

April 15, 1958

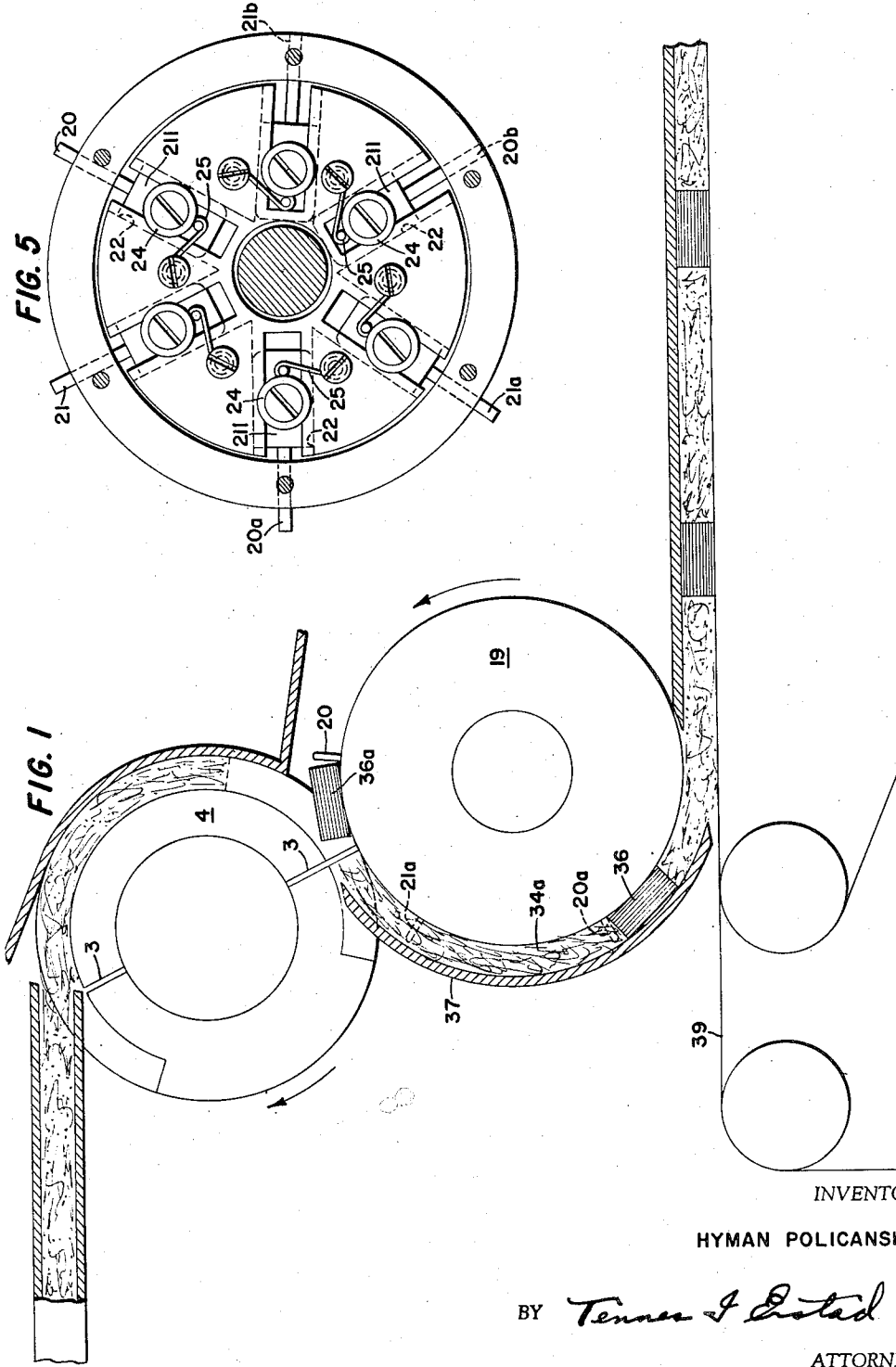
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2,830,594

METHOD FOR THE PRODUCTION OF FILTER-TIP CIGARETTES

Original Filed March 16, 1948

3 Sheets-Sheet 1



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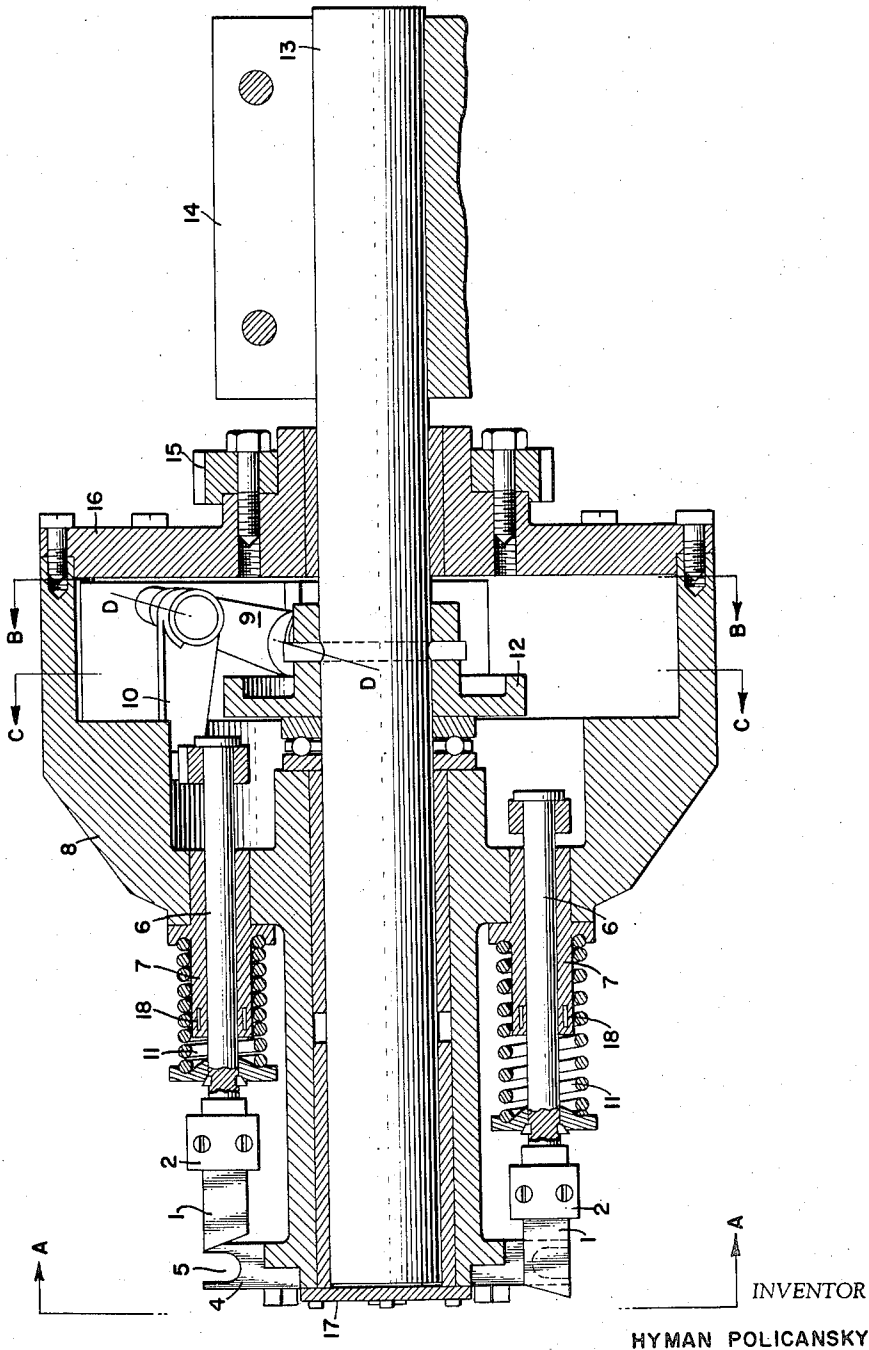
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FIG. 2



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FIG. 3

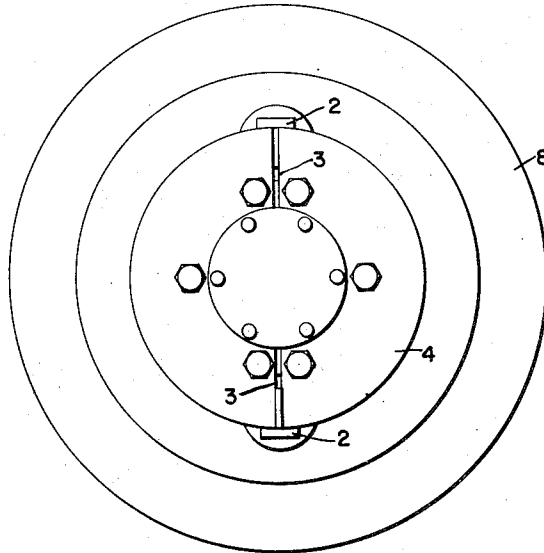
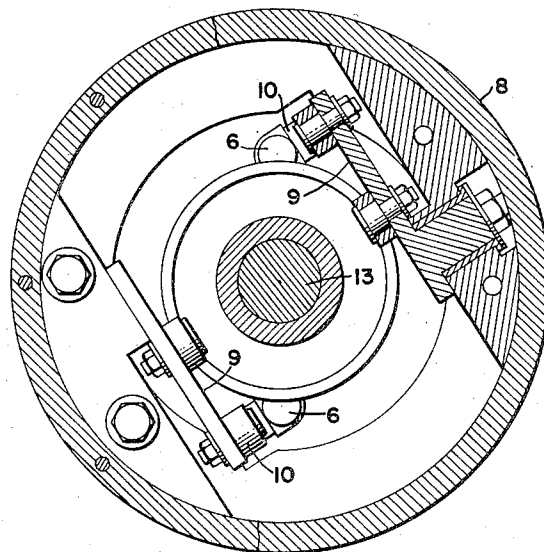


FIG. 4



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METHOD FOR THE PRODUCTION OF FILTER-TIP CIGARETTES

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Original application March 16, 1948, Serial No. 15,214. Divided and this application September 22, 1953, Serial No. 387,822

Claims priority, application Great Britain April 10, 1947

4 Claims. (Cl. 131—61)

This invention relates to a method for the production of filter tip cigarettes and is concerned with improvements for the high speed production of filter tip cigarettes on a cigarette making machine of the type known as a continuous rod machine, wherein before being wrapped and cut into individual cigarettes a continuous unwrapped tobacco rod or rope is transformed into a continuous rod comprising alternate abutting lengths of filter plugs, mouthpieces or other like objects, and lengths of tobacco rod or rope. For the purpose of this specification the words filter plugs shall be taken to mean filter plugs, mouthpieces, or the like.

The present invention is an improvement in or modification of the method for transforming a continuous tobacco rope moving along a rectilinear path of travel into a continuous rod disclosed in applicant's prior application Serial No. 696,206 filed September 11, 1946, now U. S. Patent No. 2,604,099, granted July 22, 1952, and is a divisional application of U. S. application Serial No. 15,214, filed March 16, 1948.

The aforesaid specification, inter alia, discloses means for severing lengths of unwrapped tobacco rope and for separating the lengths from the main body of tobacco rope in order to enable and effect successive delivery of the severed separated lengths, said means comprising a single wheel (hereinafter referred to as a section wheel) formed with a peripheral groove and provided with cutting knives or knife, movable with the wheel and about the axis of rotation thereof, the said wheel being adapted to rotate continuously and with even peripheral speed greater than that of the forward moving tobacco rope fed thereto.

Further, according to the aforesaid specification, means are provided for receiving the successively delivered separated lengths of tobacco rope and filter plugs and longitudinally abutting the said filter plugs and tobacco rope, said means comprising essentially a single wheel (hereinafter termed "transfer wheel") operating in conjunction with an arcuate chute, the said wheel being provided with retractable conveyor pins for transferring the lengths of tobacco rope and filter plugs in alternate succession through the arcuate chute on to a moving web of paper, or endless band, and causing them to abut longitudinally to form a continuous composite rod of alternate lengths of tobacco rope and filter plugs.

The retractable conveyor pins engage filter plugs at a suitable position on the periphery of the transfer wheel and convey the said plugs into engagement with the end of the length of tobacco rope already guided and fed into the arcuate chute. The filter plugs are fed and guided to the transfer wheel by any convenient form of plug feeding means.

By virtue of the greater peripheral speed of the transfer wheel than the speed of the moving paper web (or endless band) on to which the lengths of tobacco rope and filter plugs are deposited and by which the said plugs and tobacco rope are carried away, it will be understood that the leading end of a length of tobacco rope will be

brought into longitudinal abutment with the end of the filter plug which it pursues. At approximately the position where the retractable conveyor pins cause abutment to occur between a filter plug and a length of tobacco rope and the next filter plug and length of tobacco rope the conveyor pins are retracted.

The present invention is concerned more specifically with the function of the transfer wheel, the object of the invention being to increase the production efficiency of the apparatus. The transfer wheel hitherto employed made use of retractable pins placed at distances on the periphery of the wheel equal to or nearly equal to the sum of the length of the filter plug and the severed lengths of tobacco rope as received from the section wheel.

It has been discovered that it was not possible for the end of the plug being conveyed by a pin of the transfer wheel to engage in normal abutment with the end of the severed tobacco segment delivered by the section wheel, such normal abutment was prevented by interference by the knife. The tobacco segment would have a tendency to hesitate in the arcuate chute associated with the transfer wheel till the following filter plug closed the gap between itself and the tobacco segment. This hesitation would naturally result in imperfect abutment between the leading end of the tobacco segment and the preceding filter plug being conveyed by its related pin.

According to the present invention there is provided supplementary or auxiliary conveyors operable to hold the tobacco segments and maintain secure abutment between the end of said segments and the filter plug immediately preceding said segments.

The auxiliary conveyor means conveniently comprise supplementary pins mounted in the transfer wheel and disposed between the normal retractable pins. The supplementary pins are operated mechanically to engage with the tobacco segments intermediate the ends thereof and to be disengaged therefrom similarly to the retractable pins, the sequence of operation being such as to achieve the object of the invention.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

Fig. 1 is a semi-diagrammatic elevation of the invention with parts broken away for clearance and showing the mode of operation thereof.

Fig. 2 is a sectional elevation of the section wheel seen in Fig. 1 showing the knife operating mechanism of a section wheel.

Fig. 3 is an end elevation of Fig. 2 seen in the direction of the arrows A, A in Fig. 2.

Fig. 4 is a sectional view of Fig. 2 taken through the broken line B, B thereon.

Fig. 5 is an end elevation showing the operating mechanism for the primary and secondary retractable members of the rotatable transfer carrier.

In the form of the invention shown in the accompanying drawings Figures 2, 3 and 4 are views of grooved sectional wheel 4 provided with two cutting knives 1 held in clamps 2 and operating in slots 3 (Figure 3) transversely located across the section wheel peripheral groove 5 (Figure 2).

The knife clamps 2 are mounted on the ends of knife plungers 6 which protrude from bearings 7 in the casing 8 in which are mounted rocker arms 9. The rocker arms are connected to the knife plungers 6 by means of the links 10. The knives are urged outwardly by springs 11 and

are withdrawn by cup cam 12 acting through the cam follower rollers mounted on the rocker arms 9. The cup cam 12 is pinned to the shaft 13 which is fixedly clamped in a bracket stand 14. Although not shown in the drawings the shaft may be extended and supported near the section wheel. The cover plate 16 is spigoted and screwed to the casing 8 and carries gear wheel 15 by means of which the casing and with it the knife operating mechanism and the section wheel is caused to revolve about the stationary shaft 13. An oil retaining cover plate 17 and washer is screwed to the casing and felt oil retaining washers not shown may be provided where shafts protrude from the casing, thus sealing the casing against the escape of oil and the entry of dust. The casing is partially filled with oil (not shown in the drawings) and constitutes an oil bath for lubricating the knife operating mechanism.

Referring to Figures 1 and 2 of the drawings, the section wheel 4 is provided with two operating knives 3 as hitherto, whereas the transfer wheel 19 is provided with three sets of primary retractable conveyor pins 20, two of which are shown at 20 and 20a instead of two sets as in my aforementioned application Serial No. 696,206, now U. S. Patent 2,604,099. The transfer wheel is provided in addition with three sets of secondary retractable conveyor pins, each set disposed intermediate the primary pins 20 one of said secondary pins being shown at 21a. The remaining primary conveyor pins and secondary conveyor pins are not shown as they would be in their retracted positions.

The operating mechanism for the primary and secondary conveyor pins is shown in Fig. 5. The pins 20, 20a, and 20b are machined to fit snugly in holes in the casing in order to prevent entry of dust to the inside of the casing as well as to prevent escape past them of lubricant from the inside of the casing and in order to facilitate their construction with this end in view are constructed to retract and protrude with radial movement. In addition felt pads or washers (not shown) may be provided at a point in the casing where the retractable pins enter the rim thereof.

The pins 20, 20a, and 20b are mounted in slide blocks 211 which are retained by slide block channel guides 22. The slide blocks are actuated by a suitable cam (not shown) and cam follower rollers 24 and by springs 25. The cam (not shown) has an elongated boss which may be bushed to provide a bearing for the drive shaft to which the transfer wheel is pinned through a suitable transfer wheel boss in a manner similar to that shown in U. S. Patent 2,604,099 referred to above. The cam is non-rotatably clamped in a bracket stand and the transfer wheel revolves about the stationary cam.

The secondary retractable conveyor pins 21, 21a, and 21b are constructed and operate in a similar manner but from a separate cam than that which operates the primary retractable conveyor pins. The transfer wheel 19 is caused to revolve at a speed slightly in excess of the linear forward speed of the paper web 39 upon which it deposits the composite rod. In the arrangement illustrated a cutting knife 3 is shown as being in its fully projected position immediately before the tongue of the arcuate chute 37. The oncoming filter plug 36a conveyed by the pin 20 follows the knife 3 as closely as possible, but it is clear that the end of the plug does not make direct abutment with the end of the severed tobacco segment 34a as the knife 3 is interposed. Thus the tobacco segment 34a will hesitate in the arcuate chute 37 until the following filter plug closes the gap resulting in imperfect abutment between the leading end of the tobacco segment 34a and the preceding plug 36.

In order to meet the difficulty the section wheel is so arranged that when the knife 3 reaches the position shown in the illustration at which it is withdrawn the length of tobacco rope has been slightly compressed longitudinally against the preceding conveyor pin 20a and during this short period when the length of tobacco rope 34a is

compressed between the knife 3 and the conveyor pins 20a, the secondary conveyor pin A comes into operation and engages with the tobacco segment 34a, the knife 3 now being withdrawn completely. Having engaged the tobacco segment 34a, the supplementary conveyor pin A maintains secure and mutual abutment between the end of the tobacco segment and the filter plug being conveyed by the conveyor pins 20a. There will be a slight gap between the rear end of the tobacco segment 34a and the oncoming or following filter plug being forwarded by the pin 20. This gap will close by virtue of the fact that the transfer wheel 19 has a peripheral speed slightly faster than the speed of the endless paper web 39 and consequently the conveyor pins gain on the end of the tobacco segment by virtue of the slipping which takes place between the polished surface of the transfer wheel 19 and the upper surface of the composite rod conveyed by the paper web 39. The difference in the two speed is so arranged that the gap referred to is completely closed by the time the end of the tobacco segment and the filter plug being conveyed by the pins 20 is deposited on the moving paper web. It will be appreciated that the natural springiness of the tobacco will assist in closing the gap and that the difference between the speed of the two wheels may be exceedingly small. It will be understood that the supplementary conveyor pins A are withdrawn only after the leading end of the segment 34a and the following end of the plug with which it is in direct abutment are deposited on the moving paper web.

What I claim and desire to secure by Letters Patent is:

1. The method of making filter tip cigarettes comprising feeding cigarette filler continuously along a predetermined path in the form of a rope, separating a length of cigarette filler from the leading end of said rope, advancing said length of cigarette filler from said rope at an accelerated rate to form a gap between the trailing end of said separated length and the leading end of said rope, compressing individually each length lengthwise by moving the length up against a preceding filter plug by pushing on the trailing end of the separated length, maintaining said length under such lengthwise compression while advancing said length along a predetermined path of travel, feeding a succeeding filter plug up against the trailing end of said lengthwise compressed length of cigarette filler and maintaining the compressed cigarette filler under compression by abutting a plug with the trailing end of the compressed cigarette filler, and then combining said alternate lengths of said cigarette rope and filter plugs into a composite rod on a collector belt, said composite being in a state of compression prior to the time it reaches the collector belt.

2. The method of making filter-tip cigarettes which comprises receiving continuous cigarette rod material from a source of supply, conveying it around a curved path of travel, severing a cigarette length from the leading end of said source of supply as it is conveyed around said curved path of travel, conveying said severed section of rod around a second curved path of travel at a slower rate of speed, individually compressing said severed section of rod axially up against a preceding filter plug, by pushing on the trailing end of the section as it is conveyed around said second curved path of travel, maintaining said section under compression as it travels around said second curved path of travel, placing a filter plug behind and holding it up against each compressed section of rod as it travels around said second curved path of travel, and maintaining said section under compression by abutting a plug with the end of the compressed section, releasing said compression when said severed sections of cigarette rod are delivered to a rod forming tape to allow said compressed sections of cigarette rod to expand so as to bring the plugs and severed sections of rod into contiguous relationship before being formed into a composite rod, said composite rod being

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in a state of compression prior to the time it reaches the rod forming tape.

3. The method of making filter-tip cigarettes which consists of forwarding a continuous rod of cigarette material around an S-shaped path of travel to a rod forming station, severing said continuous rod into predetermined lengths of sections of cigarette rod as it is forwarded around the first bend of said S-shaped path of travel, separating said sections from each other, individually compressing said severed section of rod by pushing on the trailing end of each section as it is delivered to the second bend of said S-shaped path of travel to squeeze the leading end up against a preceding filter plug, maintaining said severed sections of rod in compressed condition as it is forwarded around said second bend, placing a filter-plug behind said compressed section and before the following adjoining section of severed rod and maintaining the compressed section in compressed condition by abutting a plug with the trailing end of the compressed section, and releasing said severed section of rod from lengthwise compression prior to its being discharged onto said rod former after the following adjoining section of severed rod is placed under compression.

4. The method of making filter tip cigarettes which comprises receiving continuous cigarette rod material from a source of supply, conveying it along a first path

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of travel, severing the cigarette rod into cigarette lengths as it is conveyed around said curved path of travel, delivering said severed sections of rod to a second path of travel, compressing said severed sections of rod by pushing each severed section from behind as it is conveyed along said second path of travel up against a preceding plug and compressed section of rod, maintaining said section of rod under compression as it travels along said second path of travel and then maintaining the section under compression by abutting a plug with the end of the section of compressed rod, the composite rod of filter plugs and sections of rod being in a state of compression prior to the time they reach the traveling web and then releasing said compression after being delivered to a traveling paper web, so as to utilize the natural springiness of the tobacco to obtain a positive abutment between the compressed section of the cigarette rod and the succeeding filter plug.

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