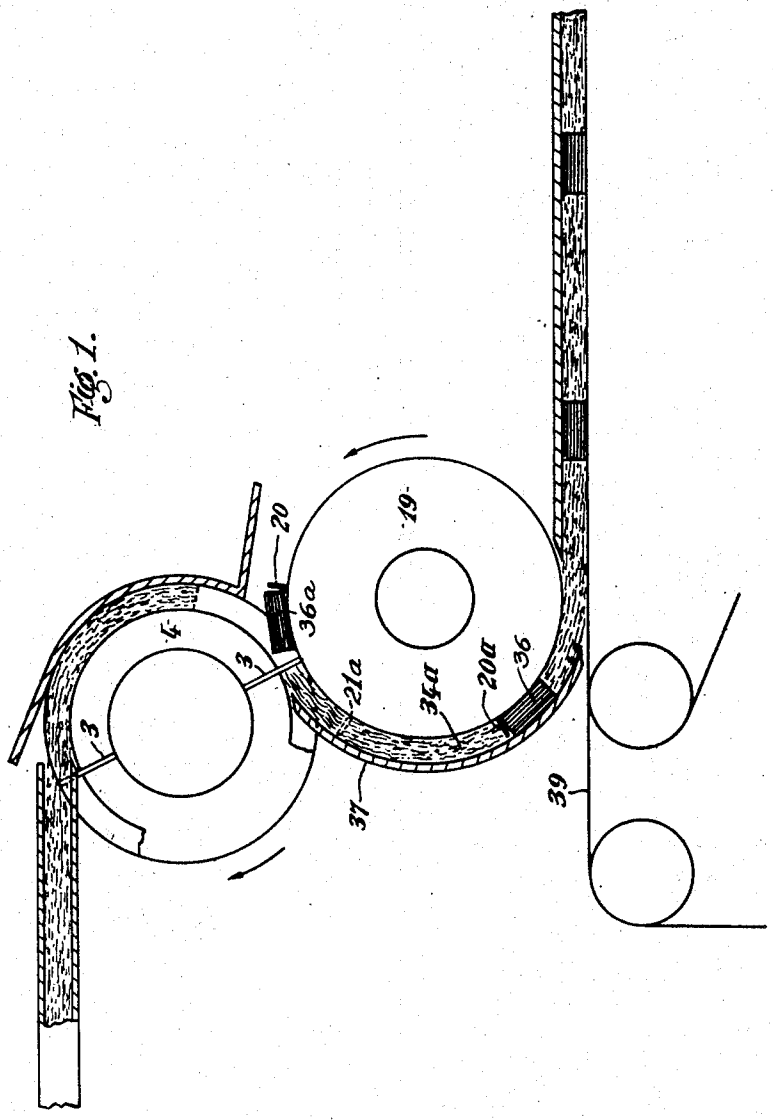
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MEANS FOR THE PRODUCTION OF FILTER-TIP CIGARETTES

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Fig. 1.



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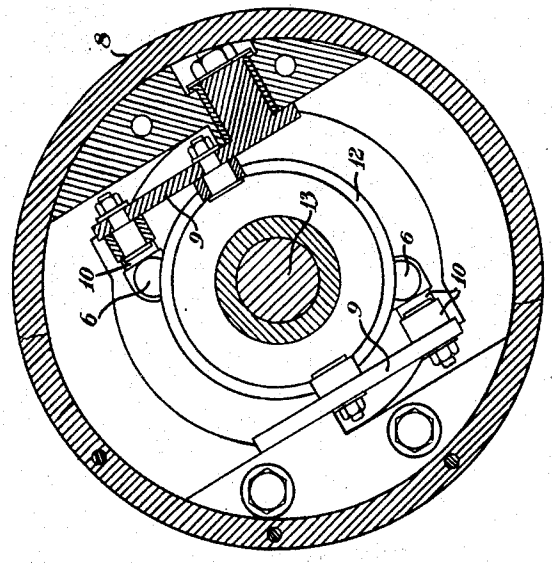


Fig. 4.

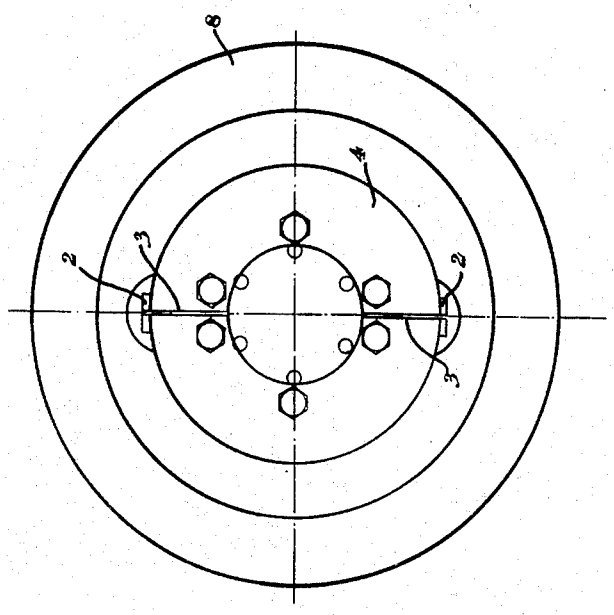


Fig. 3.

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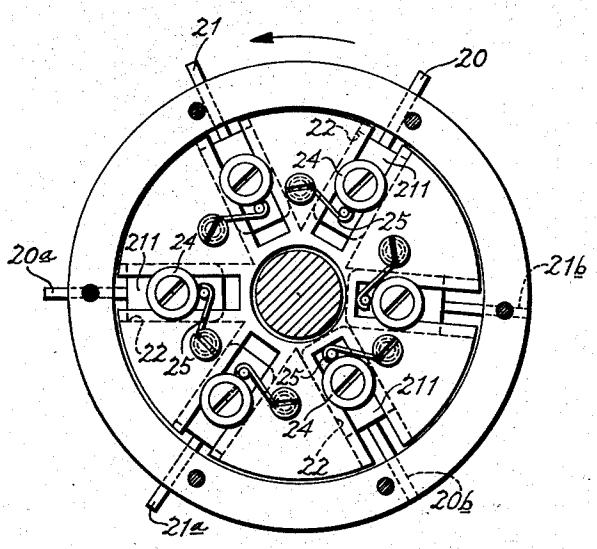
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MEANS FOR THE PRODUCTION OF FILTER-TIP CIGARETTES

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FIG.5



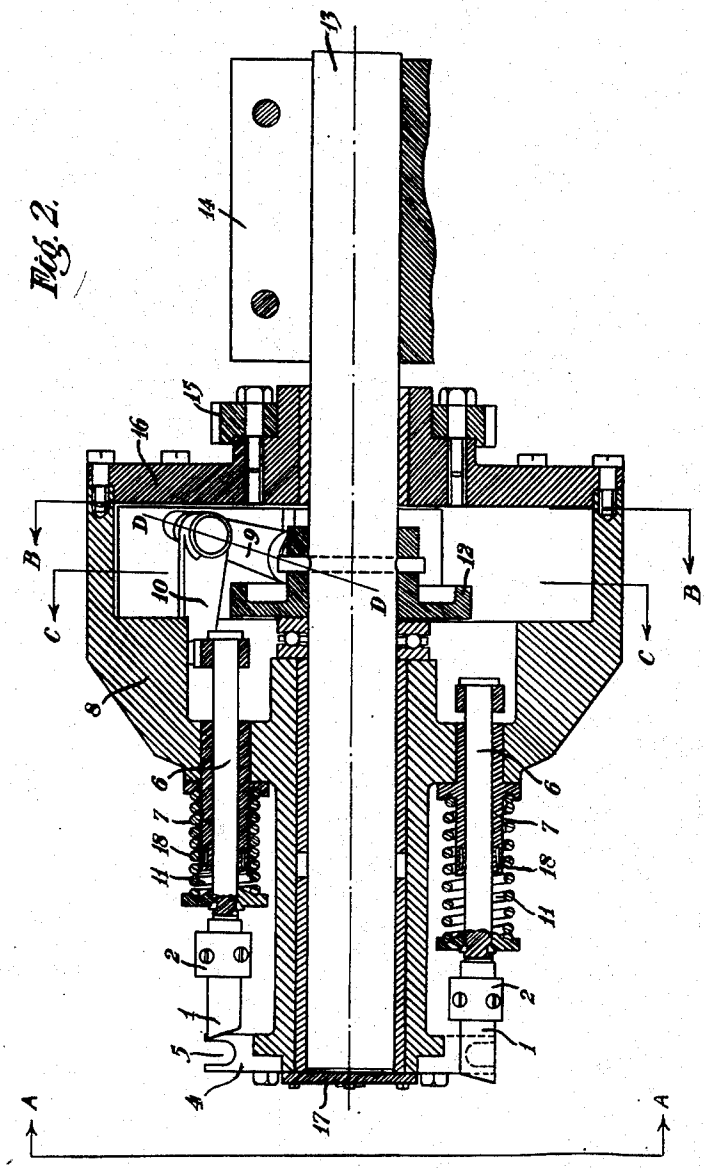
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MEANS FOR THE PRODUCTION OF FILTER-TIP CIGARETTES

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Fig. 2.



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2,695,618

MEANS FOR THE PRODUCTION OF FILTER-TIP CIGARETTES

Hyman Policansky, Cape Town, Cape of Good Hope, Union of South Africa, assignor to Industrial Machinery Company Limited, London, England

Application March 16, 1948, Serial No. 15,214

7 Claims. (Cl. 131—61)

This invention relates to a means for the production of filter tip cigarettes and is concerned with improvements in or relating to apparatus 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 apparatus 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 2,604,099 granted July 22, 1952.

The aforesaid specifications, 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 witih 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 fact that the peripheral speed of the transfer wheel is greater 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 and construction 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 conveyor pins 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 Figure 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 **20***a* instead of two sets as in my aforementioned application Serial No. 696,206. 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 **21***a*. 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**, **20***a* and **20***b* 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**, **20***a* and **20***b* are mounted in slide blocks **211** which are restrained 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 copending application S. N. 696,206 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**, **21***a* and **21***b* 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 bebore the tongue of the arcuate chute **37**. The oncoming filter plug **36***a* 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 **34***a* as the knife **3** is interposed. Thus the tobacco segment **34***a* 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 **34***a* 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 Figure 1 and at which it is substantially withdrawn the length of tobacco rope has been slightly compressed longitudinally against the preceding conveyor pin **20***a* and during this short period when the length of tobacco rope **34***a* is compressed between the knife **3** and the conveyor pins **20***a*, the secondary conveyor pin **21***a* comes into operation and engages with the tobacco segment **34***a*, the knife **3** now being withdrawn completely. Having engaged the tobacco segment **34***a*, the supplementary conveyor pin **21***a* maintains secure and mutual abutment between the forward end of the tobacco segment and the filter plug being conveyod by the conveyor pins **20***a*. There will be a slight gap between the rear end of the tobacco segment **34***a* 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 **10** 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 speeds 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 conveyod 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 **21***a* are withdrawn only after the leading end of the segment **34***a* 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. In a machine for making from a rope of tobacco fed thereto filter tip cigarettes each having a tobacco length and a filter plug, said machine comprising a rotatable member adapted to rotate at a uniform speed greater than that at which the tobacco rope is fed thereto, knife means movable with the rotatable member about the axis of rotation thereof for severing from said tobacco rope a tobacco length and positively moving said severed tobacco length along with the movable member to provide a gap between the trailing end of the tobacco length and the leading end of the tobacco rope, said gap at the discharge point of the rotatable member being of a length greater than a filter plug, a rotatable transfer carrier the peripheral surface of which is substantially tangential to a portion of the peripheral surface of the rotatable member, the transfer carrier being adapted to receive the spaced tobacco lengths from the rotatable member, and circumferentially spaced primary retractable means movable with the transfer carrier about the axis of rotation thereof for feeding filter plugs on the carrier substantially to the point of tangency between said carrier and the rotatable member so that each filter plug will be positioned in a gap between the adjacent ends of two tobacco lengths, one of which has been and the other is being transferred to the carrier, the knife means being retractable after transferring a tobacco length to the transfer carrier and compressing said tobacco length so that the leading end thereof will abut a primary retractable means on the transfer carrier engaging the trailing end of a filter plug, said transfer carrier having circumferentially spaced secondary retractable means disposed between the primary retractable means and adapted to engage a tobacco length thus compressed to hold it in said condition, and the retractable means and the transfer carrier being operable for moving the tobacco length and filter plugs during rotation of the carrier.

2. A machine for making filter tip cigarettes according to claim 1, wherein a rectilinear traveling web is disposed in substantially tangential relation to a part of the rotatable transfer carrier upon which web the alternate tobacco lengths and filter plugs are adapted to be deposited and carried away from the transfer carrier.

3. In a machine for making filter tip cigarettes, each cigarette having a tobacco length and a filter plug, said machine comprising, a source of cigarette filler arranged in the form of a rope, a rotatable member adapted to rotate at a uniform speed greater than that at which the tobacco rope is fed thereto, separating means moving with the rotatable member about the axis of rotation thereof for separating tobacco lengths from said tobacco rope and positively moving said separated tobacco length along with the movable member to provide a gap between the trailing end of said tobacco length and the leading end of the tobacco rope, said gap at the discharge point of the rotatable member being of a length greater than a filter plug, a rotatable transfer carrier the peripheral surface of which is substantially tangential to a part of the peripheral surface of the rotatable member, the transfer carrier being adapted to receive the spaced tobacco lengths from the rotatable member, primary retractable means coacting with said rotatable transfer carrier for feeding filter plugs therewith to the point of tangency between said carrier and the rotatable member so that each filter plug will be positioned in the gap between the adjacent ends of two tobacco lengths, one of which has been and the other is being transferred to the rotatable transfer carrier, the separating means being retractable after transferring a tobacco length to the transfer carrier and compressing said tobacco length so that the leading end thereof will engage with the trailing end of a preceding filter plug, said transfer carrier having circumferentially spaced secondary retractable means disposed between the primary retractable means and adapted to engage a tobacco length thus compressed to hold it in said condition, and the retractable means and the transfer carrier being operable for moving the tobacco length and filter plugs during rotation of the carrier.

4. In a machine for making filter tip cigarettes each having a tobacco length and a filter plug, said machine

comprising a source of continuous cigarette filler arranged in the form of a rope, a rotatable member adapted to rotate at a uniform speed greater than that at which the tobacco rope is fed thereto, a transfer member positioned adjacent said rotatable member, separating means movable with the rotatable member for separating from said tobacco rope a tobacco length and positively moving said separated tobacco length along with the movable member to provide a gap between the trailing end of the tobacco length and the leading end of the tobacco rope when transferring said tobacco length onto said transfer member, said gap at the discharge end of the rotatable member being of a length greater than a filter plug, means traveling with said transfer member for moving a filter plug into said gap and forwarding it up against the trailing end of the preceding tobacco length, a drive for moving said transfer member at a slower speed than said rotatable member to cause tobacco to be compressed lengthwise against the preceding filter plug, and a secondary retractable member carried by said transfer member for maintaining said compressed tobacco length in compressed condition while traveling with said transfer member.

5. In a machine for making cigarettes with filter plugs, a rotatable carrier, a rotary conveyor for feeding tobacco lengths individually in spaced end-to-end relation to the carrier, a drive for rotating said conveyor at a faster speed than said carrier so as to effect an endwise compaction of each filler length as it is delivered to said carrier, a retractable member carried by said carrier to engage with the tobacco length to hold said tobacco length under compression while traveling with said carrier, a source of filter plugs, a second retractable member engaging and moving a filter plug from said source up against the preceding trailing end of the compacted tobacco length, a collecting conveyor for receiving alternately arranged tobacco lengths and filter plugs from said carrier and forming them into a composite rod, and means for withdrawing said members individually from engagement with said plugs and tobacco lengths as such tobacco lengths and plugs are delivered to said collecting conveyor.

6. A machine for making filter-tip cigarettes comprising, a source of supply of cigarette filler arranged in the form of a rope, a cutting device for severing said rope into individual lengths of tobacco and simultaneously advancing said tobacco lengths at a speed sufficient to provide a gap between each tobacco length and the succeeding tobacco rope, a transfer wheel for receiving said severed lengths of tobacco rope, a drive for moving said transfer wheel at a speed which will cause the cutting device to compress a tobacco length axially on said transfer wheel when it is delivered thereto, retractable members carried by said transfer wheel to engage with a tobacco length after it has been delivered to said transfer wheel to maintain it under axial compression while being conveyed by said transfer wheel, a source of filter plugs, retractable members carried by said transfer wheel for engaging and moving a filter plug from said source of supply into contact with the trailing end of the tobacco length held under compression by the preceding retractable member, a collecting conveyor for receiving and forming said alternately arranged lengths of compressed tobacco rope and filter plugs into a composite rod, and means for withdrawing said retractable members from engagement with the tobacco lengths and plugs before they are delivered to said collecting conveyor.

7. A device for combining filter plugs at spaced intervals with a rope of tobacco comprising, a traveling member carrying cutting elements for severing the leading end of said rope into individual lengths and forming a gap therebetween, a transfer wheel tangentially arranged with respect to a part of said traveling member for receiving individual lengths of tobacco rope from said traveling member, a drive for moving said transfer wheel at a slower speed than said traveling member to effect an endwise compaction of the filler length as it is delivered to said transfer wheel, a source of filter plugs, a retractable element carried by said transfer wheel for maintaining said tobacco length under compression by engaging therewith, a second retractable element engaging with one of said filter plugs and moving it into engagement with the trailing end of said tobacco length held under compaction by said first retractable element, a collecting conveyor for receiving alternately arranged lengths of tobacco rope and filter plugs to combine them into a composite rod, and means for effecting a withdrawal of said retractable elements as the tobacco lengths and filter plugs are received by said conveyor.

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