C. C. STUTZ & R. F. ARNOTT.

CAP FORMING AND APPLYING MACHINE.

APPLICATION FILED APR. 17, 1912.

1,075,796.

Patented Oct. 14, 1913.

3 SHEETS—SHEET 1.

Fig. 1.

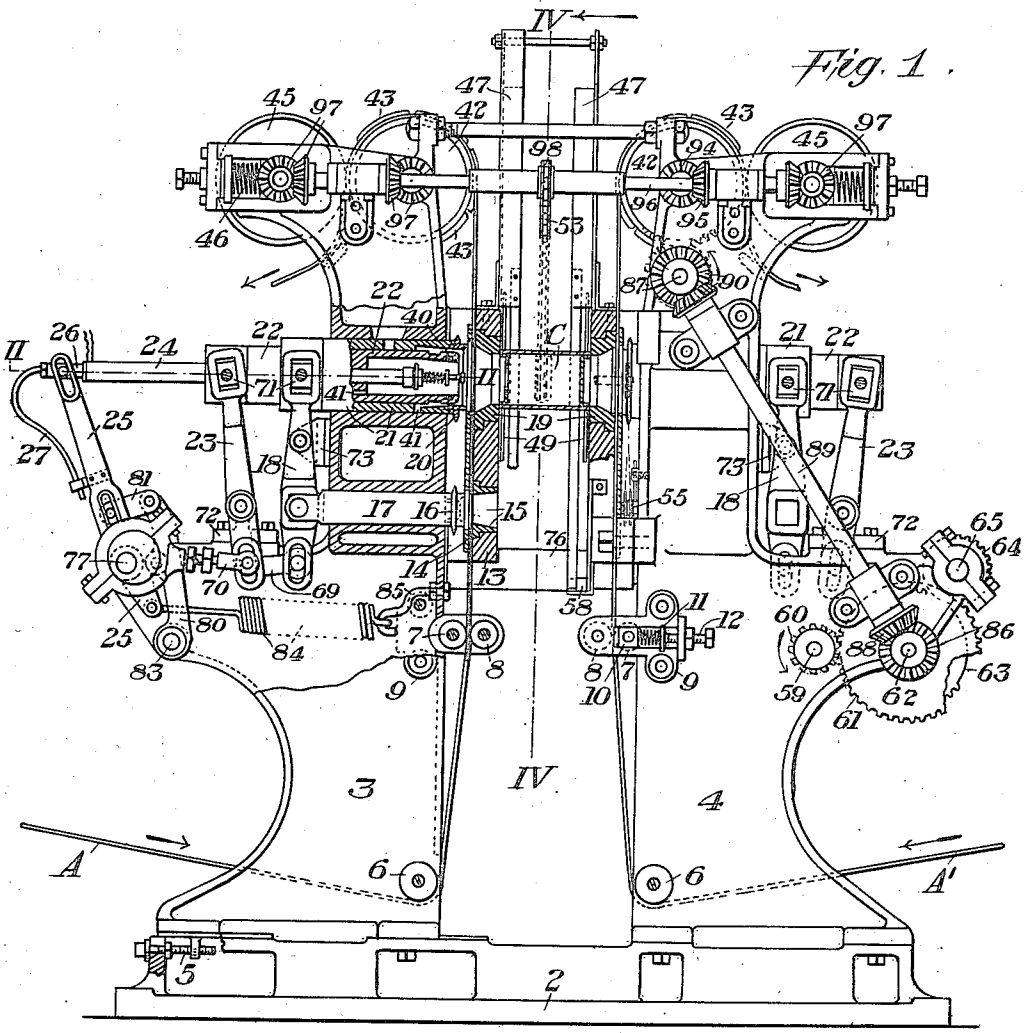


Fig. 10.

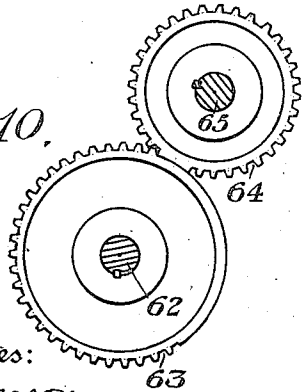
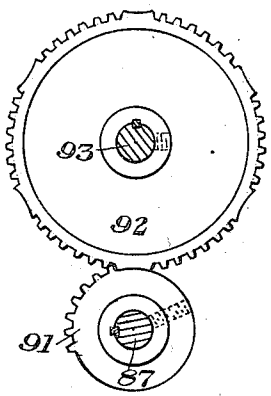


Fig. 11.



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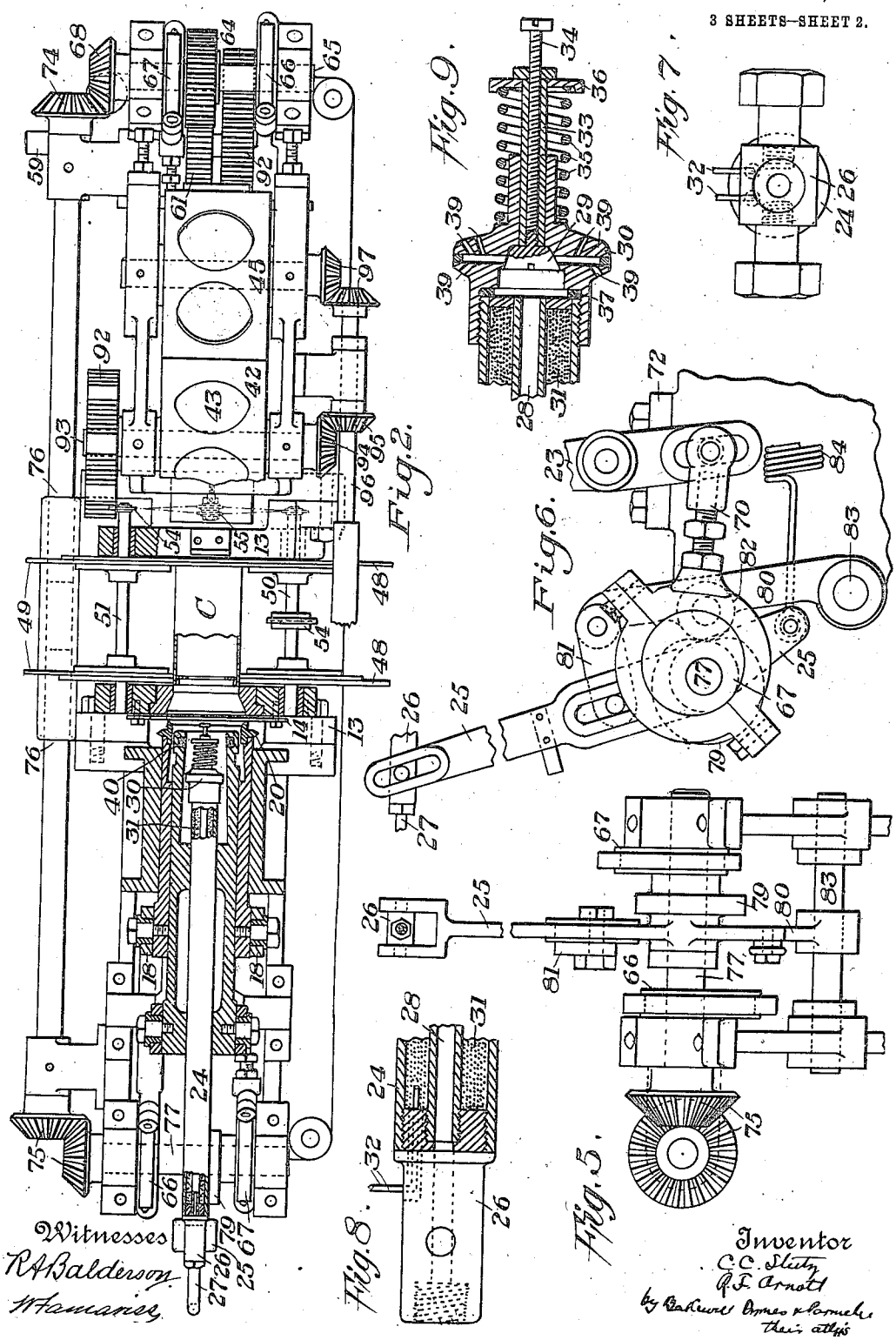
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 3.

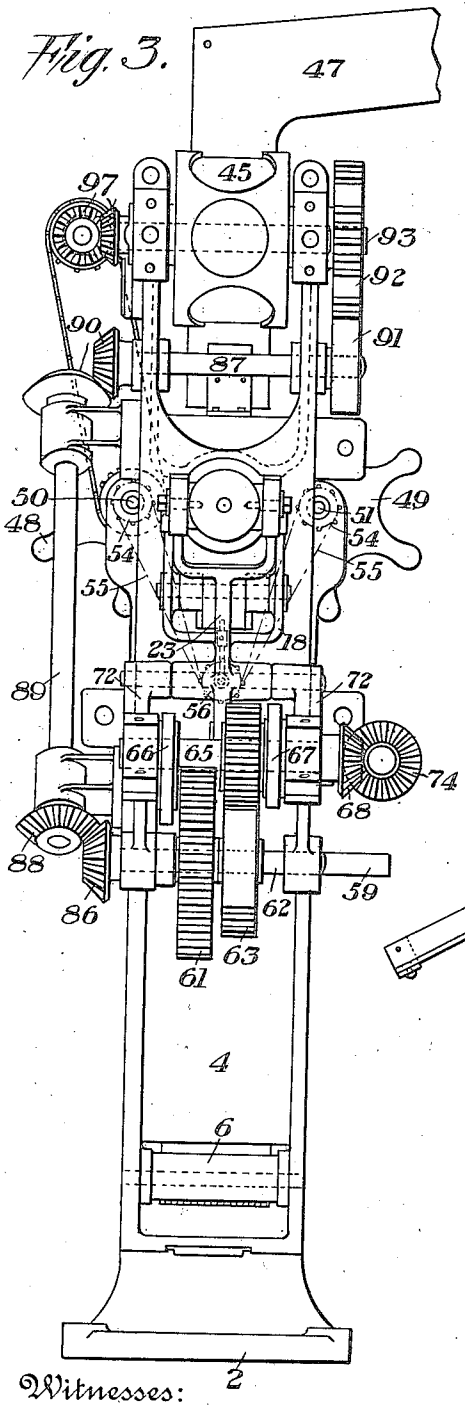
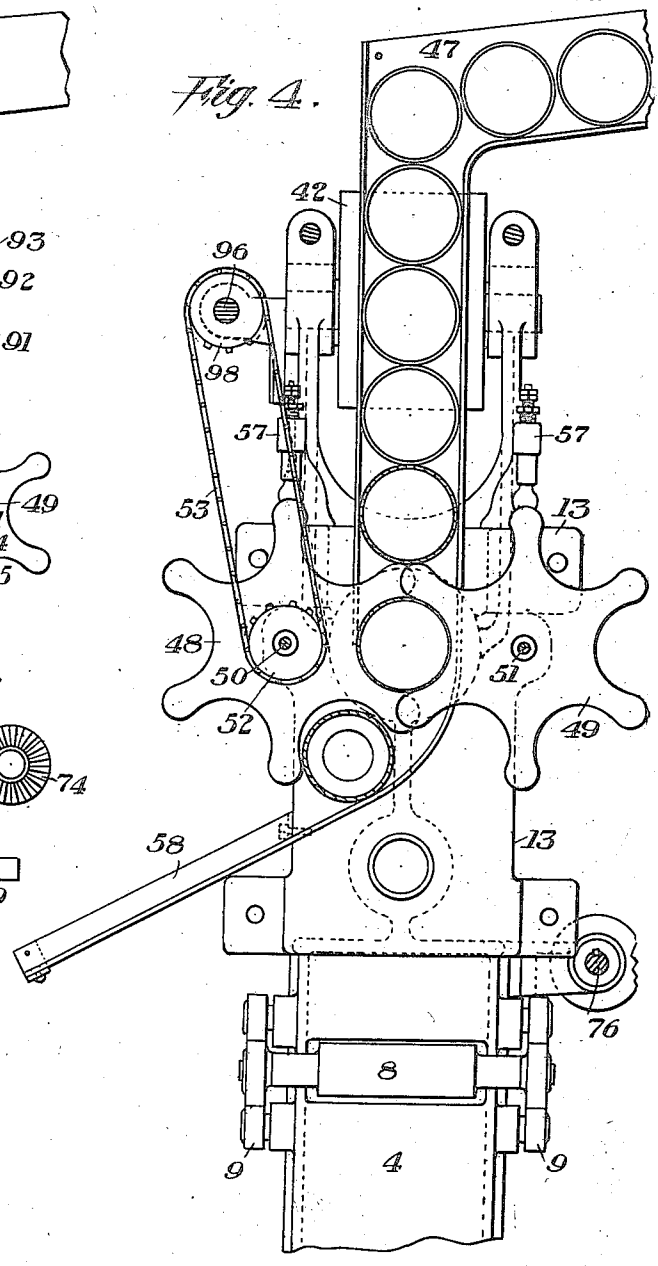


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES C. STUTZ, OF NORWOOD, OHIO, AND ROBERT FLEMING ARNOTT, OF UPPER MONTCLAIR, NEW JERSEY, ASSIGNORS TO ISADORE L. MYERS, OF PLAINFIELD, NEW JERSEY.

CAP FORMING AND APPLYING MACHINE.

1,075,796. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed April 17, 1912. Serial No. 691,532.

To all whom it may concern:

Be it known that we, CHARLES C. STUTZ, a citizen of the United States of America, residing at Norwood, in the county of Hamilton and State of Ohio, and ROBERT F. ARNOTT, a subject of the King of Great Britain, residing at Upper Montclair, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Cap Forming and Applying Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional front elevation showing one form of machine constructed in accordance with our invention. Fig. 2 is a plan view partly in section on the line II—II of Fig. 1. Fig. 3 is an end elevation of the right hand end of Fig. 1. Fig. 4 is an enlarged vertical section on the line IV—IV of Fig. 1 looking in the direction of the arrow, and showing the parts in the position when the caps are inserted in a cylinder. Fig. 5 is an enlarged view of the left hand operating mechanism. Fig. 6 is a side elevation of Fig. 5 with the outside bearing and frame removed to show the operating parts. Fig. 7 is a detail view of the paraffin spraying spring plunger. Fig. 8 is a sectional side elevation of the spraying plunger. Fig. 9 is a vertical section showing the front end of the spraying plunger. Fig. 10 is a detail view of the intermittent gears operating the main drive at the lower right hand of Fig. 1, and Fig. 11 is a detail view of the intermittent gear operating the paper drive and shown at the upper right hand side of Fig. 3.

Our invention relates to the manufacture of paper cartons or packages, particularly such as are made from paper cemented in cylindrical form by paraffin or similar cement. The invention may, however, be applied to the capping of other bodies and other shapes.

The object of the invention is to provide an improved type of machine which will cut the cap blanks from a sheet of paper or pasteboard, form the caps and insert them in the body. It is also designed in the preferred form to seal the caps within the cylinder by cement such as paraffin and also to cut a hole in one of the caps, such hole being usual in these packages.

In the preferred form of our apparatus, two continuous rolls of paper are placed on independent racks, one on each end of the machine. These paper strips are fed forward simultaneously and blanks cut from each. These blanks are then formed into caps and simultaneously inserted one in each end of a body or carton. The bands from which the blanks are cut may be fed forwardly and discharged as waste. On one side of the machine a spraying device is provided which will be projected through the hole punched in one of the caps and will spray paraffin within the packages to seal caps thereto after their insertion. We also preferably provide automatic feeding mechanism for feeding the cylinders successively to the point where the caps are applied and we preferably provide means for adjusting one side portion of the machine toward and from the other so that the space between them may be adjusted to provide for capping different lengths of cartons or bodies. To allow this, cross connecting shafts are provided with telescopic sleeves which will admit this adjustment without dismantling any part of the machine.

In the drawings, 2 represents the bedplate of the machine having mounted thereon the oppositely placed main frames 3 and 4. The frame 4 is rigidly secured to the bed plate, while the frame 3 is adjustably secured, being adjustable by the screw or screws 5. These frames carry the parts necessary for performing the operations above described.

The paper strips marked A and A′ enter the machine from opposite sides and pass under the idle rollers 6—6 and thence up between the pairs of spring pressed tension rollers 7 and 8 to the punching dies. Each set of tension rollers is secured to its corresponding frame by guide castings 9. We have shown the forward rollers 8 as revolving in the guide casting while the rollers 7 are mounted in sliding bearings 10 forced forward by springs 11, the power of which may be adjusted by screws 12.

13 is a die housing containing the female

dies for punching and the forming of caps. To this housing is fastened a stripper 14, the paper entering the housing 13 at the bottom and passing upwardly between the housing 13 and the stripper 14. At the bottom of the housing 13 is placed a small female die 15 opposite to which is located the male die 16 secured to the plunger 17 which is guided in the main frame and operated by the lever 18. The dies 15 and 16 punch the hole in the paper which provides a hole in one of the caps to allow filling of the cartons or packages; but these dies are not used on the opposite side of the machine where the caps are formed for the bottom end of the cartons or packages, which cap is closed.

At the upper end of the housing 13 is located a large female die 19 opposite to which is arranged the die 20 fastened to the hollow plunger 21 which is also operated by the lever 18 and is guided in suitable bearings in the main frame. The die 19 performs two functions, namely, to operate the punching out of the round paper disk or blank, which is then slightly advanced in the die 19 by the movement of the die 20, thus beginning the formation of the cap. The cap is completed by the further movement of the plunger 22, actuated by a lever 23, which also forces it into the end of the cylinder marked C, this having been brought into position and held by the feeding mechanism comprising the sprocket shaped wheels 48 and 49, shown in Fig. 4.

The paraffin sprayer 24 moves inside of plunger 22 and is actuated by the lever 25. This sprayer consists of a hollow metal tube (Figs. 8 and 9) to the rear end of which is fastened the tail piece 26 to which is connected the flexible tube 27 which supplies hot liquid paraffin under pressure from a suitable supply tank, not shown. Inside the sprayer tube 24 is located the metal tube 28 which conveys the paraffin from the tail piece 26 to the valve 29 located in the head 30 of the sprayer. By arranging the metal tube 28 inside the sprayer body, a hollow space is formed between them in which is placed an electric heating device 31 to keep the paraffin heated to any desired temperature. The wiring for this electrical device enters through the tail piece and is shown at 32. The valve 29 in the head 30 is fastened to a hollow valve stem 33 and an adjusting bolt 34 screws into the valve stem and can be locked by lock nut shown in Fig. 9.

35 is a compression spring located around the valve stem 33 and held in position by washer 36, thus acting on the valve stem and tending to keep the sprayer valve closed.

The head piece 30 is shown as secured to the sprayer tube 24 and a washer 37 is inserted for tightening. Around the valve 29 are provided a series of radial channels from which lead perforations 39, which allow the escape of hot paraffin when the valve 29 is opened.

In the operation of the sprayer, after a paper cylinder has been moved into position by the feeding mechanism and the disks of paper have been punched out of the strip and formed into caps and are being forced into the cylinder; the sprayer traveling forward enters the cylinder and advances until the adjusting bolt 34 strikes the plunger 22 at the right hand side of the machine. This plunger 22 at the right hand side when meeting the adjusting bolt of the sprayer, has not completed its full stroke, and by advancing to the full ends of its stroke forces back the adjusting bolt and opens the valve allowing escape of the heated paraffin. This operation takes place while the plunger 22 is forcing the right hand cap into the cylinder to its proper position. The exhaust holes in the sprayer head are so arranged as to allow thorough spraying of the surfaces and sealing of the caps to the cylinder. The plungers 22, at their extreme outer end, are provided with electric heating devices 40, as well as drainage holes 41, to carry off any surplus paraffin.

After the strips of paper have been operated upon by the punching dies they are drawn upwardly by the paper feed wheels 42. The feed wheels 42 are carried by shafts and bearings in the main frames and are operated by intermittent bevel gears. Each drive wheel 42 is provided on its outer periphery with bosses 43 which are properly spaced so as to engage the holes punched in the paper by the dies. The drive wheels 45 are provided with circular depressions to admit the bosses or drive wheels 42, the latter revolving in fixed position while the driving wheels 45 are arranged in sliding bearings acted upon by compression springs 46. The adjusting springs 46 may be used to force the wheels closer together, thus putting the strip of paper under such compression as may be desirable to prevent slipping.

The paper cylinders forming the bodies of the cartons or packages are made in another machine and brought by a suitable conveyer to the rear of the present machine and into the top of the chute 47 (Figs. 3 and 4). They roll down this chute by gravity to the feeding mechanism which consists of two sets of wheels 48 and 49 secured to shafts 50 and 51, which in turn are mounted in the die housings 13. To the center of the shaft 50 is secured a sprocket wheel 52 actuated by sprocket chain 53. The arms or wheels 48 and 49 are suitably shaped to firmly engage and retain the cylinders and each shaft 50 and 51 is at its outer end provided with sprocket 54, the chain 55 connecting both sprockets. This chain moves over an adjustable idler 56 to take up slack.

In order to insure the proper positioning of the cylinders being operated upon, it is necessary to stop the rotation of the wheels 48 and 49 at the same place in their intermittent movements. To accomplish this, we have provided an automatic spring stop 57 fastened to the top of each die housing 13, thus engaging the outer end of each arm of the wheels 48 and 49 as they come into position and holding them firmly in place by spring action. After the operations of capping and spraying, further turning of the wheels causes the cylinders to be thrown out and down the discharge chute 58 into a suitable box or conveyer.

The operation of the above parts is carried out by the following mechanism: The main driving shaft of the machine is marked 59 and carries pinion 60 which drives the gear 61 secured to the intermediate shaft 62. To the intermediate shaft 62 is secured the intermittent gear 63 which drives intermittent pinion 64. The latter intermittent pinion 64 is secured to shaft 65 which carries two eccentrics 66 and 67 and also has at its outer end the bevel gear 68. The eccentric 66 connects by an adjusting rod 69 to the lever 18 which operates the punch 21 on the right hand side of the machine. The eccentric 67 connects by adjusting rod 70 to lever 23 which operates plunger 22 on the same side of the machine. The levers 18 and 23 are connected to plungers 21 and 22 by sliding bearings 71 which allow the transformation of rocking motion into a straight line motion. The lever 23 is pivoted by a pin to bearing block 72 mounted on the main frames. The lever 18 is pivoted by a pin to bearing block 73. The levers 18 and 23 are slotted at their lower ends to allow adjustment of the strokes.

The operation of the above parts is as follows: By rotating drive shaft 59, shaft 62 is driven continuously by pinion 60 and gear 61. The intermittent gear 63 fastened to shaft 62 will, owing to the construction of its teeth, transmit two-thirds of this motion to shaft 65, giving this shaft a complete revolution during two-thirds of its motion but keeping it idle during the remaining one-third. The remaining one-third of revolution of shaft 62 is utilized for driving the paper feed located near the top of the machine, and later described. The complete turning of shaft 65 drives the two eccentrics 66 and 67 which move the levers 18 and 23. The bevel gear 68 transmits the intermittent motion of shaft 65 to the left hand side of the machine by means of bevel gears 74 and 75 and the telescopic shaft 76. This motion being received by shaft 77, is transmitted by eccentrics and levers to the plungers and punchers on the left hand side of the machine. On this side the lever 18 also serves to operate the small punch 17. To the shaft 77 is fastened a cam 79 and on the same shaft 77 is pivoted a lever 25 for operating the sprayer by means of intermediate lever 80 and link 81. The turning of shaft 77 revolves cam 79 which moves over the lever 80 by roller 82. The intermediate lever 80 pivots around shaft 83 and by means of link 81 it throws forward the lever which operates the sprayer. The return motion of the levers is accomplished by tension spring 84 fastened at one end to the lever 25 and at its other end by adjusting bolt 85 to the main frame. All operations so far described, on the left hand as well as on the right hand side of the machine, take place at the same time during two-thirds of the rotation of intermittent gear 63. The remaining one-third of revolution is utilized to operate the paper drive and during this period all the above mentioned levers and plungers are at rest. For the paper drive we provide a bevel gear 86 at the outer end of shaft 62, which gear drives the intermediate shaft 87 by means of bevel gear 88, transmission shaft 89 and bevel gears 90. To the intermediate shaft 87 is fastened the intermittent pinion 91 which drives the intermittent gear 92 secured to the outer end of shaft 93. To the other end of shaft 93 is secured bevel gear 94 which by bevel gear 95 drives the telescopic cross shaft 96. This cross shaft, by means of gear 97, drives the shaft upon which the paper feed wheels 43 and 45 are mounted on the right as well as the left hand side of the machine. Centrally mounted on telescopic shaft 96 is the sprocket wheel 98 which operates by sprocket chain 53 the feeding mechanism above described. The intermittent pinion 91 in each revolution rotates the intermittent gear 92 one-sixth of a revolution, thus turning the cylinder feed wheel 48 and 49 one-sixth of a revolution and feeding one carton body forward for each revolution of pinion 91. The paper feed and paper cylinder feed are, therefore, operated at the same time during one-third of the revolution of the main driving shaft, while the other two-thirds of each revolution are utilized to punch and form the caps, position the same within the bodies and spray and seal them with paraffin.

The advantages of our invention result from the simplicity, compactness and rapidity of operation of the machine.

By cutting the blanks from the paper strips and forming them and forcing them into the cylinder in the same machine, we avoid the necessity for handling paper blanks or caps, or feeding them from one machine to another.

Many variations may be made in the form and arrangement of the operating connections and the mechanisms for carrying out

the operations described without departing from our invention.

We claim:

1. In a capping machine for paper cartons, mechanism for intermittently feeding a series of carton bodies to a predetermined station and registering with oppositely disposed female dies, mechanism for feeding a paper strip past each of the dies, and mechanism for cutting disks therefrom and forcing them through the female dies into opposite ends of the carton bodies; substantially as described.

2. In a capping machine for paper cartons, mechanism for feeding carton bodies successively to a station between two oppositely disposed tubular guiding dies, and means for simultaneously forming and forcing head blanks through said dies and into position in the opposite ends of the cartons; substantially as described.

3. In a capping machine for paper cartons, carton-holding mechanism, mechanism for simultaneously cutting two head blanks, and mechanism for simultaneously forcing said head blanks in opposite directions through hollow forming dies into the opposite ends of the carton; substantially as described.

4. In a capping machine for paper cartons, carton-holding-mechanism, mechanism for feeding two strips of paper past oppositely disposed registering hollow shaping dies, and mechanism for simultaneously cutting blanks from the strips and forcing them in opposite directions through the dies into the opposite ends of the cartons; substantially as described.

5. In a capping machine for paper cartons, a pair of registering hollow shaping dies, mechanism for feeding a carton body between them, means for feeding strips of paper past the dies, mechanism arranged to cut disks therefrom, and mechanism for forcing the disks through the shaping dies into the cartons; substantially as described.

6. In a capping machine for paper cartons, a pair of registering hollow shaping dies, mechanism for feeding a carton body between them, means for feeding strips of paper past the dies, mechanism arranged to cut disks therefrom and to punch a central hole in one of said disks, and mechanism for forcing the disks through the shaping dies into the cartons; substantially as described.

7. In a capping machine for paper cartons, a pair of registering hollow shaping dies, mechanism for feeding a carton body between them, means for feeding strips of paper past the dies, mechanism arranged to cut disks therefrom and to punch a central hole in one of said disks, and mechanism for forcing the disks through the shaping dies into the cartons, a spraying nozzle, means for moving said spraying nozzle into the receptacle through the hole in one of the heads and opening said nozzle within the carton to spray the joints between the heads and the carton; substantially as described.

8. In a capping machine for paper cartons, mechanism for feeding two strips of paper, mechanism for punching holes in one strip, and mechanism for cutting disks from both strips and shaping and forcing the disks in opposite directions into the opposite ends of the receptacle; substantially as described.

9. In a capping machine for paper cartons, a hollow shaping die, mechanism for capping successive blanks in alinement therewith, a hollow plunger arranged to cut a disk from a traveling strip of paper, and a plunger arranged to force said disk through the hollow shaping die into the carton, together with a spraying nozzle within the hollow plunger to spray the joint between the disk and the carton; substantially as described.

10. In a capping machine for paper cartons, a hollow shaping die, mechanism for capping successive blanks in alinement therewith, a hollow plunger arranged to cut a disk from a traveling strip of paper, and a plunger arranged to force said disk through the hollow shaping die into the carton, a spraying nozzle within the hollow plunger, and mechanism for advancing the nozzle through a hole in the head into the carton and admitting fluid pressure after its insertion to spray the joint between the disk and the carton; substantially as described.

11. In a capping machine for paper cartons, mechanism for intermittently feeding a series of open ended cartons to a heading station and discharging them therefrom, and mechanism for simultaneously forming and applying heads to opposite ends of the cartons while at the station; substantially as described.

12. In a capping machine for paper cartons, mechanism for intermittently feeding a series of open ended cartons to a heading station and discharging them therefrom, and mechanism for simultaneously forming and applying heads to opposite ends in opposite directions to the cartons while at the station and cementing them in place; substantially as described.

13. A cap-forming machine for making paper cartons, comprising a bed plate, a main frame mounted on each end of the bed plate, means for adjusting one bed plate toward and from the other, mechanism for feeding a series of carton bodies to a predetermined point between the frames, paper strip feeding mechanism mounted on each of said frames, oppositely disposed female dies mounted on each of said frames, cap

punches mounted on each of said frames, cap seating plungers mounted on each of said frames, cap punch actuating mechanism mounted on each of said frames, and mechanism for actuating said cap seating plungers on each of said frames; substantially as described.

14. In a capping machine for paper cartons, a hollow shaping die, mechanism for capping successive blanks in alinement therewith, a hollow plunger arranged to cut a disk from a traveling strip of paper, a plunger arranged to force said disk through the hollow shaping die into the carton, together with a spraying nozzle within the hollow plunger to spray the joint between the disk and carton, and means for heating the material in the nozzle; substantially as described.

15. In a capping machine for paper cartons, mechanism for intermittently feeding a series of open-ended cartons to a heading station and discharging them therefrom, mechanism on each side of the machine for simultaneously forming and applying heads to the opposite ends of the cartons, a supporting frame for each of said mechanisms, and means to adjust one frame relative to the other; substantially as described.

16. In a capping machine for paper cartons, carton-holding mechanism, feeding apparatus arranged to feed a plurality of strips of paper, mechanism for cutting and flanging head blanks from said strips, and mechanism for forcing said blanks into the carton through the opposite ends thereof, substantially as described.

17. In a capping machine for paper cartons, mechanism for forming and forcing a head blank into one end of the carton, and a spray device to spray the joint between the head and the carton within the carton, after the head blank has been forced into the carton, substantially as described.

18. In a capping machine for paper cartons, carton-holding mechanism, feeding apparatus arranged to feed a plurality of strips of paper, mechanism for cutting and flanging head blanks from said strips, and mechanism for simultaneously forcing said blanks into the carton through the opposite ends thereof, substantially as described.

In testimony whereof, we have hereunto set our hands.

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Witnesses as to Robert F. Arnott:
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