Aug. 21, 1951 P. E. WIXON ET AL 2,565,162

PAPER FEED MECHANISM FOR CUP-MAKING MACHINES

Original Filed Jan. 6, 1948 2 Sheets-Sheet 1

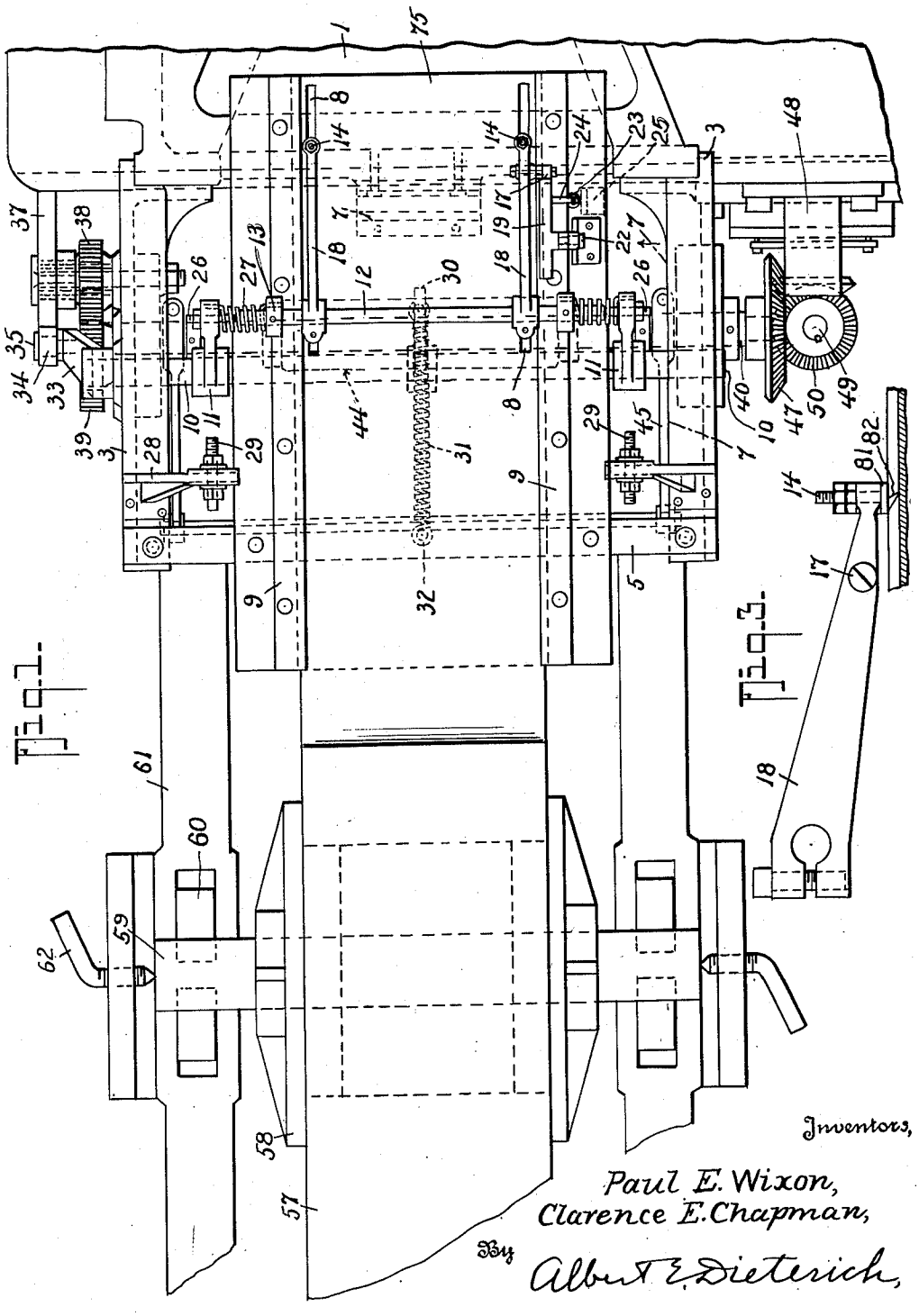


Fig. 1.

Fig. 2.

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Fig. 2.

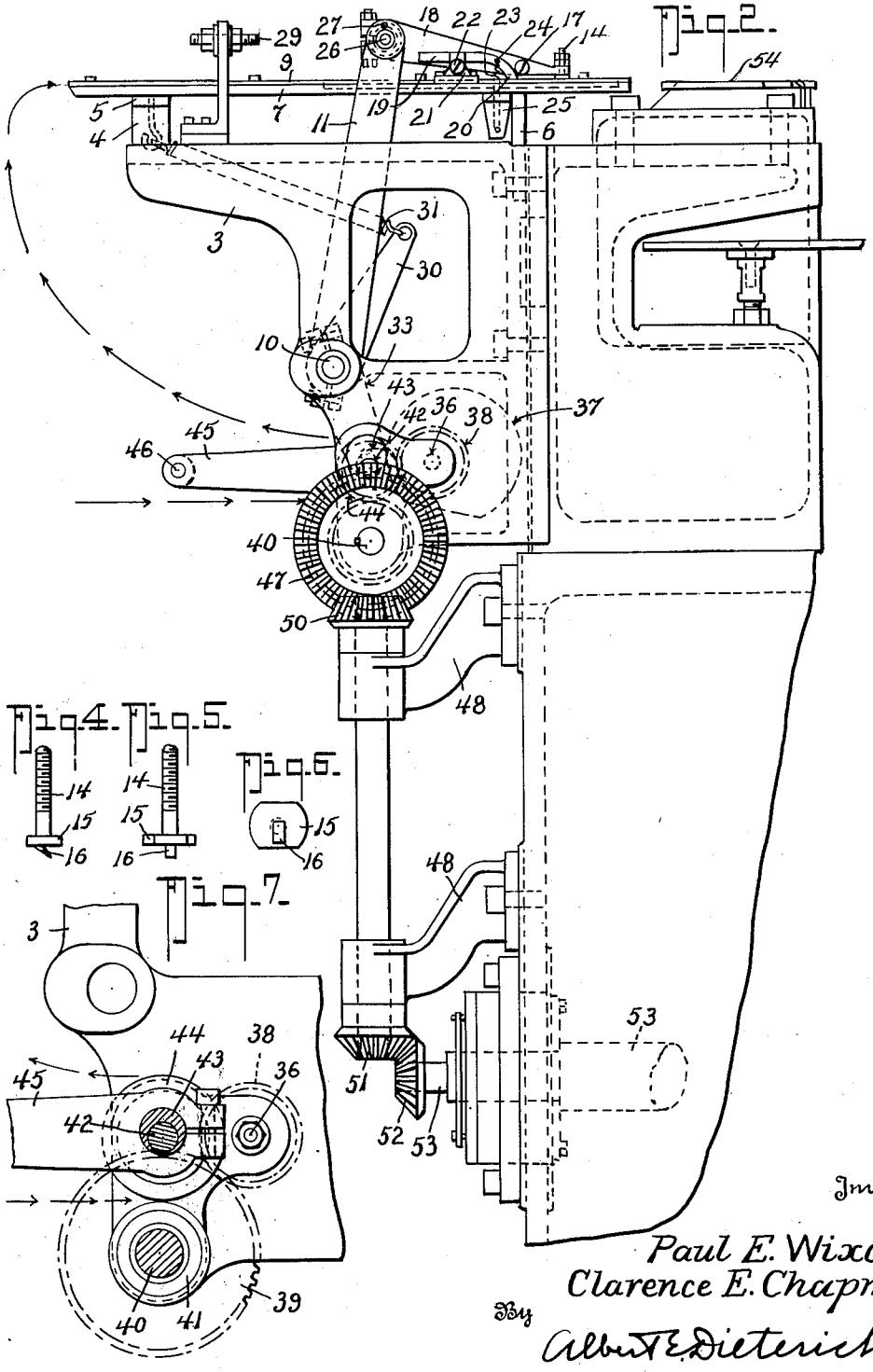


Fig. 4. Fig. 5.

Fig. 6.

Fig. 7.

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PAPER FEED MECHANISM FOR CUPMAKING MACHINES

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Original application January 6, 1948, Serial No. 748. Divided and this application May 23, 1949, Serial No. 94,892

5 Claims. (Cl. 271—2.5)

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Our invention relates to machines for making paper cups and it primarily seeks to provide an improved means for feeding paper from a continuous roll to the body-blanking dies of a machine of the type disclosed in Letters Patent No. 1,766,420, issued June 24, 1930.

In the drawings,

Fig. 1 is a top plan view of so much of a cupmaking machine as is necessary to illustrate our invention.

Fig. 2 is a side elevation of the parts shown in Fig. 1.

Fig. 3 is an enlarged detail side elevation of the perforator feed finger later specifically referred to.

Fig. 4 is a side elevation, on a larger scale than Fig. 1, of one of the perforator feed finger inserts.

Fig. 5 is a side elevation of the same looking from right to left in Fig. 4.

Fig. 6 is a bottom view of the same.

Fig. 7 is a detail vertical section on the line 7—7 of Fig. 1.

In the drawings in which like numerals of reference indicate like parts in all the figures, 1 represents a part of the base of the machine and 54 indicates a cam shaft of the machine from which the paper feed mechanism is driven.

Mounted on the end of the base where the cup body blanking mechanism is located is the paper perforator feed and drive assembly. By reference to Figs. 1 and 2 it will be observed that 3 represents perforator feed brackets on which are mounted feed plate holding bar spacers 4 which carry a feed plate holding cross bar 5 to which and to an angle bracket 6 a feed plate 7 is attached in any suitable way. The plate 7 has longitudinal grooves 8 with which perforator feed finger inserts 14 cooperate. The inserts 14 are carried by fingers 18 that are mounted on a rod 12 that is carried by levers 11. The levers 11 are secured to a shaft 10, later again referred to. Paper guide bars 9 are mounted on plate 7 according to the width of paper used.

A perforator feed finger operating shaft 10 is journalled in the brackets 3 and carries pivot screws 26 between which a perforator feed finger pivot rod 12 is mounted. Springs 27 on the rod are anchored to levers 11 and to collars 13 and continuously tend to hold the fingers 18 with their inserts 14 in the grooves 8. The inserts 14 (see Figs. 4, 5 and 6) have flat heads 15 which ride on the plate 7 and chisel points or teeth 16 which ride in the slots or grooves 8. One of the perforator feed fingers 18 has a lifting roller 17 which cooperates with a perforator feed finger

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lifting cam 19 (see Figs. 1 and 2) which cam is fulcrumed on a stud 22 carried by a bracket 21 that is mounted on the plate 7. A spring 23 is anchored to a bracket 25 and to a stud 24 on the cam 19 to hold its end 20 yieldably down on the adjacent guide bar 9. The cam 19 is so located above the bar 9 that on the forward movement of the fingers 18 the roller 17 will ride under the cam and on the return movement the roller 17 will ride up and over the cam, as will more fully appear later.

The backward movement of the levers 11 is arrested by means of adjustable stops 29 on brackets 28 carried by the perforator feed brackets 3 and the levers 11 are constantly urged toward such stops by a coil spring 31, one end of which is connected to a hook 32 and the other end is connected to an arm 30 secured on the shaft 10. Also secured on the shaft 10 is a cam roller lever 33 which carries a cam roller 34 (Fig. 1) that is engaged by a cam 37 which is rotatable on a stud 36 and is operatively connected to a gear 38 also journalled on the stud 36. The roller 34 is journalled on a stud 35 that is carried by the lever 33.

The gear 38 meshes with a cam drive gear 39 that is mounted on a drive shaft 40. The shaft 40 is journalled in suitable bearings in the brackets 3 (Fig. 7). The shaft 42 is journalled in eccentric bushings 43 that are oscillatably journalled in the brackets 3 and capable of being rocked by arms 45 secured to the bushings and connected together by a rod 46.

Mounted on the shaft 40 is a paper unwinder drive roll 41 while a paper unwinder driven roll 44 is carried by the shaft 42.

Secured to the shaft 40 is a bevel gear 47 which meshes with a pinion 50 (Fig. 2) on a vertical drive shaft 49 that is journalled in bearing brackets 48 secured to the base port 1. The shaft 49 is driven from the front cam shaft 53 through bevel gears 51 and 52.

The paper for the body of the cup is in a roll 57 held between plates 58 on a shaft 59 resting on bearing rollers 60 in frames or brackets 61 and held in place by centering screws 62 (Fig. 1). The paper is placed over the roll 41 and around the roll 44 and from thence is carried in a loose loop over the free edge of the plate 7, and along the plate between the guide bars 9, under the feed fingers 18 by which fingers the paper is advanced to the body blanking mechanism. It will be understood that when the paper is passed under the fingers 18 their teeth 16 will perforate the paper and thereby effect a positive connection with the paper so that as the shaft 12 is advanced

from its back position where levers 11 rest against the stops 29, to the position shown in Figs. 1 and 2 the paper will be advanced a predetermined distance with its advance end between the body blanking dies. While the dies are in operation shaft 12 is quickly returned to its back position, roller 17 riding over the cam 19 to free the teeth 16 from the paper and drop the teeth again into the paper after the fingers shall have been lifted and cleared the cam 19. The paper is thus fed to the blanking dies step-by-step.

The paper is continuously unrolled by the rolls 41, 44 and intermittently advanced by the perforator feed fingers, the two operations being so timed that there is always a slack portion of the paper between the feed rolls 41, 44 and the entrant (left in Fig. 2) end of the feed plate 7 (see arrows Fig. 2).

This application is a division of our application filed January 6, 1948, Serial No. 748, which has matured into Patent No. 2,546,621 on March 27, 1951.

What we claim is:

1. In a machine of the class described, a support, a feed plate over which a continuous strip of paper may pass, guide bars on said plate, and means cooperating with said plate and guide bars for advancing the strip of paper forwardly step-by-step, said means comprising a finger operating shaft journalled in said support, a horizontal driving shaft, a vertical drive shaft geared to said horizontal driving shaft, means for supporting said vertical drive shaft, a paper unwinder drive roll shaft having a drive roll thereon and being gear-connected with said vertical driving shaft and having bearing in said support, a cam journalled on a stud carried by said support, gear connections between said cam and said drive roll shaft, a paper unwinder driven roll having a shaft mounted in said support in cooperative relation to said drive roll, a lever mounted on said finger operating shaft and having a cam roller to engage said cam, finger operating levers secured to said finger operating shaft, feed fingers carried by said finger operating levers, paper perforators on said fingers for engaging and perforating the paper strip and feeding it forwardly, means to disengage the perforators from the paper at the end of the forward stroke of the fingers and hold them free of the paper during the back stroke of the fingers, means to restore the perforators to the paper at the end of said back stroke, and means continuously tending to move the fingers backwardly.

2. A machine according to claim 1 wherein the means for disengaging the perforators from the paper strip includes a finger lifting cam pivotally mounted on and above said feed plate and having its advance end held yieldingly in contact with said plate, and a finger lifting roller on one of said fingers for cooperation with said finger lifting cam and adapted to ride under the

cam on the forward stroke of the fingers and to ride up and over said finger lifting cam on the back stroke of the fingers.

3. A machine according to claim 1 wherein the driven roll shaft is mounted on eccentric bushings, and arms are provided for turning said eccentric bushings at will to raise and lower said driven roll.

4. A machine according to claim 1 wherein adjustable back stops, for said finger operating levers, are mounted on said support.

5. In a machine of the class described, a plate over which a continuous strip of paper is fed, said plate having spaced grooves formed therein, supports for said plate, a finger operating shaft journalled in said supports, finger operating levers on said shaft, a pivot rod carried by said levers, fingers carried by said pivot rod, paper engaging and perforating inserts in said fingers, said perforating inserts having flat heads formed on an end thereof for engaging said plate, perforating teeth provided on said heads and adapted to project into the grooves in said plate, collars secured to said pivot rod adjacent said fingers, spring means on said pivot rod intermediate said finger operating levers and collars for retaining said perforating teeth in said grooves, means for rocking said finger operating shaft to move said fingers back and forth along said grooves, and means for lifting said fingers clear of the paper strip on the back stroke only of said fingers, a finger lifting cam pivotally mounted on said support, resilient means engaging one end of said cam for yieldably retaining said end of the cam in engagement with said plate, said finger lifting means including a roller on one of said fingers adapted to pass under said cam against the action of said spring on the forward stroke and to pass over said cam on the back stroke of said fingers.

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