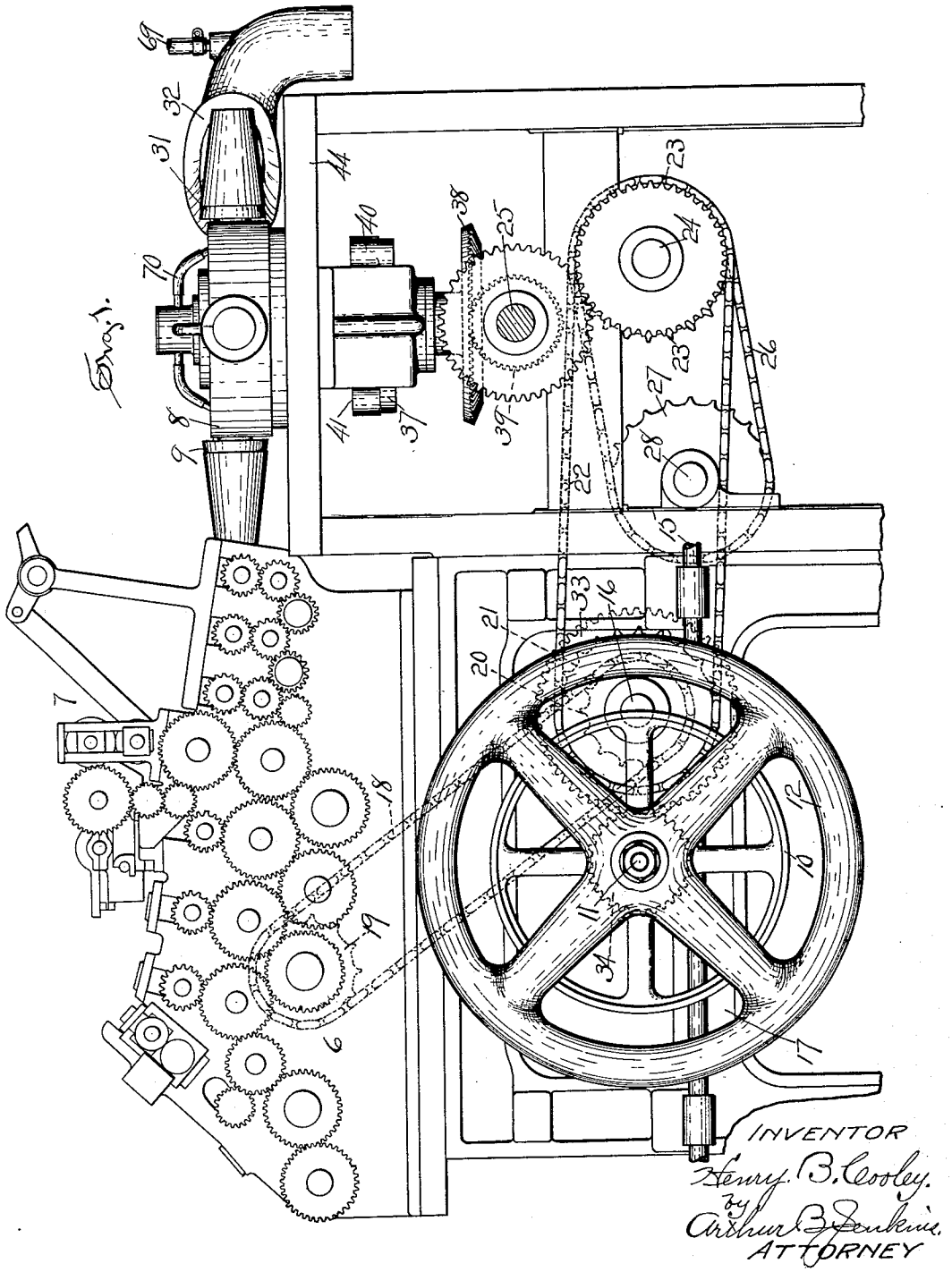
April 17, 1934. H. B. COOLEY 1,955,577

STOPPING MECHANISM

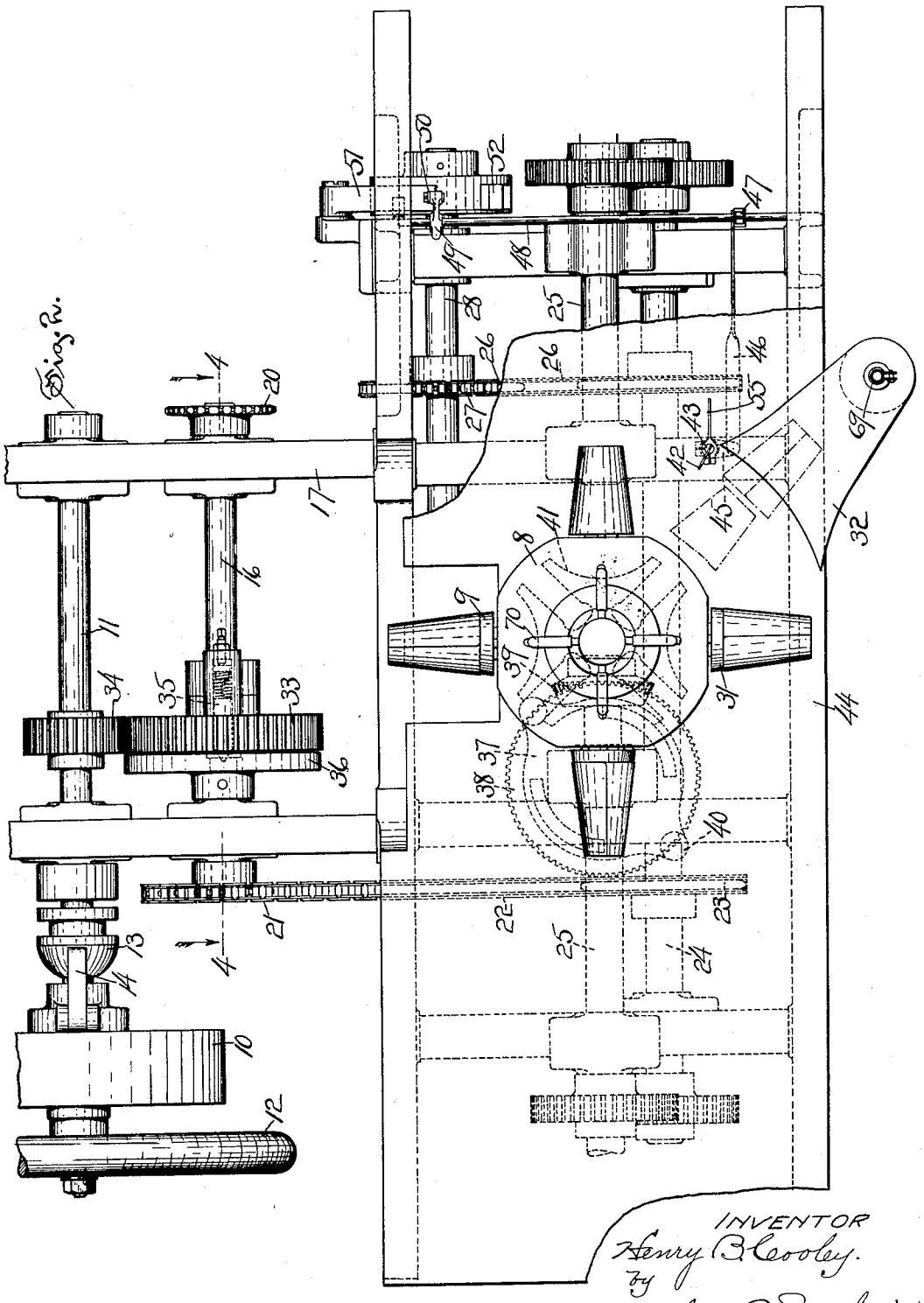
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STOPPING MECHANISM

Filed Feb. 1, 1933 3 Sheets-Sheet 2



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STOPPING MECHANISM

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Fig. 3.

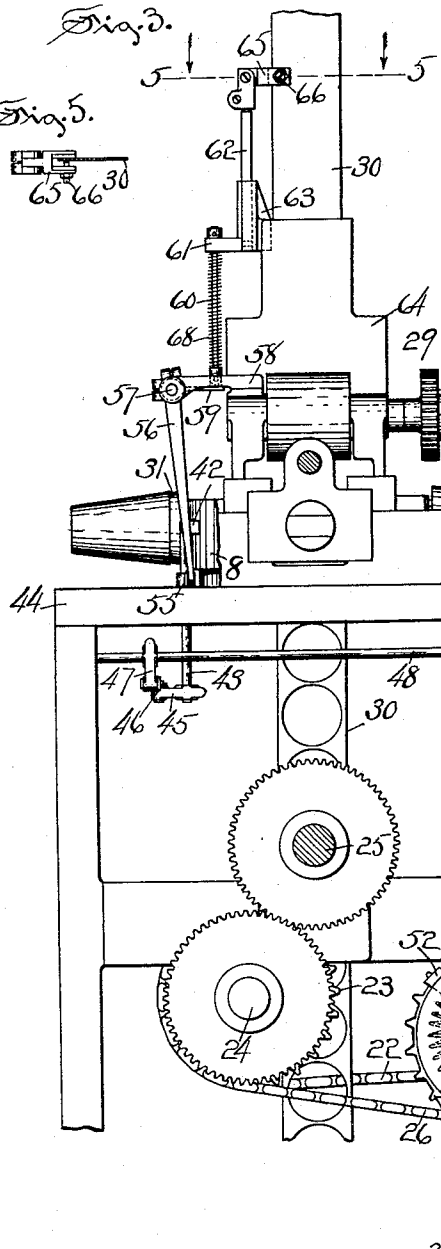


Fig. 5.

Fig. 6.

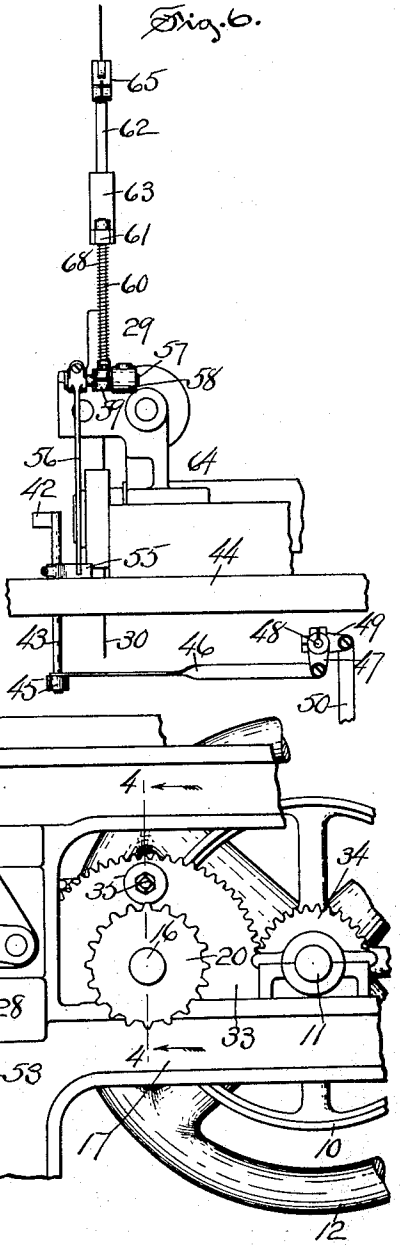
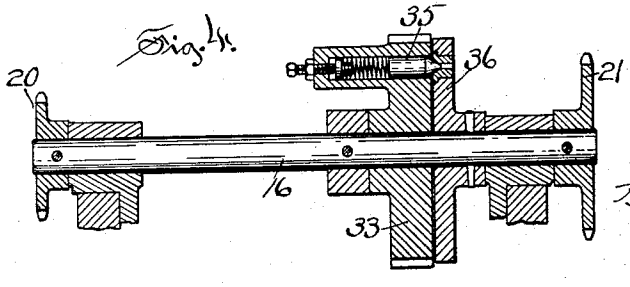


Fig. 4.



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UNITED STATES PATENT OFFICE

1,955,577

STOPPING MECHANISM

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Application February 1, 1933, Serial No. 654,597

12 Claims. (Cl. 93—39)

My invention relates to the class of devices which are employed for stopping the operations of machines, and an object of my invention, among others, is the production of a stopping mechanism that shall be simple in construction and sure and effective in its operation.

One form of a stopping mechanism embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of a cup making machine embodying my invention with parts beyond omitted.

Figure 2 is a plan view of a portion of the machine shown in Fig. 1, parts being broken away to show construction underneath.

Figure 3 is a view in side elevation of a portion of the machine looking in a direction opposite to that viewed in Figure 1 and illustrating some parts not shown in Figure 1.

Figure 4 is a view in section on a plane denoted by the dotted line 4—4 of Figures 2 and 3.

Figure 5 is a view in section on a plane denoted by the dotted line 5—5 of Figure 3.

Figure 6 is a side view of the bottom forming mechanism shown in Figure 3.

My invention is particularly applicable for stopping the operations of machines in which articles or devices being operated upon by the machines are moved past certain points or in which material of improper thickness caused by the producers in overlapping the ends of strips to splice or piece them together may be prevented from passing into the machines. It will be understood that my invention is not limited to use in machines of any particular type, but as it is well adapted for use in connection with machines for making cups from paper or other like material and in which the stopping mechanism has been demonstrated by me, such a machine has been adopted for the purpose of disclosure of my invention herein. Such machine embodies feeding mechanism generally denoted by the numeral 6 and which comprises feed rolls and gumming mechanism 7 with gumming rolls, all of which may be interconnected by intermeshing gears and pinions, as shown in Fig. 1 of the drawings, a detailed description of such mechanism not being necessary to a clear understanding of my invention. The blanks are delivered by the feeding mechanism to cup forming mechanism, the turret 8 and mandrels 9 thereon only of which are shown herein.

Briefly described the machine is driven by means of a belt applied to a driving pulley 10 loosely mounted on a driving shaft 11 having a hand wheel 12 as a means for temporary manual operation. The driving pulley is connected to the driving shaft as by means of a clutch which may be of any well known construction, a detailed description of which is not necessary herein, it being sufficient to state that it embodies a cone 13 operating clutch fingers 14, the cone having an annular groove to receive the fork of a shifting lever which may be operated by a clutch actuating rod 15, shown in Fig. 1, in a manner that will be readily understood.

The driving shaft 11 is connected by an intermeshing pinion and gear, as shown in Fig. 2, with a secondary shaft 16 said shafts being mounted in side bars 17 comprising a part of the frame of the machine. The feeding mechanism may be driven from said secondary shaft as by means of a sprocket chain 18 passing around a sprocket 19 secured to a shaft of said feeding mechanism and a sprocket 20 secured to the shaft 16.

The shaft 16 also supports a sprocket 21 connected, as by means of a chain 22, with a sprocket 23 secured to an intermediate shaft 24 mounted in bearings in the frame of the machine and connected by intermeshing gears preferably at opposite ends thereof with the opposite ends of a turret driving shaft 25, as shown in Figs. 1 and 2 of the drawings. The shaft 24 is also connected as by means of a sprocket chain 26 and sprocket 27 to drive a stop motion shaft 28 mounted on the frame of the machine underneath bottom forming mechanism 29, the structure of the latter not being described in detail herein, it being sufficient to state that it comprises dies for cutting blanks to form cup bottoms from a strip 30 of paper or other comparatively thin material. All of the mechanism thus far referred to has been described in general terms, but its construction and operation will be readily understood by those skilled in the art and its application to the parts comprising the invention to be hereinafter described will also be readily perceived.

It is briefly stated that the cup bottoms after being cut and formed are inserted by said forming mechanism in recesses in the ends of said mandrels 9 to be later forced out of the recesses in the projecting bottom ends of cup bodies located on the mandrels.

After the completion of cups upon the mandrels 9, each last operation taking place upon the mandrel 31, said cups are automatically removed in the travel of said mandrels to the next position where the formation of another cup is

begun. During this movement the mandrel 31 sweeps past a chute 32 and the cup is removed from the mandrel by air pressure or suction. This may be effected as by means of a current of air delivered into the chute 32 through a pipe 69 entering the chute beyond the mouth thereof to create a partial vacuum between the pipe and said mouth to withdraw the cups from the mandrel. The cups may also be forced from the mandrel as by pressure of air delivered through pipes 70 suitably connected with any source of pressure which is transmitted to the interior of each of the mandrels 31. Should a cup fail to be removed from the mandrel, mechanism now to be described is provided for stopping the operation of the entire machine.

Such mechanism comprises a gear 33 driven by an intermeshing pinion 34 on the driving shaft 11, said gear 33 being loosely mounted on the secondary shaft 16. A clutch detent 35 having a tapered end to engage within a socket in a clutch disk 36 secured to the shaft 16 is spring pressed to engage said socket, and its tapered end is such that a certain amount of resistance to rotation of the disk 36 will slip the detent out of its sockets and permit the gear 33 to rotate independently of the shaft 16.

The step-by-step rotation of the turret 8 is effected by means of a so-called Geneva mechanism comprising a disk 37 rigidly connected with a bevel gear 38 in mesh with a bevel pinion 39 secured to the shaft 25. Driving studs 40 project from the disk 37 and engage open ended radially formed slots in the member 41 rigidly connected with the turret shaft, and as shown in Fig. 1 and 2 of the drawings. At each engagement of a stud 40 with a slot in the member 41 a one-step movement is imparted to the turret in a manner that will be readily understood.

As a cup on the turret is moved from the position in which the formation of the cup is completed it is swept opposite the mouth of the chute 32 into which it is forced as by the operation of the air currents hereinbefore described. Should, however, a cup fail to be removed from the mandrel at this point the bottom edge of said cup will strike a stop finger 42 projecting from a stop motion actuating shaft 43 pivotally mounted in and projecting through a table 44 on which the turret is mounted and having at its opposite end an arm 45 connected by a bar 46 with an arm 47 on a stop motion connecting shaft 48 pivotally mounted underneath the table 44. The shaft 48 has an arm 49 connected by a bar 50 with a stop dog 51 pivotally mounted on the frame of the machine, and as shown in Fig. 3.

When the stop finger 42 is actuated by a cup retained on the mandrel, as just described, the connecting mechanism just referred to projects the end of the dog 51 into the path of movement of a resistance lever 52 secured to the shaft 28 and within a drum 53 secured to the shaft 28. A cushioning spring 54 within the drum resists movement of the lever 52 and thereby acts as a cushion for the same. As the lever 52 strikes the end of the dog 51 now interposed in its path, as just described, resistance to movement of the shaft 28 takes place and this resistance is communicated to the shaft 16 through the sprocket 27, chain 26, shaft 24, sprocket 23, chain 22, sprocket 21, the shaft 16 and the disk 36 secured thereto. This resistance is sufficient to disengage the detent 35 from its recess in said disk, thereby causing the gear 33 to rotate independently of the shaft 16, stopping the operation of the machine. When the cause for stopping the machine is removed and pressure of the lever 52 against the dog 51 is released a spring 67 secured at one end to the bar 50 and at its opposite end to the frame will return the parts to their normal positions ready for another operation.

Another stop motion controlling mechanism includes a second stop finger 55 extending from the shaft 43 into the path of a pivotally mounted actuating arm 56 which, when engaged with the finger 55, actuates the shaft 43 to effect stopping movement of the machine in the manner just described. The arm 56 is secured to and projects from a shaft 57 mounted in a bracket 58 and having an arm 59 connected by a rod 60 with the foot 61 of a slide rod 62 mounted in a bracket 63 secured to the frame 64 of the bottom forming mechanism supported on the table 44, as shown in Fig. 3 of the drawings, the bracket 58 being also secured to said frame.

A detector 65 is supported by the rod 62 and has a slot through which one edge of the strip 30 from which the cup bottoms are formed projects, the width of said slot being governed by a gage screw 66 projecting into the slot, and as shown in Fig. 5 of the drawings.

If the strip 30 of paper or other thin material from which the cup bottoms are formed is too thick at any point, as soon as this thickened portion encounters the gage screw 66 binding action will follow and the rod 62 will be moved downwardly, thereby moving the rod 60 and operating the arm 59 to swing the arm 56 into contact with the finger 55, thereby stopping the machine as hereinbefore described. When the obstruction has been removed a spring 68 on the rod 60 will return the parts to their normal positions, ready for another stopping operation.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative, and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A cup making machine including a carrier having a mandrel to receive a blank, means for forming a blank into a cup body on said mandrel, means for moving said carrier, means for removing said body from said mandrel, a trip located between two stations and in an extended path of travel of said body past said removing means and operative independently of said mandrel, and stop mechanism mechanically connected with said trip for operation thereby before a cup reaches the next station.

2. A cup making machine including a carrier having a mandrel to receive a blank, means for forming a blank into a cup body on said mandrel with its end extending beyond the end of said mandrel, means for moving said carrier, means for removing said body from said mandrel, a trip located in an extended path of travel of the projecting end of said body past said removing means and operative independently of said mandrel, and stop mechanism operatively connected with said trip for operation thereby to stop said machine.

3. A cup making machine including a carrier having a mandrel to receive a blank, means for forming a blank into a cup body on said mandrel,

means for moving said carrier, a chute having a mouth past which the end of said mandrel sweeps in its movement, a trip located in an extended path of travel of said blank past the mouth of said chute and operative independently of said mandrel, and stopping mechanism operatively connected with said trip for operation thereby to stop said machine.

4. A cup making machine including a carrier having a mandrel to receive a blank, means for forming a blank into a cup body on said mandrel, means for moving said carrier, mechanism for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed, said detector including means for preventing passage therethrough of an excess thickness in said strip and thereby to effect operation of said detector, means for removing formed bodies from said mandrel, a trip located in an extended path of travel of said blank past said removing means, a stop mechanism operatively connected with said trip for operation thereby to stop said machine, and an operative connection between said detector and said trip for operation of the latter by the former.

5. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, mechanism for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed said detector being mounted to move in the same direction as the direction of movement of said strip and including means for effecting movement of said detector upon engagement thereby of an excess thickness of said strip, means for removing formed bodies from said mandrel, a trip located in an extended path of travel of said blank past said removing means, a stopping mechanism operatively connected with said trip for operation thereby to stop said machine, and an operative connection between said trip and said detector for operation of the former by the latter.

6. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, mechanism for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed, said detector including means for preventing passage of an excess thickness of material in said strip and thereby to effect operation of said detector, means for removing formed bodies from said mandrel, a movably mounted stop actuating device, a trip finger projecting from said device into an extended path of travel of said blank past said removing means, a second trip finger projecting from said device, and an operative connection with said detector, said connection including a member movably mounted to contact with said second trip finger.

7. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, means for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed, said detector including means for preventing passage of an excess thickness of material in said strip and thereby to effect operation of said detector, means for removing formed bodies from the mandrel, a stop motion mechanism, a connection between said detector and stop motion mechanism for operation of the latter by the former, a trip finger located in an extended path of travel of said blank past said removing means, and a connection between said trip finger and the other connection for operation of a portion of the latter independently of the other portion thereof to operate said stopping mechanism.

8. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, mechanism for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed, said detector including means for preventing passage of an excess thickness of material in said strip and thereby to effect operation of said detector, means for removing formed bodies from said mandrel, a stop motion mechanism, an interrupted connection between said detector and said stop motion mechanism for operation of the latter, and a trip finger projecting from a member of said connection into an extended path of travel of said blank past said removing device to operate that part of said connection extending from the point of interruption to the stop motion mechanism.

9. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, mechanism for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed, said detector including means for preventing passage of an excess thickness of material in said strip and thereby to effect operation of said detector, means effective only upon absence of a bottom in a cup body for removing formed bodies from said mandrel, a movably mounted stop actuating member, a connection between said detector and said member including an actuating arm for operation of said device by movement of the arm in one direction only, a stop motion mechanism, and an operative connection between said stop actuating device and said mechanism for operation of the latter by the former.

10. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, pneumatic means for removing formed bodies from said mandrel, a trip finger located in an extended path of movement of said cups past the mouth of said pneumatic device and operative independently of said mandrel, a stop motion mechanism, and an operative connection between said finger and said stop motion mechanism for operation of the latter by the former.

11. A cup making machine including a carrier having a mandrel to receive a blank, means for moving said carrier, means for forming a blank into a cup body on said mandrel, mechanism for forming a cup bottom to be attached to said body on said mandrel, pneumatic means for removing only cup bodies with bottoms therein from said mandrel, a stop motion mechanism, a stop actuating device located in an extended path of a cup body past the mouth of said pneumatic

removing device and operative independently of said mandrel, and an operative connection between said actuating device and said stop motion mechanism for operation of the latter by the former.

12. A cup making machine including a carrier having a mandrel to receive a blank, means for forming a blank into a cup body on said mandrel, means for moving said carrier, mechanism for forming a cup bottom to be attached to said body on said mandrel, said mechanism including a detector engageable with a strip from which said bottom is formed, said detector including means for preventing passage of an excess thickness of material in said strip and thereby to effect operation of said detector, stopping mechanism for controlling operations of said machine, and an operative connection between said detector and said stopping mechanism for operation of the latter by the former.

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