seats therein, means whereby one member of some of said pairs is mounted for adjustment and is adjusted toward and from the other member of said pair, comprising a pair of rotary carriers for each adjustable member mounted in said circular seats in said side frames, bearings eccentrically arranged on each said carrier rotatably supporting the opposite ends of said adjustable members, a bearing support including a plate mounted on the outside of one of said side frames, a bearing on said bearing support, a drive gear for each adjustable member mounted on said bearing support bearing and outside and closely adjacent said plate in approximate alignment with the axis of its corresponding driven member, means within the carrier adjacent the plate for transmitting the torque and motion from the drive gear to its said corresponding member maintaining the angular relation between the gear and said corresponding member constant, gear teeth in said eccentric carrier adjacent the drive gear on the periphery of the carrier and within said side frame supporting said adjacent carrier for rotating the carrier.

4. In a slotter for corrugated board and similar box blanks having pairs of rotary members comprising pull rollers, printing cylinders and slotting rollers and the like between the members of which pairs the blanks are passed under pressure, the members of each pair being parallel, said printer slotter having continuous side frames having circular seats therein, means whereby one member of some of said pairs is mounted for adjustment and is adjusted toward and from the other member of said pair, comprising a pair of rotary carriers for each adjustable member mounted in said circular seats in said side frames, bearings eccentrically arranged on each said carrier rotatably supporting the opposite ends of said adjustable members, a bearing support including a plate mounted on the outside of one of said side frames, a bearing on said bearing support, a drive gear for each adjustable member mounted on said bearing support bearing and outside and closely adjacent and in approximate alignment with the axis of its corresponding driven member, means for transmitting the torque and motion from the drive gear to its said corresponding member maintaining the angular relation between the gear and said corresponding member constant, gear teeth in said eccentric carrier adjacent the drive gear on the periphery of the carrier and within said side frame supporting said adjacent carrier for rotating the carrier, said transmitting means being disposed substantially wholly within the circular seat adjacent the plate.

5. In a printer slotter, a pair of co-operating rollers adapted to engage the opposite sides of a sheet to be fed by application of gripping pressure thereto to advance the sheet, one of said rollers having a shaft, bearings therefor at the opposite ends of said shaft, the said printer slotter having continuous side frames with circular seats therein, rotary carriers one for each of said bearings, mounted in said circular seats in said side frames, said carriers being rotatable about an axis which is parallel to but eccentrically spaced from the axis of said bearings, a bearing support including a plate rigidly secured to the outside of one of said frames and mounted in one of said side frame circular seats, a bearing on said bearing support, a drive gear for said roller mounted on said bearing support bearing and outside and closely adjacent said plate and a floating coupling providing a laterally variable driving connection from said gear to said roller shaft, said floating coupling lying substantially wholly within the circular seat adjacent the plate.

6. In a printer slotter for corrugated board and similar box blanks having pairs of rotary members comprising pull rollers, printing cylinders and slotting rollers and the like between the members of which pairs the blanks are passed under pressure, the members of each pair being arranged in parallel, said printer slotter having continuous side frames having circular seats therein, means whereby one member of some of said pairs is mounted for adjustment and is adjusted toward and from the other member of said pair, comprising a pair of rotary carriers for each adjustable member mounted in said circular seats in said side frames, bearings eccentrically arranged on each said carrier rotatably supporting the opposite ends of said adjustable members, a bearing support including a plate mounted on the outside of one of said side frames having a central space and a pair of circular bearings on either side of said space with

one in said plate, a shaft mounted in said bearing support circular bearings in approximate alignment with the axis of its corresponding driven member, a drive gear for each adjustable member fixed to said shaft and rotatable in said bearing support space closely adjacent said plate, a floating coupling mounted between said shaft and said driven member within the carrier adjacent the plate for transmitting the torque and motion from the drive gear to its said corresponding member maintaining the angular relation between the gear and said corresponding member constant.

7. In a printer slotter for corrugated board and similar box blanks having parts of rotary members comprising pull rollers, printing cylinders and slotting rollers and the like between the members of which pairs the blanks are passed under pressure, the members of each pair being parallel, said printer slotter having continuous side frames having circular seats therein, means whereby one member of some of said pairs is mounted for adjustment and is adjusted toward and from the other member of said pair, comprising a pair of rotary carriers for each adjustable member mounted in said circular seats in said side frames, bearings eccentrically arranged on each said carrier rotatably supporting the opposite ends of said adjustable members, a bearing support including a plate mounted on the outside of one of said side frames in the circular seat thereof and having a central space, a pair of circular bearings, one on each side of said space with one in said plate, a shaft mounted in said bearing support circular bearings in approximate alignment with the axis of its corresponding driven member, a drive gear for each adjustable member fixed to said shaft and rotatable in said bearing support space closely adjacent said plate, a floating coupling mounted between said shaft and said driven member within the carrier adjacent the plate for transmitting the torque and motion from the drive gear to its said corresponding member maintaining the angular relation between the gear and said corresponding member constant.

8. In a printer slotter, a pair of co-operating rollers adapted to engage the opposite sides of a sheet to be fed by application of gripping pressure thereto to advance the sheet, one of said rollers having a shaft, bearings therefor at the opposite ends of said shaft, the said printer slotter having continuous side frames with circular seats therein, rotary carriers one for each of said bearings mounted in said circular seats in said side frames, said carriers being rotatable about an axis which is parallel to but eccentrically spaced from the axis of said bearings, a bearing support including a plate mounted on the outside of one of said side frames adjacent its circular seat, a bearing on said bearing support, a drive gear for said roller mounted on said bearing support and outside and closely adjacent said plate and a floating coupling within the carrier adjacent the plate providing a laterally variable driving connection from said gear to said roller shaft.

9. In a printer slotter, a pair of co-operating rollers adapted to engage the opposite sides of a sheet to be fed by application of gripping pressure thereto to advance the sheet, one of said rollers having a shaft with bearings therefor at the opposite ends of said shaft, the said printer slotter having continuous side frames with circular seats therein, rotary carriers one for each of said bearings mounted in said circular seats in said side frames, said carriers being rotatable about an axis which is parallel to but eccentrically spaced from the axis of said bearings, a bearing support including a plate mounted on the outside of one of said side frames having a central space and a pair of circular bearings one on each side of said space with one in said plate, a shaft mounted in said bearing support circular bearings in approximate alignment with the axis of its corresponding driven member, a drive gear for each adjustable member fixed to said shaft and rotatable in said bearing support space closely adjacent said plate, a floating coupling mounted between said shaft and said driven member within the carrier adjacent the plate for transmitting the torque and motion from the drive gear to its said corresponding member maintaining the angular relation between the gear and said corresponding member constant.

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Number	Name	Date
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2,259,441	Fitchett	Oct. 21, 1941
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