

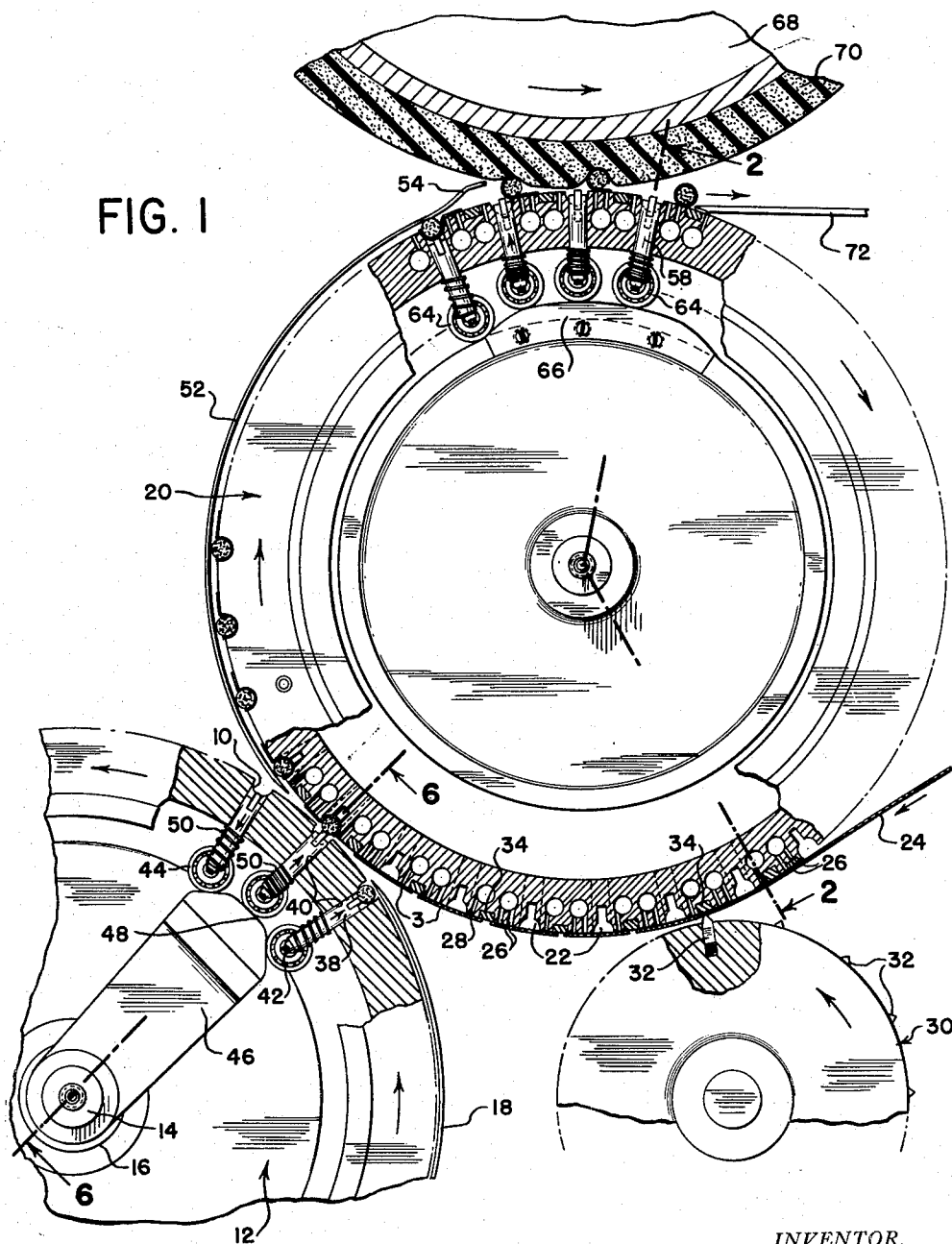
Sept. 13, 1960

M. O. SCHUR
WRAPPING DEVICE

2,952,105

Filed Aug. 6, 1957

3 Sheets-Sheet 1



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FIG. 2

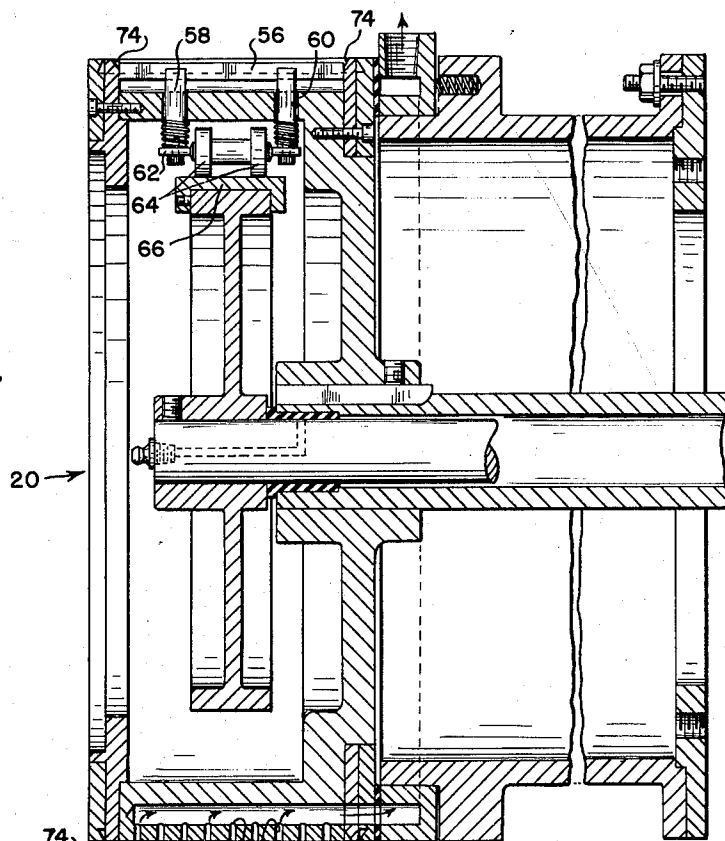


FIG. 3

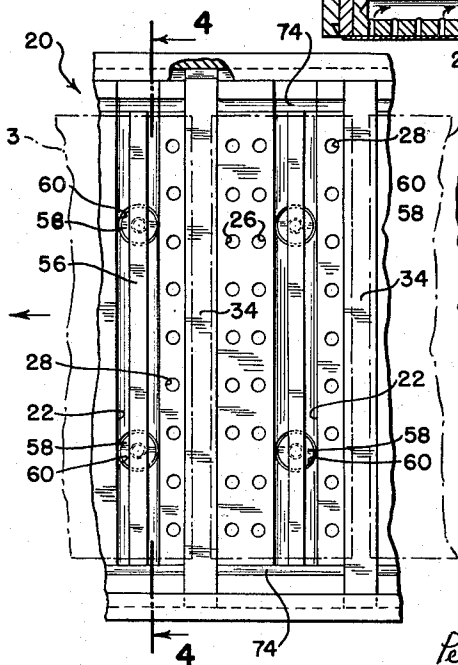
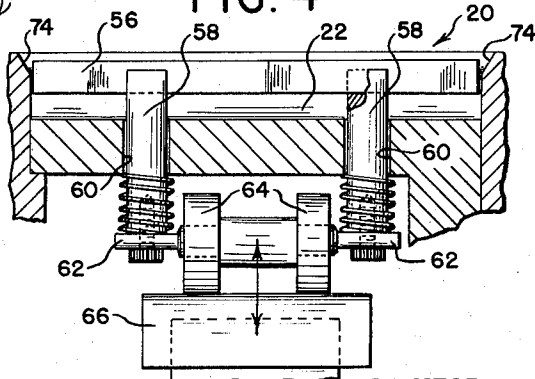


FIG. 4



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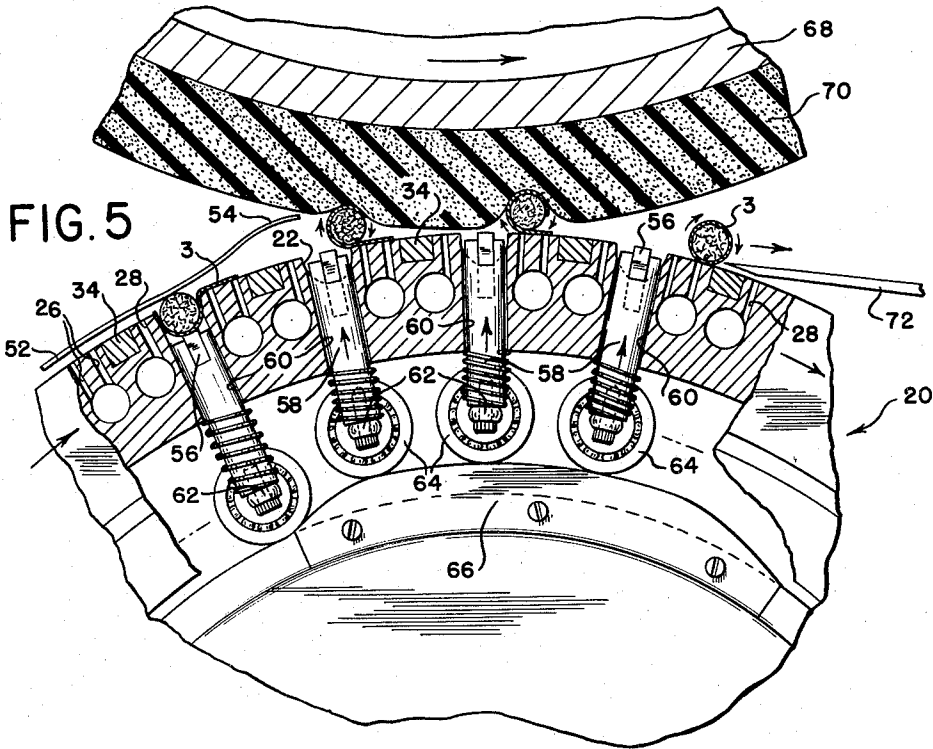
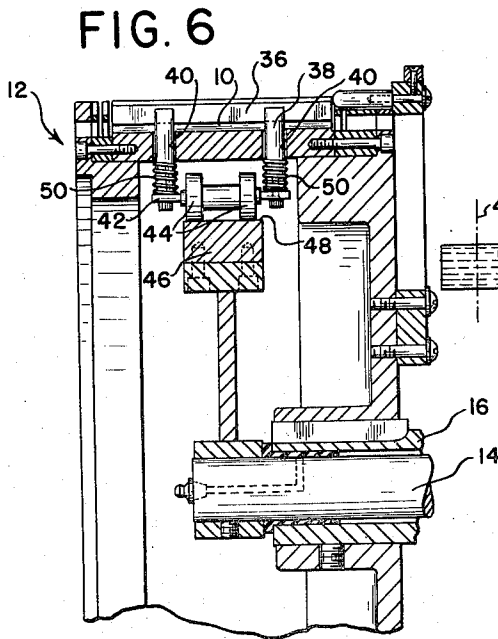
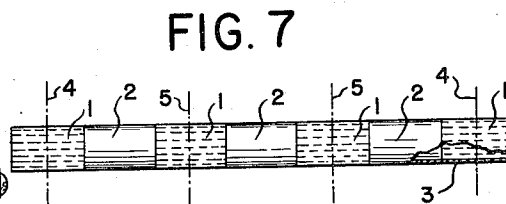
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3 Sheets-Sheet 3



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2,952,105

WRAPPING DEVICE

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Filed Aug. 6, 1957, Ser. No. 676,528

10 Claims. (Cl. 53—32)

This invention relates to a wrapping machine, and more particularly to a machine for wrapping sheet material, such as paper, around a plurality of axially aligned cylindrical members to form a unit, or package.

While the invention may be used for wrapping a number of different types of cylindrical articles, I have designed it for use in wrapping filter tip sections in the manufacture of laminated cigarette filter tips. In my copending application Serial No. 578,989, filed April 18, 1956, now Patent No. 2,882,970, I have disclosed a method of manufacturing laminated filter tips in which rods of multiple filter length are cut into sections, the sections aligned with sections of one type in end to end relation with sections of the second type to provide an assembly of such sections, the assembly wrapped to form a composite filter tip rod of a plurality of alternately arranged sections, and the rod then cut to form double laminated filter tips. The present invention relates to apparatus for wrapping such assemblies of alternate filter tip sections to produce a composite filter tip rod.

In carrying out the invention, paper is delivered from a bobbin to a wrapping roll, the width of the paper being substantially equal to the length of a filter tip rod. As it is delivered to the roll, the paper is cut into lengths slightly greater than the circumference of the filter tip sections that are to be wrapped. These strips of paper are retained on the wrapping roll by suction. The surface of the roll is provided with spaced pockets to receive the filter tip assemblies. Each strip of paper fed to the roll extends over one of these pockets. A transfer roll delivers the filter tip units to the pockets of the wrapping roll as it rotates, and as each unit is delivered into a pocket, the paper wrapping is forced into the pocket around a substantial portion of the circumference of the unit. At another point in the rotation of the wrapping roll, the unit is forced out of the pocket, and is engaged by a roll or belt traveling at a greater speed than the wrapping roll. This rotates the partially wrapped unit and completes the wrapping operation.

The mechanism provides a relatively simple means which, while adapted primarily to the wrapping of filter tip sections to produce composite filter tip rods, is also useful for wrapping assemblies of other cylindrical articles arranged in axial alignment. The device is one that requires a minimum of maintenance and repair to keep it in operable condition, and is therefore particularly useful in modern day cigarette manufacture.

In the accompanying drawings, I have shown one embodiment of the invention. In this showing:

Fig. 1 is a side elevation, parts being shown in section, of the wrapping roll, a transfer roll which delivers the assemblies to the wrapping roll, and a spin roll;

Fig. 2 is a vertical, sectional view on line 2—2 of Fig. 1;

Fig. 3 is a detailed view of a portion of the surface of the wrapping roll;

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Fig. 4 is a detailed, sectional view on line 4—4 of Fig. 3;

Fig. 5 is a vertical section of a portion of the wrapping roll and spin roll, on an enlarged scale;

Fig. 6 is a detailed, sectional view of the transfer roll on line 6—6 of Fig. 1; and

Fig. 7 is a sectional view of a composite filter rod.

The use of the apparatus forming the subject matter of the present invention will be described in connection with the manufacture of composite filter rods. As shown in Fig. 7, such rods may consist of alternate filter tip sections 1 and 2 arranged in an outer wrapper 3. Such filter tip sections may be formed of any suitable material or materials as the construction of the filter tip, per se, forms no part of the present invention. The sections 2, which ultimately become the end of the cigarette that is placed in the smoker's mouth, may be a tube that forms a mouthpiece, or it may contain filtering material. In Fig. 7 I have shown a composite rod formed of seven filter tip sections, with a section 1 on each end. The provision of a composite rod of seven sections is arbitrary and is used for illustration, because it is employed in the industry at the present time.

Assemblies of such sections without the outer wrapper are first formed by the apparatus and method of my prior application, Serial No. 578,989, or by other suitable means, and are delivered to pockets 10 equally spaced on the periphery of a transfer roll 12. The transfer roll consists of a shell and in the illustration, rotates counter-clockwise around a stationary shaft 14 (see Fig. 6). The roll is keyed to and revolves with a sleeve 16 which surrounds the shaft and is driven in any suitable manner. The assemblies in pockets 10 are retained in place by a shield 18 until they reach the point where they are transferred to the wrapping roll 20.

Wrapping roll 20 is likewise provided with spaced pockets 22 into which the assemblies are delivered. Prior to delivery of each assembly to a pocket of the wrapper roll, a strip of paper, which forms the wrapper 3, is positioned over the pocket. As shown, a web of paper 24 is fed from a bobbin or reel (not shown) between a pair of pinch rolls (not shown) to the surface of wrapping roll 20. The width of the paper is equal to the length of the composite filter rod, and as it is delivered to the wrapping roll, it is cut into strips of a length slightly greater than the circumference of the filter rods to provide sufficient overlap to permit the edges to be secured to each other by a suitable adhesive. The paper is held against the surface of the wrapping roll by suction. As shown (see Fig. 3) two transverse rows of openings 26 are provided in advance of each pocket 22 and one transverse row of openings 28 is arranged behind each pocket. A knife roll 30 is arranged adjacent the wrapping roll just beyond the point of delivery of the paper web. Knives 32 are arranged on this roll and they cooperate with hardened steel inserts 34 on the wrapping roll to sever strips 3 from the web. The pinch rolls which feed the web to the wrapping roll travel at a slightly lower surface speed than the wrapping roll. Thus gaps are formed between the strips of paper on the wrapping roll. The strips travel on the wrapping roll from the point where they are cut toward the point where transfer roll 12 and the wrapping roll approach each other, and each pocket 10 on the transfer roll comes into alignment with a pocket 22 on the wrapping roll. At that time, a strip 3 is arranged over each pocket extending from the insert 34, preceding the pocket to the insert 34 following the pocket, as shown at the bottom of the wrapping roll in Fig. 1.

Suitable means are provided for ejecting the assembly of filter tip sections from the pockets 10 into pockets 22.

An ejector bar 36 is arranged in each pocket (see Fig. 6). The ejector bars are carried by rods 38 which pass through openings 40 in the shell of the drum. The inner ends of rods 38 carry a pin or shaft 42 on which is mounted a pair of rollers 44. Rollers 44 engage cam 46 (see Figs. 1 and 6) to raise the ejector bar flush with the surface of the roll 12 and deliver the assembly into pocket 22 of the wrapping roll. Cam 46 is mounted on stationary shaft 14 and has its high area 48 positioned to raise the ejector bars 36 at the proper point in the revolution of the transfer roll 12. As shown, in Fig. 1, the shield 18 terminates ahead of this point to permit the transfer of the assembly to the wrapping roll. Ejector bars 36 are retained in retracted position during the period that rollers 44 are fed out of contact with cam 46 by springs 50. As shown, the springs surround rods 38 between the shell of the roll and shaft 42.

As the ejector bar is raised to the position of the middle one shown in Fig. 1, it pushes the assembly of filter tip sections into the aligned pocket 22. The paper strip 3 is forced into the pocket surrounding the portion of the assembly that is within the pocket. The pair of rows 26 of suction ports in advance of the pocket exerts a greater holding force on the strip than is exerted by the single row 28 behind the pocket. As a result, the trailing edge of the paper moves, and assumes a position at the upper, rear edge of the pocket (see Fig. 1). The paper remains in this position as illustrated in Fig. 1 while the wrapping roll travels from the loading position, illustrated at the bottom in Fig. 1 to the discharge position illustrated at the top. A shield 52 prevents displacement of the assemblies from the pockets 22. The end of the shield adjacent the discharge is spaced a greater distance from the roll, as at 54.

The pockets of the wrapping roll are provided with ejector mechanism similar to that heretofore described in connection with the transfer roll. As shown, an ejector bar 56 is arranged in each pocket (see Fig. 2). The ejector bars are carried by rods 58 which pass through openings 60 in the shell of the drum. The inner ends of rods 58 carry a pin or shaft 62 on which is mounted a pair of rollers 64. Rollers 64 engage cam 66 (see Figs. 1 and 2) to raise the ejector bar flush with the surface of roll 20. As the assembly is raised, the offset end 54 of the shield prevents its displacement. A spin roll 68 is mounted over the wrapping roll, and it rotates in a counter-clockwise direction. It also rotates at a higher surface speed than the wrapping roll. It is provided with a surface covering 70 of foam rubber, or other elastomer. When ejector bar 56 reaches a position flush with the surface of the wrapping roll, the assembly has been pushed into the covering of the spin roll. The assembly is rolled forwardly over the surface of the wrapping roll causing it to be completely wrapped by the portion of the paper strip on the roll preceding the pocket 22. Adhesive that had been applied to the paper by conventional means (not shown) as the paper was fed to the wrapping roll causes the strip to adhere, forming a composite filter tip rod with the outer wrapping 3. The composite filter rods are delivered by their own momentum to a plate 72.

Thus, the aligned filter plugs, with alternate plugs of different types to produce a composite filter rod shown in Fig. 7, or other cylindrical articles to be wrapped into a unit in end to end arrangement, are delivered by transfer roll 12 or other suitable apparatus to the pockets of the transfer roll with the strips of paper or other flexible wrapping material previously arranged on the surface of the roll, and over the pockets provided in the surface for the reception of the units or assemblies to be wrapped. By forcing the wrapping material at the rear of the pocket around the material in the pocket and having the excess in advance of the pocket, the rolling of the

assembly by the faster moving spin roll completes the wrapping operation. The spin member may be a roll, as shown, or a belt traveling tangent to the surface of the wrapping roll.

When the rolling of the assembly begins at approximately the point where the shield 52 ends, the portion of strip 3 in advance of the pocket is still retained on the surface of the drum by suction. This prevents skidding of the assembly and insures rolling of the uncovered portion within the strip. As the composite rod reaches a point adjacent plate 72, the openings 26 and 28 may be disconnected from the source of suction to facilitate transfer of the rod to the plate. Means for connecting the ports 26 and 28 to a source of suction are well known in the art and a detailed description thereof is deemed unnecessary.

The composite filter rod of Fig. 7 consists of seven sections of filter tip length, the four sections 1 representing the portion of a filter tip that is to be arranged adjacent the end of the cigarette portion proper and the three sections 2 representing the portions which form the other ends or mouthpieces. Following the present practice, a half filter section is removed from each end by cutting the rod at lines 4 and the trimmed ends may be reused in the manufacture of the additional filter sections 1, depending upon the characteristics of the material being used. The rod is then cut on the lines 5 to produce three rods each of two filter tips with inner filter tip sections 1 on the outer ends of each rod, and a double outer filter tip section 2 between them. These double filter tips are fed to a conventional cigarette-making machine and assembled between two tobacco sections to produce two cigarettes.

To prevent the filter tip sections from separating from each other on the wrapping roll, the end walls of pockets 22 are beveled, as at 74 (see Fig. 2). A slight compression is exerted on the filter tip sections to hold them in contact with each other.

I claim:

1. A method of wrapping a plurality of axially aligned rod-like articles disposed in a group comprising the steps of providing a moving carrier having a plurality of pockets, sequentially disposing strips of paper over the pockets so that a given strip overlaps a mating pocket and so that margins of the strip extend beyond the mating pocket, holding one margin more firmly than the other, delivering groups of aligned articles to the pockets in sequence so that a given group and a corresponding strip are poised over the same pocket simultaneously, utilizing the group of articles to push the strip into the pocket and to move said other margin relative the pocket so as to envelop at least one half the circumference of each article of the group and to position said margin adjacent the edge of said pocket, ejecting the half wrapped group from the pocket and thereafter rolling the strip and the group to utilize said one margin to fully envelop the group.

2. Apparatus for wrapping a plurality of axially aligned rod-like articles comprising a moving carrier, a plurality of spaced pockets on the carrier to receive the rod-like articles, means for delivering strips of flexible wrapping material in sheet form to the surface of the carrier and arranging each of said strips over one of said pockets with a portion of the strip in front of the pocket and a portion in the rear of the pocket, means for projecting the aligned rod-like articles into a pocket over the strip and causing the portion of the strip in the rear of the pocket to enter the pocket around the rod-like articles, means for projecting the rod-like articles and the strip from the pocket forwardly onto the surface of the carriers, and means for rolling them on the surface to complete the wrapping of the strip.

3. The apparatus of claim 2 in which the carrier is a roll and the pockets are formed on the periphery of the roll.

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4. The apparatus of claim 2 in which the surface of the carrier is provided with a plurality of openings in front of and in the rear of each pocket, and said openings are connected to a source of suction to retain the strips of material on the carrier.

5. The method of claim 1 in which said one margin is held by suction and the suction exerted to hold the strip in front of the pocket is greater than that exerted in the rear of the pocket whereby when the aligned rod-like articles are delivered into the pocket on top of the strip, the portion of the strip in the rear of the pocket is caused to enter the pocket around the aligned articles.

6. Apparatus in accordance with claim 4 in which a greater area of openings is provided in front of each pocket than in the rear of the pocket to exert more suction on the strip in front of the pocket.

7. Apparatus in accordance with claim 2 in which an ejector bar is mounted in the bottom of each pocket, and cam means raise the projector bar to the surface of the carrier at a point in the travel of the carrier to project the partially wrapped rod-like articles from the pocket.

8. The method of claim 1 in which the completion of the wrapping is accomplished on the surface of the car-

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rier and is caused by contacting the rod-like articles with a yielding surface traveling at a different speed from that of the carrier.

9. Apparatus in accordance with claim 2 in which the means for rolling the rod-like articles and wrapping strip on the surface of the carrier consists of a moving, yielding surface spaced from the carrier a distance less than the diameter of the rod-like articles, and means to cause said surface to travel at a different speed than the speed of the carrier.

10. Apparatus in accordance with claim 2 in which the means for rolling the rod-like articles and wrapping strip on the surface of the carrier consists of a roll having a yielding surface spaced from the carrier a distance less than the diameter of the rod-like articles, and means for rotating said roll at a different speed than the speed of the carrier.

References Cited in the file of this patent

UNITED STATES PATENTS

1,272,799	Greer	July 16, 1918
2,624,164	Donofrio	Jan. 6, 1953
2,749,692	Conti	June 12, 1956