

Sept. 11, 1951

O. F. GOEPFERT

2,567,201

CIGARETTE PAPER BOOKLET MACHINE

Filed June 1, 1945

6 Sheets-Sheet 1

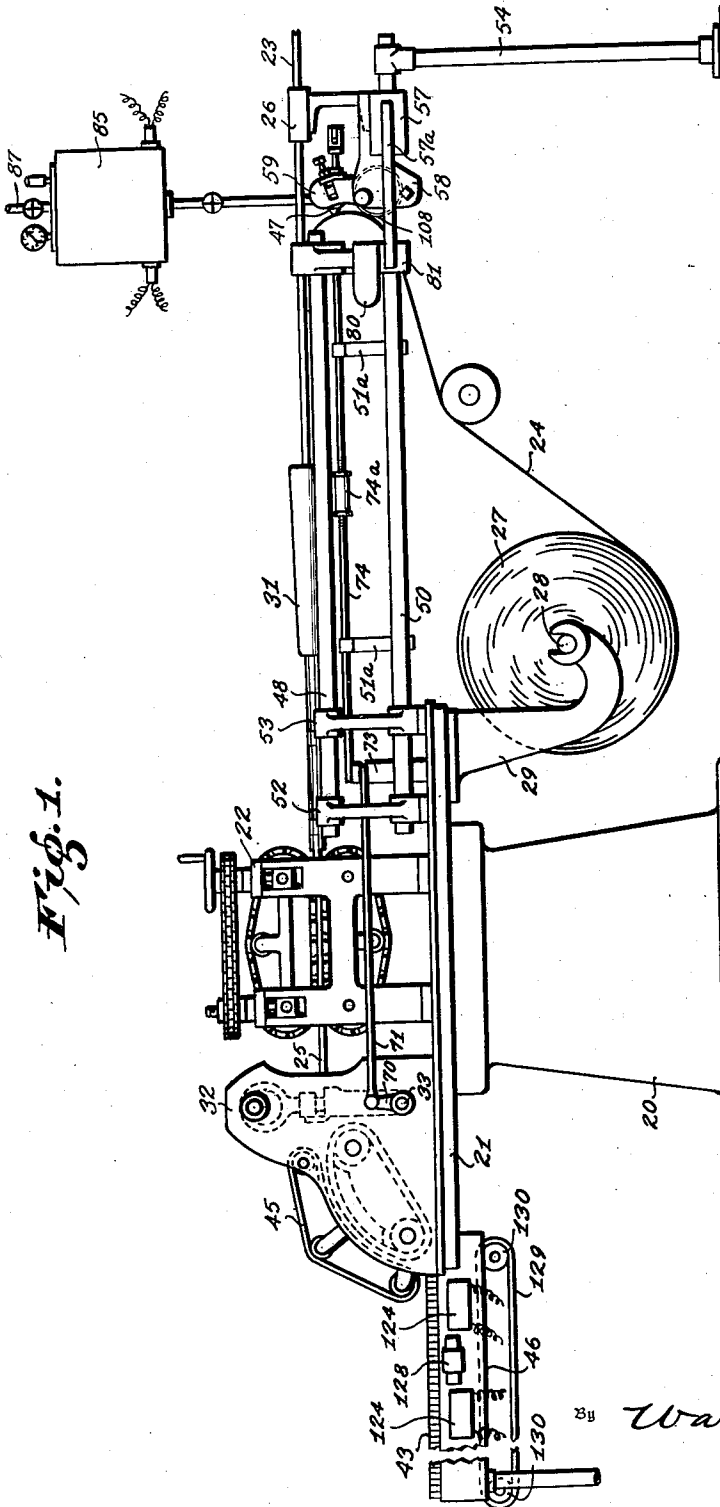


Fig. 1.

Fig. 15.

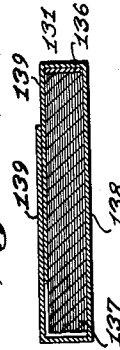
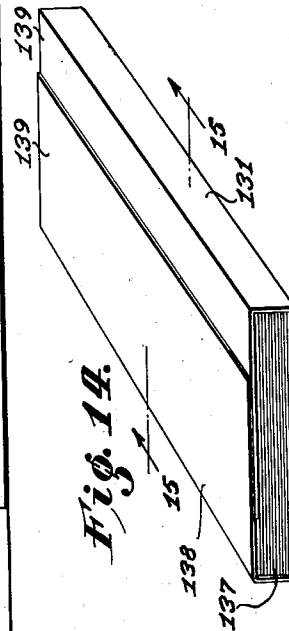


Fig. 14.



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6 Sheets-Sheet 2

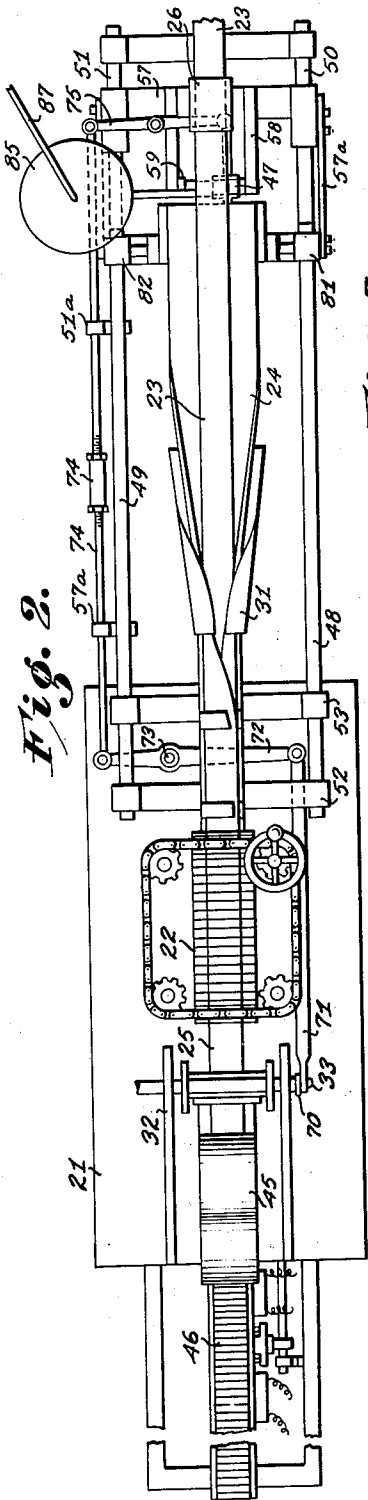


Fig. 2.

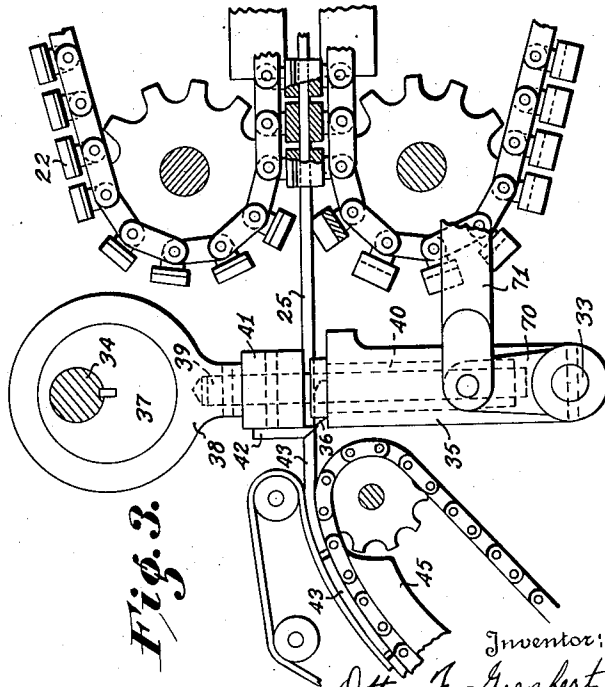
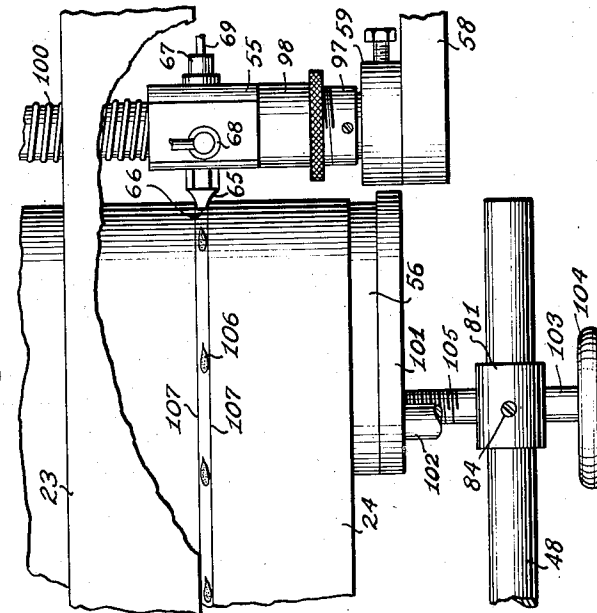


Fig. 3.

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6 Sheets-Sheet 4

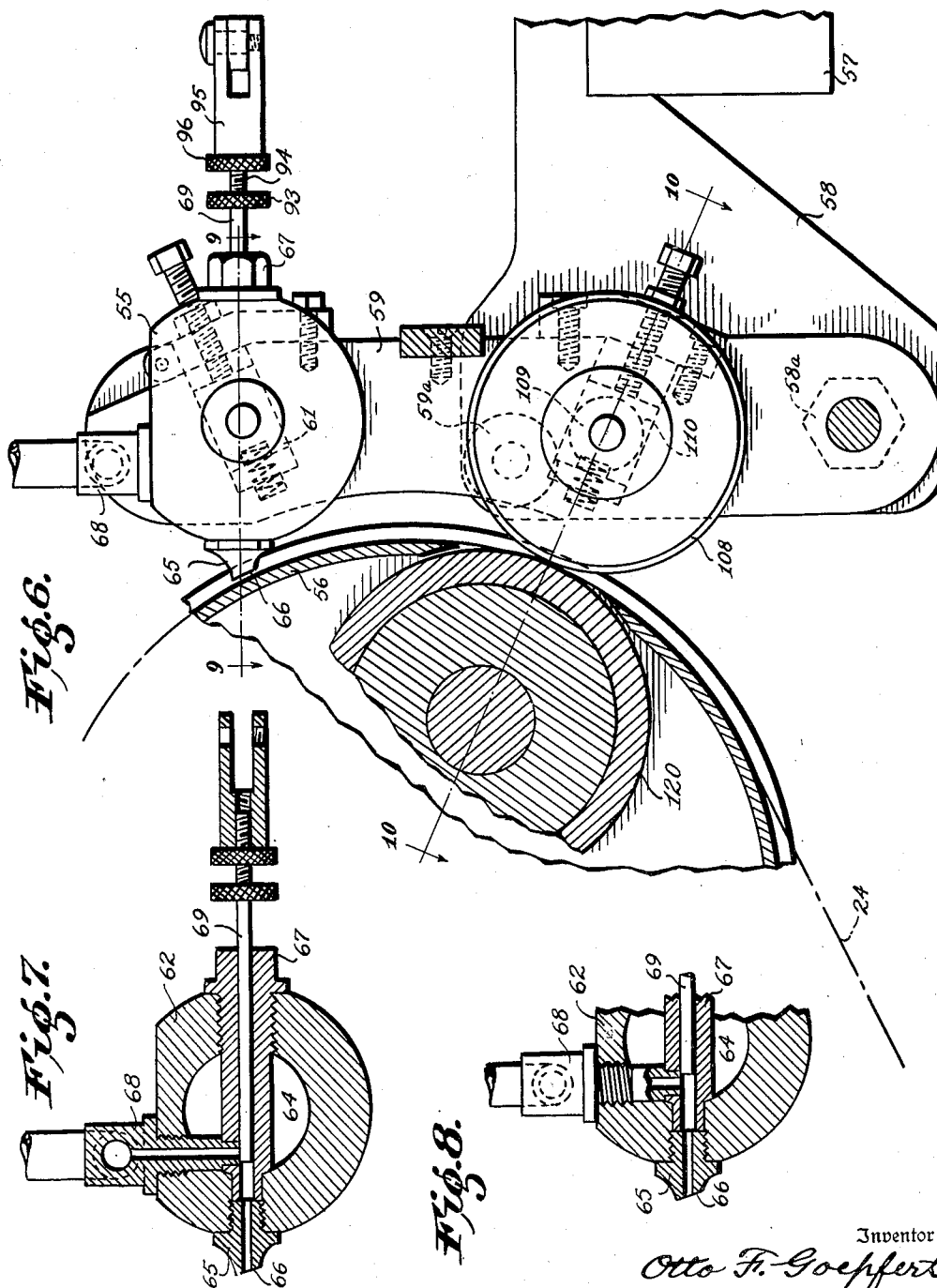


Fig. 8.

Fig. 7.

Fig. 6.

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CIGARETTE PAPER BOOKLET MACHINE

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6 Sheets-Sheet 5

Fig. 9.

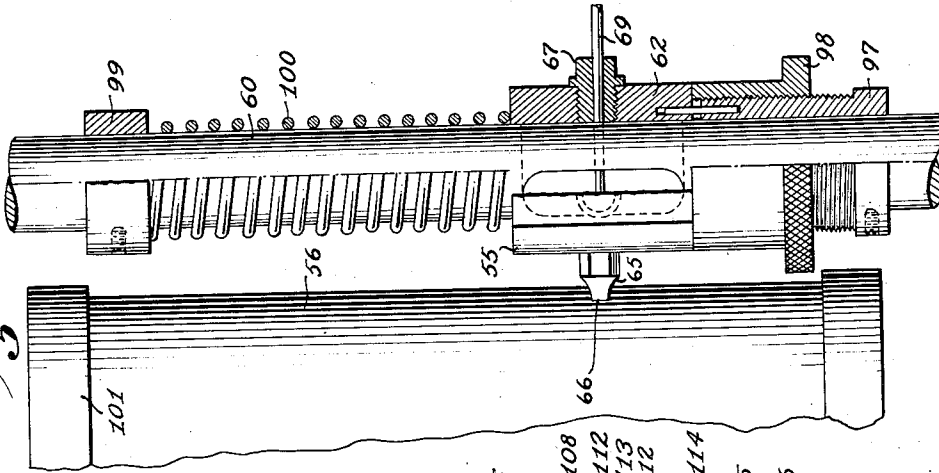
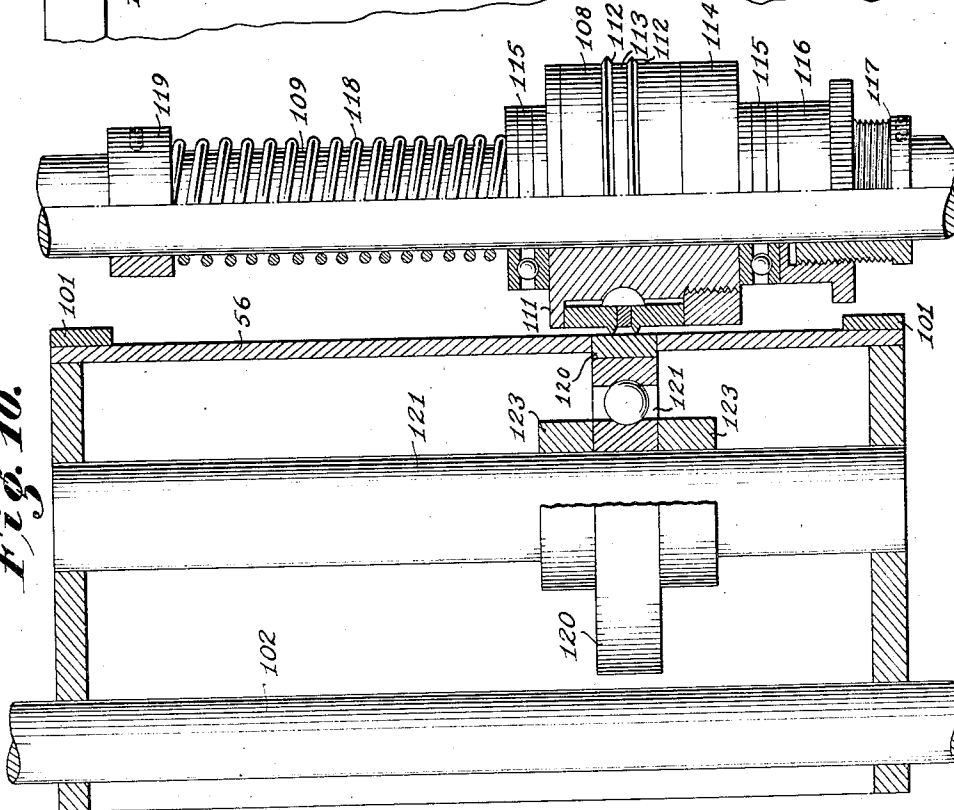


Fig. 10.



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CIGARETTE PAPER BOOKLET MACHINE

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6 Sheets-Sheet 6

Fig. 11.

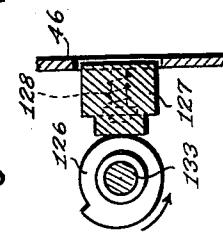
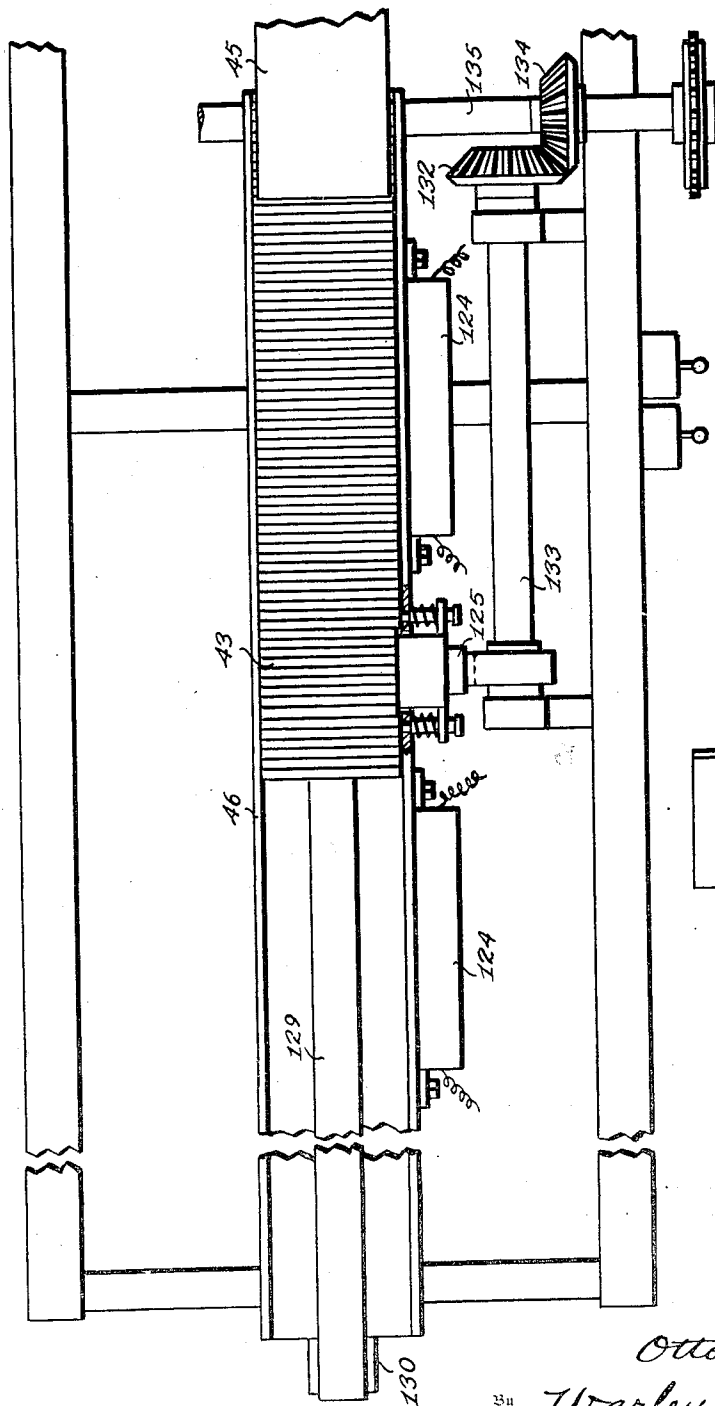


Fig. 13.

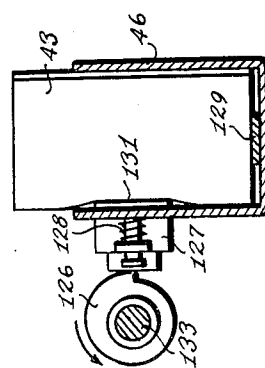


Fig. 12.

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UNITED STATES PATENT OFFICE

2,567,201

CIGARETTE PAPER BOOKLET MACHINE

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mesne assignments, to Ecusta Paper Corpora-
tion, Pisgah Forest, N. C., a corporation of
Delaware

Application June 1, 1945, Serial No. 597,057

5 Claims. (Cl. 270—41)

1

This invention relates to the manufacture of cigarette paper booklets and more particularly to an improved machine for high speed, automatic manufacture of booklets containing a block of cigarette papers bonded along one edge to the booklet cover and adapted to be removed in seriatim.

The only machine-made type of cigarette paper booklet that has met with commercial success previously in this country is the thin, giveaway booklet which is usually attached to a package of smoking tobacco. This booklet contains only a few leaves of cigarette paper, e. g. 15 leaves, which are not bonded in the booklet. The cover of this booklet is made of thin paper stock and is loosely folded around the leaves without any scoring of the folded edges.

Cigarette paper booklets containing a large number of cigarette paper leaves such as 100 or more have been commonly manufactured heretofore by hand and are known in the trade as the "five-cent" booklet. The cover for this booklet is made of relatively stiff cardboard type of material and the block of 100 cigarette papers is bonded to the backbone edge of this booklet. The forming and assembly of this booklet have always required time consuming, hand operations since no machine has previously been developed which would form and assemble these booklets automatically.

In accordance with the present invention, a machine has now been developed that will manufacture the five-cent type booklet automatically and at a very high rate of speed. This machine constitutes a marked technical and economic improvement in this art, considering the fact that these booklets are commonly sold to the tobacco manufacturers and distributors in quantities of five million or more at a time.

One of the major problems in automatic machine manufacture of the five-cent type booklet was the gluing of the cigarette papers to the backbone edge in continuous strip form and at a high rate of speed such that the block of papers in the finally cut booklets would be securely held as a block, but yet adapted for easy removal of one paper at a time, as needed by the smoker, without disturbing the remaining papers. This and the problem of forming and shaping the necessarily relatively stiff booklet cover stock, have held back machine manufacture of the five-cent booklet for the past twenty years.

Now, for the first time a commercially satisfactory and acceptable five-cent booklet is cap-

2

able of automatic machine manufacture as a result of the present invention.

The solution to the above problems involved the development of a rotary scoring device which scores the relatively stiff cover material in continuous strip form and comprises two rotary members that move in the direction of movement of the cover paper. This produces a squared, flat-surface backbone edge for secure and uniform bonding of the cigarette paper sheets thereto. An important counterpart of this device, which also functions to produce the necessary bond for the cigarette paper sheets, is an automatic, intermittently operated adhesive applicator that deposits a drop of adhesive at spaced intervals on the rapidly moving booklet cover paper. And a third, cooperative device for obtaining effective bonding is a closed chamber and conduit that supply the adhesive and are maintained under a positive pressure, e. g. 30 to 50 pounds gauge pressure. This pressure system, which is co-actively connected with the above adhesive applicator, enables the use of relatively heavy, viscous adhesive which will provide a good bond between the booklet cover paper and the edge of the block of cigarette papers without penetrating the main surface area of the cigarette paper sheets.

In the drawing:

Fig. 1 is a side elevation of a cigarette paper booklet making machine incorporating my invention;

Fig. 2 is a corresponding plan view;

Fig. 3 is a diagrammatic detail partly in section of the severing means, and related feeding means and collating means;

Fig. 4 is an enlarged fragmentary plan view of the machine adjacent the point at which adhesive is applied;

Fig. 5 is a side elevation partly in section and partly cut away of the adhesive applying means and related elements of the machine;

Fig. 6 is a corresponding enlarged detail illustrating the disposition of the automatic valve element and related scoring means;

Figs. 7 and 8 are sections illustrating the operation of the automatic valve element;

Fig. 9 is a section substantially on the line 9—9 of Fig. 6;

Fig. 10 is a section substantially on the line 10—10 of Fig. 6;

Fig. 11 is a plan view of the booklet collecting means;

Figs. 12 and 13 are details of an attachment

for the collecting means used to condition the adhesive bond of the severed booklets;

Fig. 14 is a perspective view of a cigarette paper booklet formed according to my invention; and

Fig. 15 is a section on the line 15—15 of Fig. 14.

Referring at first to Fig. 1 of the drawing, the cigarette booklet making machine illustrated comprises a base portion 20 which supports a table or platform portion 21. Substantially centrally located on the table 21 is a feeding device, indicated generally at 22, adapted to feed a plurality of superimposed strips of cigarette paper 23, of indefinite length, enclosed in a wrapper strip of cover paper 24, also of indefinite length. The wrapper enclosed strips of cigarette paper are indicated in Fig. 1 at 25.

The strips of cigarette paper 23 enter the machine in superimposed relation at the right hand end as shown in Fig. 1, the cigarette paper strips 23 being led through an aligning guide 26 from a suitable source of supply (not shown.) The wrapper strip of covering paper 24 is fed from a roll 27, mounted for rotation on a shaft 28 in brackets as indicated at 29, over an idler roll 30. Suitable restraining means (not shown) are preferably provided for regulating the tension on the cigarette paper 23 and enclosing wrapper 24.

The enclosing wrapper strip of cover paper 24 is wrapped about the superimposed strips of cigarette paper 23 at a folding station indicated generally in Fig. 1 at 31. The feeding device 22 is adapted to draw the strips of cigarette paper 23 and enclosing wrapper 24 through the folding station 31, and feed the assembled wrapper enclosed strips of cigarette paper 25 to a severing device 32.

The severing device 32 (see Fig. 3) comprises two suitably journaled shafts 33 and 34 which are parallel and spaced apart. The shaft 33 oscillates in its bearings. Extending upwardly from shaft 33 is a frame 35, and on top of this frame 35 a platen 36 is arranged. Secured to the shaft 34 are eccentrics 37. Mounted on the eccentrics are eccentric straps 38, to each of which is attached ends or shafts 39. These rods or shafts 39 reciprocate in corresponding bores 40 provided in the frame 35, and are connected to a crosshead 41. The crosshead 41 carries a guillotine knife 42 which cooperates with the platen 36 to form a cutting means. As the shaft 34 rotates, the guillotine knife 42 reciprocates by reason of its eccentric mounting toward and from the platen 36, and may be operated in this manner to sever the assembled wrapper enclosed strips of cigarette paper 25 in booklet length.

Simultaneously with the movement just described of the guillotine knife 42, the frame 35 is oscillated on the shaft 33 through the connection formed by the rods 39 which as mentioned above reciprocate in the bores 40. As a result, a swinging motion is imparted to the platen 36 and knife 42 which may be adjusted in accordance with the rate at which the assembly 25 is fed so that the feeding movement of the assembly 25 is not interfered with during the cutting operation.

Beyond the severing device 32, the individual cigarette paper booklets 43 formed from the assembly 25 are fed by a suitable collating device 45 into a collecting device 46 from which they may be removed as desired.

The foregoing elements of the cigarette booklet making machine incorporating my invention are known and have been previously employed in booklet making machines so that it is not considered necessary to detail them further here.

As mentioned above, the cigarette paper booklet making machine of the present invention is adapted for making the five-cent type of cigarette paper booklet, which contains a relatively large supply of cigarette paper, e. g., of the order of 100 or more. A cigarette booklet of this type requires a substantial cover member which will protect the enclosed cigarette papers adequately; and it is necessary to provide an adhesive mounting for the cigarette papers in the cover member so as to maintain the cigarette papers in order over the extended period for which a booklet of this type is used.

The cigarette paper booklet making machine of the present invention is accordingly provided with an adhesive applying means indicated generally in Fig. 1 at 47. The adhesive applying means 47 is mounted at the end of shafts 48, 49, 50 and 51 which extend in parallel and square-spaced relation from suitable supports 52 and 53 arranged on the table 21. Further support is provided by pedestals 54.

The adhesive applying means 47 comprises an automatic valve element 55 which is disposed in relation to an arcuate guide 56 over which the enclosing wrapper strip of cover paper 24 is drawn as it is advanced to the folding station 31. The automatic valve element 55 applies adhesive to the wrapper strip 24, in a manner which will be described more fully below, to provide the necessary adhesive mounting for the cigarette paper when the assembled wrapper enclosed strips of cigarette paper 25 are formed at the folding station 31. Also, the operation of the automatic valve element 55 is timed in relation to the severing device 32 so that a separate adhesive mounting is provided for each booklet 43 ultimately formed by the severing device 32.

The automatic valve element 55 is supported from a cross-bar 57 carried on extending shafts 50 and 51. Support arms 58 extend forward from the cross-bar 57 and in turn support upstanding bracket arms 59. A shaft 60, having square end portions 61 which prevent rotation, are adjustably supported in the bracket arms 59 to provide a mounting for the automatic valve element 55. The upstanding bracket arms 59 are pivotably mounted on the support arms 58 as at 58a, so that the automatic valve element 55 may be retracted when not in use. A snaplock 59a is arranged to position the automatic valve element 55 in relation to the arcuate guide 56 during operation.

The automatic valve element 55 itself (see Figs. 7 and 8) is composed of a hollow body portion 62 formed with a flat top surface and having an internal bore 64 corresponding to the diameter of the shaft 60. A nozzle fitting 65, having a tip 66 adapted to the contour of the arcuate guide 56, and a supplementary tubular fitting 67 are aligned on the horizontal axis of the body portion 62. A vertically disposed tubular fitting 68 opening into the tubular fitting 67 is also arranged in the body portion 62 as shown in Figs. 7 and 8. As will be explained more in detail presently, adhesive is supplied to the automatic valve element 55 through the vertical fitting 68, and is metered in proper amounts from this fitting 68 to the fitting 67 and through the nozzle 65 for application on the wrapper strip of cover paper 24 carried by the arcuate guide 56.

The adhesive is metered from the fitting 68 by a plunger rod 69 arranged for reciprocation in the horizontally disposed tubular fitting 67, and adapted in this manner to uncover or close the opening of the fitting 68 into the fitting 67.

Reciprocation of the plunger rod 69 is effected through a connection with the severing device 32 which, as previously mentioned, is adapted to time the application of adhesive so that a separate adhesive mounting is provided for each booklet 43 formed by the severing device 32. This connection comprises a rocker arm 70 which is fixed on and consequently oscillates with the lower severing device shaft 33 (see Figs. 1, 2 and 3). The rocker arm 70 extends upwardly from the shaft 33 and is pivotally connected at its upper end with a rearwardly extending connecting rod 71. The connecting rod 71 is in turn joined to one arm of a transverse lever 72 pivoted on a standard 73 mounted on the table 21. The other arm of the lever 72 is attached to second connecting rod 74 which is slidingly supported by suitable brackets 51a carried on the shaft 51, and has a length adjustment sleeve 74a arranged about mid-way of its length. This second connecting rod 74 extends rearwardly to engage one arm of a second transverse lever 75 which is pivoted in a mounting 75a carried on the shaft 60 supporting the automatic valve element 55. The other arm of the second transverse lever 75 is joined to the plunger rod 69 operating in the automatic valve element 55. Sliding joints (not shown) are provided where necessary in connecting these elements.

It is apparent that the connecting linkage just described is adapted to translate oscillation of the severing device shaft 33 into timed reciprocation of the plunger rod 69, and that by properly spacing the adhesive applying means 47 from the severing device 32, the application of adhesive by the automatic valve element 55 may be regulated to provide a separate adhesive mounting for each booklet 43 to be formed at the severing device 32.

Means for obtaining the necessary spacing of the adhesive applying means 47 from the severing device 32 is provided by racks 77 and pinions 78 arranged as shown in Fig. 5. The racks 77 are mounted on the shafts 50 and 51, and the pinions 78 are fixed on a shaft 79 journaled in mountings 80 carried by support brackets 81 and 82, which also support the arcuate guide 56. The support bracket 81 is fitted on the shafts 49 and 51. Connector bars extending from each of the support brackets 81 and 82 to the cross-bar support 57 make it possible to move the automatic valve element 55 and the arcuate guide 56 as a unit with the racks 77 and pinions 78 to adjust the spacing from the severing device 32. A handwheel 83 is provided on the shaft 79 for manipulating the pinions 78 on the racks 77. Set screws 84 are arranged in the support brackets 81 and 82 to bear on the shafts 48 and 49 to fix the adhesive applying means 47 in place when properly adjusted.

Adhesive is supplied to the automatic valve element 55 from an adhesive reservoir 85 (see Fig. 5). The reservoir 85 is an entirely closed vessel, a removable lid 86 being provided to afford an access opening. A pressure connection 87, suitably leading from a source of air pressure (not shown), is tapped into the reservoir 85, and an outlet connection 88 to the previously described tubular fitting 63 vertically disposed in the automatic valve element 55 is also provided. The pressure connection 87 is fitted with a reduction valve 89 for adjusting the pressure in the reservoir 85 as indicated by a pressure gauge 90. The reservoir 85 is surrounded by a spaced jacket 91 provided for use in regulating the temperature of adhesive contained in the reservoir 85. The jacket 91 is adapted as a liquid container as

shown in Fig. 5 and is fitted with electric heating elements 92 with which a desired jacket temperature can be maintained.

It will thus be seen that the adhesive supply is protected from oxidation and consequent crust formation by the closed reservoir 85. A positive flow of adhesive from the reservoir 85 is effected by the pressure connection 87, which also eliminates all entrained air from the adhesive supply. Further conditioning of the adhesive is possible through the temperature regulation which may be effected from the jacket 91.

These features of the adhesive supply system of my invention maintain the steady and uniform flow of adhesive necessarily required for application of the adhesive in relation to the rapid operation of a cigarette booklet making machine. A suitable pressure, such as 40 p. s. i., applied to the viscous adhesive causes it to flow and eject properly onto the cover paper. A viscous solution of gum arabic has given good results.

Adhesive is supplied to the automatic valve element 55, as noted above, through a connection 88 to the vertical tubular fitting 68. The previously described connecting linkage from the severing device 32 reciprocates the plunger rod 69 during operation of the machine so that the opening of the vertical fitting 68 into the horizontal fitting 67 which leads to the nozzle 65 is periodically uncovered and closed. It is apparent that when the opening of the vertical fitting 68 is uncovered, adhesive will be forced into the horizontal fitting 67 and in turn to the nozzle 65 by reason of the pressure maintained on the supply in reservoir 85.

To provide means for metering a desired amount of adhesive to the nozzle 65 during each reciprocation of the plunger rod 69, this rod 69 is formed with an integral collar portion 93 beyond which a threaded portion 94 extends. The threaded portion 94 fits a tapped opening in a clevis member 95 which forms the connection for the plunger rod 69 with the transverse lever arm 75. The integral collar portion 93 provides a point of adjustment for the plunger rod 69. By adjusting the plunger rod 69 at this point for corresponding settings of the threaded portion 94 in the clevis member 95, the position of reciprocation of the plunger rod 69 in the horizontal fitting 67 may be shifted as desired in relation to the opening from the vertical fitting 68. As a result, the period for which the opening from the vertical fitting 68 is uncovered during a reciprocation of the plunger rod 69 may be regulated to allow the flow of a given amount of adhesive during each reciprocation and thus meter the amount of adhesive applied at the nozzle 65 as desired. A locking collar 96 is arranged on the threaded portion 94 in the clevis member 95 after an adjustment has been made.

The automatic valve element 55 is mounted as mentioned above on a shaft 60 adjustably supported in bracket arms 59. The body portion 62 of the automatic valve element 55 is fitted over the shaft 60 as shown in Fig. 9, the shaft 60 being cut away to allow insertion of tubular fittings 67 and 68. The automatic valve element 55 is slidingly pinned in upright position on the shaft 60 from a collar 97 which is fixed on this shaft. The collar 97 is formed with a threaded portion on which a mating collar 98 is carried in abutting relation with the body portion 62 of the automatic valve element 55. The mating collar 98 forms a means for adjusting the lateral position

7

of the automatic valve element 55. A second fixed collar 99 arranged on the shaft 60 to force a compression spring 100 against the other side of the body portion 62 makes the lateral adjustment available in either direction.

The arcuate guide 56, in relation to which the automatic valve element 55 is disposed, comprises a substantially half round guide surface which is defined on either side by guide strips 101. The arcuate guide 56 is slidingly mounted on rods 102 which extend between the previously mentioned support brackets 81 and 82. Lateral adjustment of the guide 56 is provided by a shaft 103 which carries the handwheel 104 and has a threaded portion 105 engaging the guide 56. This lateral adjustment provision for the guide 56 allows the wrapper strip of cover paper 24 to be positioned properly in relation to the folding station 31. The previously described lateral adjustment provision for the automatic valve element 55 allows the adhesive to be applied at a proper lateral position on the wrapper strip 24.

When the automatic valve element 55 and arcuate guide 56 have been set in properly adjusted relation, adhesive is applied to the wrapper strip 24 during operation of the machine at a position which is laterally spaced in relation to one edge of the plurality of superimposed strips of cigarette paper 23 so as to dispose the adhesive in position for bonding one edge of the cigarette paper strips 23 (see Fig. 4). As described above, the adhesive is metered from the automatic valve element 55 so that it is applied to the wrapper strip 24 in spaced deposits as indicated in Fig. 4 at 106 so as to form a separate adhesive mounting for each booklet 43 to be formed at the severing device 32.

To effect adequate bonding of the cigarette paper strips 23 in the wrapper strip 24 at the folding station 31, the wrapper strip 24 is conditioned with scored lines 107 as illustrated in Fig. 4. These scored lines 107 result in the formation of a squared backbone portion as the wrapper strip 24 is drawn through the folding station 31. This squared backbone portion presents a flat surface which markedly facilitates the bonding of the cigarette paper strips 23 in the wrapper strip 24.

The scored lines 107 are formed on the wrapper strip 24 by a scoring wheel 108 which is mounted for rotation on a stationary shaft 109 which has square end portions 110 adjustably supported in the upstanding bracket arms 59 similar to the manner in which the automatic valve element mounting shaft 60 is supported. The scoring wheel 108 comprises a body portion 111 rotatably fitted on the shaft 109. Annular scoring knives 112 are in turn fitted on this body portion 111 and a woodruff key is arranged as shown in Fig. 10, to prevent the scoring knives 112 from shifting on the body portion 111. A spacer ring 113 is disposed on the body portion 111 between the scoring knives 112 to position the knives 112 in accordance with the spacing desired between the scored lines 107. This arrangement allows the spacing between the scored lines 107 to be adjusted for different sizes of booklets 43, a spacing ring 113 of appropriate thickness being used for a given size of booklet 43. The scoring knives 112 are held on the body portion 111 by a threaded collar 114 disposed on the body portion 111 as shown in Fig. 20.

The body portion 111 rotates on the shaft 109 between thrust bearings 115. Lateral adjustment of the scoring knives is afforded through

8

an adjusting collar 116 which is carried in threaded engagement with a base member 117 fixed to the shaft 109. The adjusting collar 116 is disposed in abutting relation with one of the thrust bearings 115 and may be shifted on the base member 117 to adjust the lateral position of the scoring knives 112. A compression spring 118, arranged on the shaft 109 between a fixed collar 119 and the other thrust bearing 115 renders lateral adjustment of the scoring knives 112 available in either direction. The scoring knives 112 may accordingly be positioned readily in correspondence with the lateral adjustment of the arcuate guide 56 and the automatic valve element 55 as previously described.

To provide an adequate support for the application of the scoring knives 112 to form the scored lines 107 on the wrapper strip of cover paper 24 as it passes over the arcuate guide 56 a roll member 120 is disposed in relation to the scoring knives 112 through an opening in the arcuate guide 56 as shown in Fig. 6. The roll member 120 is carried on a fixed shaft 121 mounted in the arcuate guide 56. A roller bearing 122 is arranged on this shaft 121 between fixed collars 123. The roll member 120 which consists of a hardened steel ring is disposed on the roller bearing 122 for free rotation.

In operation the plurality of superimposed strips of cigarette paper 23 enter the machine from the right as shown in Fig. 1. The wrapper strip of cover paper 24 is led from the roll 27 around the arcuate guide 56 to a position which disposes it for folding in cover relation to the strips of cigarette paper 23 when it reaches the folding station 31. The wrapper strip 24 and strips of cigarette paper 23 are drawn into the machine in this manner by the feeding device 22.

As the wrapper strip of cover paper 24 passes over the arcuate guide 56 it is acted on by the scoring knives 112 to form the scored lines 107. For this purpose the scoring knives 112 are adjusted in relation to the roll member 120 to form clearly defined scored lines 107, but not to cut the wrapper strip 24 or unduly weaken it. The lateral adjustment of the scoring knives 112 is such that the scored lines 107 are formed in the wrapper strip 24 in relation to one edge of the strips of cigarette paper 23 as indicated in Fig. 4 to result in the formation of a squared backbone portion as previously mentioned when the wrapper strip 24 is drawn through the folding station 31.

After scoring in this manner the wrapper strip 24 is advanced over the arcuate guide 56 to the position of the automatic valve element 55. At this point a deposit of adhesive is placed on the wrapper strip 24 between the scored lines 107, as indicated in Fig. 4. As mentioned above, the deposits of adhesive are spaced on the wrapper strip 24 in timed relation to the operation of the severing device 32. The wrapped strip 24 accordingly leaves the arcuate guide 56 with a portion beyond one edge of the strips of cigarette paper 23 defined by scored lines 107, and having spaced deposits of adhesive applied to it.

Upon reaching the folding station 31 the wrapper strip 24 is folded in cover relation to the strips of cigarette paper 23 and the portion of the wrapper strip 24 defined by the scored lines 107 assumes an upstanding position during folding so that the deposits of adhesive are presented in bonding relation to the edges of the strips of cigarette paper 23. The strips of cigarette paper 23 and wrapper strip 24 accordingly leave

the folding station 31 as the assembled wrapper enclosed strips of cigarette paper 25. The assembled wrapper enclosed strips of cigarette paper 25 then pass through the feeding device 22 from which they are fed to the severing device 32 for cutting into booklet length, to form the cigarette paper booklets 43. The booklets 43 formed in this manner are carried by the collating device 45 into the collecting device 46.

The booklets 43 are further conditioned in this collecting device 46 to set the adhesive bond. It appears that when the assembled wrapper enclosed strips of cigarette paper 25 are cut at the severing device 32, the cutting operation has a tendency to shift the strips of cigarette paper 23 slightly, and as the adhesive bond between the wrapper strip 24 and the cigarette paper strips 23 is still tacky at this point, the bond may be impaired to some extent by the cutting operation. The further conditioning of the booklets 43 is carried out in the collecting device 46 to insure a sound adhesive bond.

For this purpose two electric heating elements 124 are arranged on the collecting device 46 to apply heat to the edge of the booklets 43 on which the adhesive bond is disposed as they are advanced through the collecting device (see Fig. 11). The heating elements 124 are spaced apart sufficiently to allow the arrangement of a pressing element 125 between them. The pressing element 125 comprises a cam 126 (see Figs. 12 and 13) which is rotated in relation to the advance of the booklets 43 through the collecting device 46. The cam 126 actuate a pressure block 127 mounted in the side of the collecting device 46. This pressure block 127 is arranged on a spring mounting 128 which urges it to a position of continuity with the side of the collecting device 46. Rotation of the cam 126 periodically shifts the pressure block inwardly in the collecting device so that the cigarette booklets are squeezed between the pressure block 127 and the opposing wall of the collecting device 46 as shown in Fig. 12. The rotation of the cam 126 is such that this squeezing action is exerted on each booklet as it is advanced through the collecting device. This squeezing action presses the wrapper and enclosed cigarette papers into intimate contact so that any disarrangement of the adhesive bond is remedied and the adhesive itself is set by the heat applied by the two heating elements 124 to insure that the adhesive bond is secure and fast when the booklets 43 reach a position for removal from the collecting device 46.

The booklets 43 are advanced through the collecting device 46 on an endless conveyor belt 129 which is disposed longitudinally on pulleys 130 at the bottom of the collecting device 46. The booklets 43 are delivered to the collecting device 46 in vertically disposed position, as is best illustrated in Fig. 12. In this position, a short side of the booklets 43 rests on the conveyor belt 129, and the booklet backbone 131, on which the adhesive bond is disposed, is oriented adjacent the side wall of the collecting device 46 in which the presser block 127 is mounted. As the booklets 43 are delivered serially from the severing device 32 by the collating device 45, they are received in the collecting device 46 and advanced on the conveyor belt 129 as illustrated in Figs. 1, 2 and 11. The above described conditioning of the adhesive bond for the cigarette papers contained in the booklets 43 takes place as the booklets are advanced in this manner through

the collecting device 46. The arrangement for rotating the cam 125 so that the presser block 127 is actuated in relation to the advance of the booklets 43 through the collecting device comprises a bevel gear 132 mounted on the shaft 133 which carries the cam 125. This bevel gear 132 meshes with a second bevel gear 134 carried by the drive shaft 135 for the conveyor belt 129. Rotation of the shaft 135 to drive the conveyor belt 129 accordingly causes rotation of the cam 125 in relation to the travel of belt 129 and consequent actuation of the pressure block 127 in relation to the advance of booklets 43 through the collecting device.

A cigarette paper booklet 43 formed according to my invention is illustrated in Figs. 14 and 15. The adhesive bond on the squared backbone portion 131 of the booklet is shown at 136. The cigarette papers 137 severed from the superimposed strips 23 are securely mounted by virtue of this adhesive bond 136 in the cover 138 formed from the enclosing wrapper strip 24. The overlapping cover flaps 139 allow easy access to the cigarette papers 137, and are readily disposed in closed position without requiring the use of any fastening means.

The improved automatic valve element 55 of my invention makes it possible to adjust the adhesive bond 136 to just the right condition. If too much adhesive is applied to form the bond 136 the cigarette papers 137 will be secured too tightly and will tear when an attempt is made to remove them from the booklet 43. If, on the other hand, not enough adhesive is applied the bond 136 will not be secure. This problem is further complicated by the fact that adhesives, such as gum arabic, vary from batch to batch in physical properties. As previously mentioned, the adhesive is forced to the automatic valve element 55 under adjustable pressure to provide adequate flow and ejection of the adhesive. Also, the plunger rod 69 arranged for reciprocation in the automatic valve element 55 may be adjusted as described above to vary the amount of the adhesive deposits applied. These features allow close regulation of the adhesive bond 139 formed, and make it possible to obtain satisfactory results with commercial grade adhesives.

While the means and method of the present invention are particularly adapted for making cigarette paper booklets as described above, it will be understood that my invention is applicable generally for applying deposits of adhesive on a traveling web of paper as defined in the appended claims.

I claim:

1. In a cigarette paper booklet making machine having a feeding device for feeding a plurality of strips of cigarette paper in superimposed relation to constitute the leaves of a cigarette paper booklet, a folding device for enclosing said strips of cigarette paper in a wrapper strip of cover paper, and a cutting device for severing the wrapper enclosed strips of cigarette paper in booklet length; a means for forming an adhesive bond for the cigarette papers in said enclosing wrapper cover comprising means for scoring said wrapper strip of cover paper to define a portion of said wrapper strip to be disposed in cover relation to an edge of said strips of cigarette paper by said folding device, and an adhesive applying means including a valve element for depositing metered quantities of adhesive at intervals on the portion of said wrapper strip defined by said scoring means, said scoring means

and said valve element being mounted at a point past which the wrapper strip of cover paper is guided before being folded to enclose said strips of cigarette paper, and said valve element being actuated intermittently in timed relation to the operation of said cutting device to space the adhesive deposits on said wrapper strip at intervals disposing the adhesive to form a separate bond for the cigarette papers in each booklet to be formed at said scoring device.

2. In a cigarette paper booklet making machine having a feeding device for feeding a plurality of strips of cigarette paper in superimposed relation to constitute the leaves of a cigarette paper booklet, a folding device for enclosing said strips of cigarette paper in a wrapper strip of cover paper, and a cutting device for severing the wrapper enclosed strips of cigarette paper in booklet length; a means for forming an adhesive bond for the cigarette papers in said enclosing wrapper cover comprising a scoring wheel and an opposed base roller, means for guiding said enclosing strip of wrapper paper between said scoring wheel and base roller to define a portion of said wrapper strip by scored lines, means for adjusting said scoring wheel and base roller laterally with respect to said wrapper strip to position the portion of said wrapper strip defined by scored lines in correspondence with a portion of said wrapper strip to be disposed in cover relation to one edge of said strips of cigarette paper by said folding device, and an adhesive applying means including a closed adhesive reservoir, a valve element, means for forcing adhesive from said reservoir to said valve element under pressure, means for metering adhesive from said valve element for deposit on said wrapper strip of cover paper, means for adjusting said valve element laterally with respect to said wrapper strip to apply the adhesive deposited from said valve element on the portion of said wrapper strip defined by scored lines, and means for actuating said metering means intermittently in relation to the operation of said cutting device to space adhesive deposits on said wrapper strip at intervals disposing the adhesive to form a separate bond for the cigarette papers in each booklet to be formed at said severing device.

3. In a cigarette paper booklet making machine having a feeding device for feeding a plurality of strips of cigarette paper in superimposed relation to constitute the leaves of a cigarette paper booklet, a folding device for enclosing said strips of cigarette paper in a wrapper strip of cover paper, a cutting device for severing the wrapper enclosed strips of cigarette paper in booklet length, and a collecting device arranged to receive the severed lengths of wrapper enclosed cigarette paper in the form of booklets as delivered from said cutting device; a means for applying adhesive to bond the cigarette papers in said enclosing wrapper cover comprising means for scoring said wrapper strip of cover paper to define a portion of said wrapper strip to be disposed in cover relation to an edge of said strips of cigarette paper by said folding device, an adhesive reservoir and means for depositing metered quantities of adhesive from said reservoir at intervals on the portion of said wrapper strip defined by said scoring means, said depositing means being actuated intermittently in timed relation to the operation of said cutting device to space the adhesive deposits on said wrapper

strip at intervals disposing the adhesive to form a separate bond for the cigarette papers in each booklet formed at said severing device, and heating means and a squeezing element arranged on said collecting device and operated in timed relation to said cutting device for pressing said adhesive deposited edge portion of the enclosing wrapper cover to condition and set the adhesive bond of the wrapper enclosed cigarette papers as delivered from said cutting device in the form of booklets.

4. In a cigarette paper booklet making machine, the combination with means for feeding a plurality of strips of cigarette paper in superimposed relation to constitute the leaves of a cigarette paper booklet, means for folding an enclosing wrapper strip of cover paper in cover relation to said strips of cigarette paper, means for severing the wrapper enclosed strips of cigarette paper in booklet lengths, and means for collating and collecting the severed lengths of wrapper enclosed cigarette paper in the form of booklets as delivered from said severing machine, of: a device for applying adhesive to bond the cigarette papers in said enclosing wrapper cover comprising a closed adhesive reservoir, a valve element, means for forcing adhesive from said reservoir to said valve element under pressure, and a plunger member disposed for reciprocation in said valve element and arranged to release and confine the adhesive forced to said valve element alternately during complementary periods of each cycle of reciprocation of said plunger member, whereby the adhesive may be deposited intermittently to provide a separate adhesive deposit on said enclosing wrapper strip of cover paper for each booklet formed at said severing device.

5. In a cigarette paper booklet making machine, the combination defined in claim 4 and further characterized in that the position of reciprocation of said plunger member in said valve element is adjustable to vary the relation of the complementary periods of the reciprocation cycle of said plunger member, whereby the separate adhesive deposits may be metered at a desired level.

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