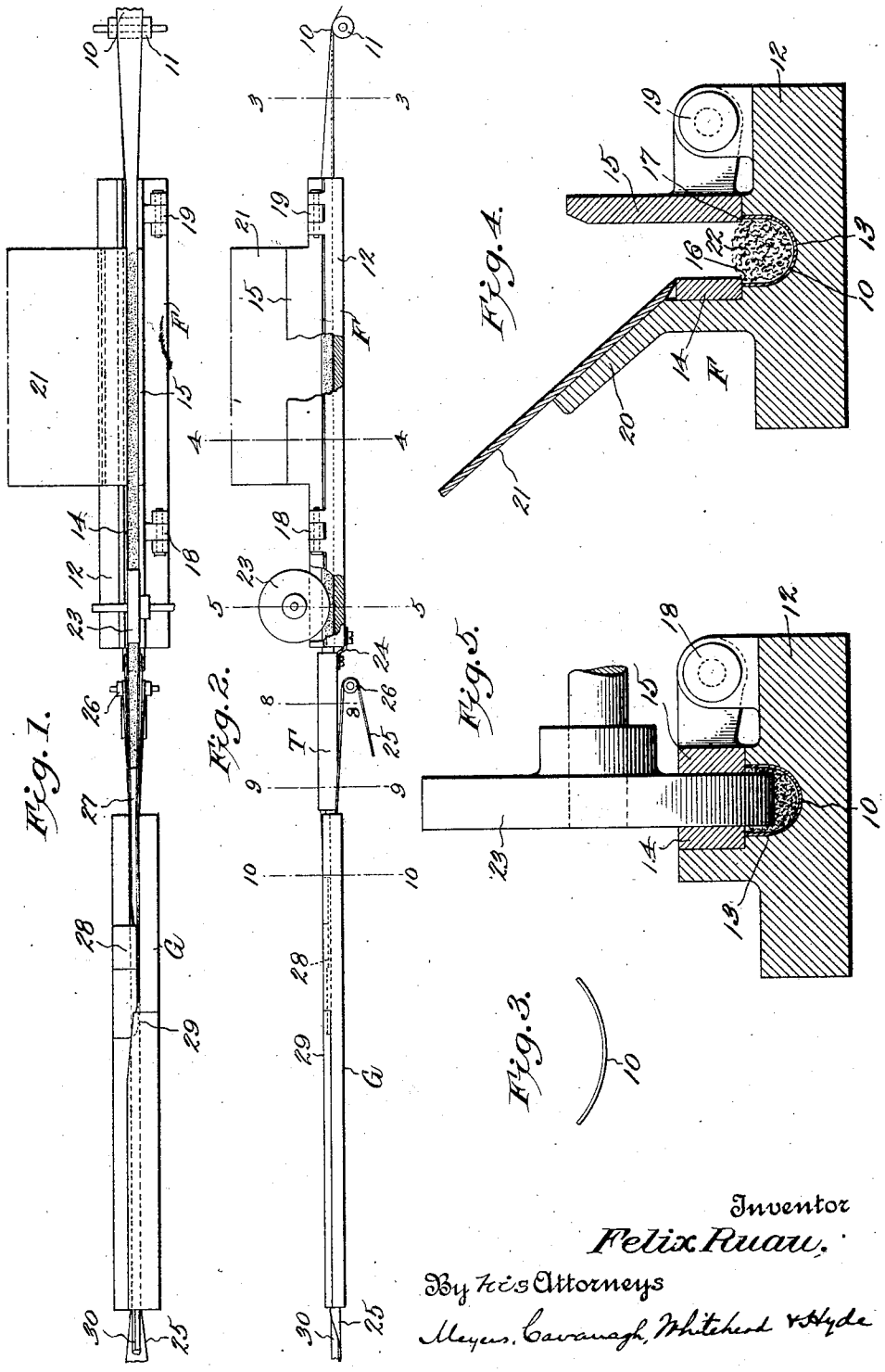
Nov. 23, 1926. 1,608,138

F. RUAU

CIGARETTE MACHINE

Filed Nov. 30, 1921 2 Sheets-Sheet 1



Inventor
Felix Ruau.
By his Attorneys
Meyers, Cavanagh, Whitehead & Hyde

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CIGARETTE MACHINE

Filed Nov. 30, 1921 2 Sheets-Sheet 2

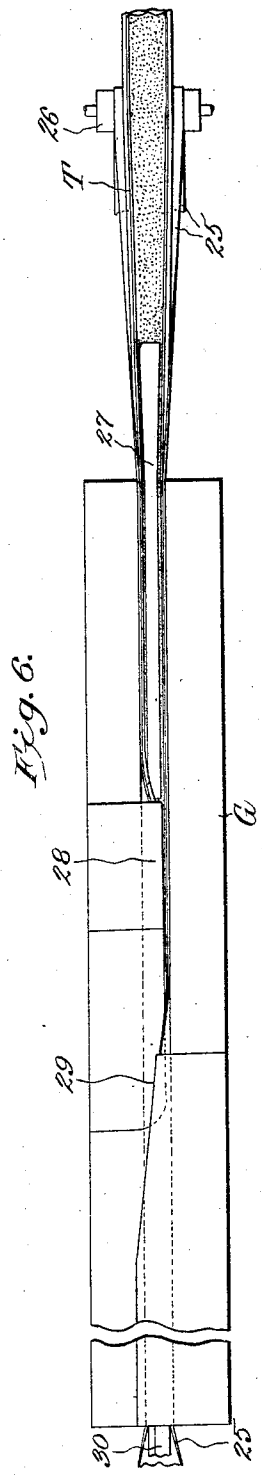


Fig. 6.

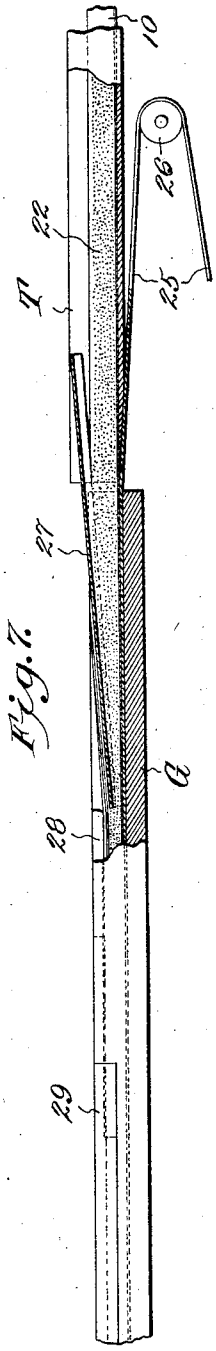


Fig. 7.

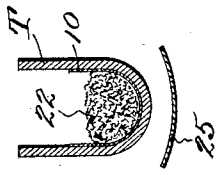


Fig. 8.

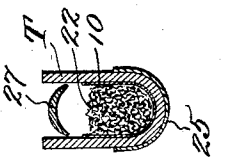


Fig. 9.

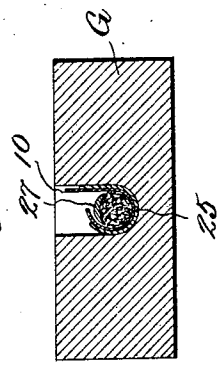


Fig. 10.

Inventor

Felix Ruau,

Byrkis Attorneys

Meyers, Cavanagh, Whitehead & Hyde

Patented Nov. 23, 1926. 1,608,138

UNITED STATES PATENT OFFICE.

FELIX RUAU, OF LYNCHBURG, VIRGINIA, ASSIGNOR TO UNITED CIGARETTE MACHINE CO., INC., OF LYNCHBURG, VIRGINIA, A CORPORATION OF VIRGINIA.

CIGARETTE MACHINE.

Application filed November 30, 1921. Serial No. 518,836.

This invention relates to cigarette machines and more particularly to cigarette machines of the continuous rod type in which the tobacco filler is fed in loose condition onto the cigarette paper or wrapper in the operation of the machine; and has special reference to the provision in a machine of this type of a novel method of and apparatus for charging the paper with the filler and for forming the continuous cigarette rod.

In prior cigarette machines of the type referred to the cigarette paper or wrapper is fed in continuous strip form past a tobacco filling station at which station the tobacco filler, in loose form, is deposited onto the paper strip, the tobacco filler being thereafter compacted and the wrapper formed about the filler for producing the cigarette rod. In prior methods and apparatus for feeding the paper and filling the same, the paper strip is fed through a channel receiving the filler, the paper being fed through the channel in flat form; and the filler is deposited on the paper while the latter is in the flat, the side walls of the channel functioning to confine the charge or filler and for positioning the same centrally of the wrapper. With this method and apparatus the tobacco filler is carried along with the paper solely by the friction at the bottom where the filler rests on the top surface of the paper, the paper and its charge or filler moving relatively to the bottom and side walls of the channel. In this construction the side walls of the channel confining and therefore being in contact with the tobacco filler, exert a drag on the latter, this effecting a retarding of the motion of the tobacco at irregular intervals, with the result that the cigarette weights vary and are not uniform throughout the resulting tobacco rod, yielding a non-uniformity in the resulting cigarettes obtained. At times the friction of the filler against the side walls of the channel may be so great that the tobacco is completely stopped, necessitating stopping the machine and clearing the filling channel. To provide a machine in which these disadvantages resulting from the feeding of the cigarette paper in flat form may be avoided and to provide a method and apparatus in which a uniform cigarette product will be obtained not only, but one in which stoppages of the machine caused by the bunching and the stopping up of the tobacco in the filling channel will be effectively obviated, is a prime desideratum of my present invention.

In prior machines of the type above referred to, the side walls of the filling channel are undercut to provide portions overhanging the wrapper edges, this to permit the edges of the paper to be fed through the channel free from the tobacco filler. In this construction, tobacco, stems or the like will find their way or migrate between the undercut surfaces of the side walls and the bottom surface of the channel and with these surfaces rigid and unyielding the binding and tearing of the paper edges takes place. Some of the improved machines of this type further include the arching of the undercut overhanging portions to provide a clearance to keep the particles of tobacco, stems, dirt or foreign material which inevitably work their way between the unyielding surfaces from pinching the paper and either tearing it or causing it to waver from its proper course. It has been found that this improved arching, however, cannot remedy the defect as the migratory particles of tobacco, stems or foreign material, in moving in the space between the unyielding surfaces, still cause a pinching and a resulting tearing of the paper. The provision of a machine in which the unyielding surfaces in the channel are done away with, with the elimination of the disadvantages incident thereto, and the provision of a method and apparatus in which the paper is fed through the filling channel without pinching or tearing is another prime desideratum of my invention.

The principal objects of my invention may therefore be said to include, besides the provision of a novel method and apparatus having the characteristics and performing the functions above enumerated, the provision of a method and apparatus for feeding the cigarette paper and filling the same in which the cigarette paper is caused to assume a concave, dished or substantially U configuration, the tobacco filler being deposited on the cigarette paper so formed when the latter is presented to or passes the cigarette filling station; the provision of a method and apparatus of this nature in which the paper is guided in U-shaped form through a U-shaped channel or guide-trough with the paper surfaces in

contact with the channel walls; the further provision of an apparatus and method of this nature in which the paper is fed through the channel by pulling the same at the middle portion thereof, the edges of the paper being relieved of pulling strain and the edges being caused to lightly but firmly and uniformly press against the walls of the channel; the still further provision of a cigarette machine in which the paper or wrapper when filled is given a U form with the width of the U substantially greater than the width of the ultimate rod to be obtained and in which the ultimate rod dimensions are obtained by first reducing the width of the U without substantial compression of the tobacco therein and effecting as little strain on the paper as possible and by thereafter compacting the tobacco in the U of reduced width; and the provision of a method and apparatus of this nature in which the paper is fashioned or fed to withstand relatively great strains and in which the operations of filling and forming are carried on while exerting minimum stresses on the paper or wrapper, the whole resulting in a machine capable of high speed with a minimum of breakdown and with the production of the desired uniformity of the resulting cigarette product.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, my invention consists in the elements and their relation one to the other, as hereinafter particularly described and sought to be defined in the claims, reference being had to the accompanying drawings which show a preferred embodiment of my invention and in which:

Figure 1 is a plan view of my cigarette machine,

Figure 2 is an elevational view thereof with parts shown in section,

Figure 3 is an enlarged cross section taken on the line 3—3, Figure 2,

Figure 4 is an enlarged cross section taken on the line 4—4, Figure 2,

Figure 5 is an enlarged cross section taken on the line 5—5, Figure 2,

Figure 6 is an enlarged plan view of part of the apparatus shown in Figure 1,

Figure 7 is an elevational view thereof with parts shown in section, and

Figures 8, 9 and 10 are enlarged cross sectional views taken on the lines 8—8, 9—9 and 10—10 respectively of Figure 2.

Before describing my novel method and apparatus in detail, I will briefly recite the successive steps in my method and apparatus whereby the cigarette paper or wrapper is charged with the tobacco filler and the wrapper and enclosing filler formed into a continuous cigarette rod.

The cigarette paper or wrapper is first unreeled or unwound from the usual reel or bobbin and is formed into a U shape; and in this form the paper is moved past a cigarette filling station. To produce the U configuration the paper wrapper is moved through a channel of U cross sectional configuration, the channel forming a guide-trough for the paper and imparting to the paper its U form. The paper is fed through this channel with the paper surfaces in contact with the channel walls, the paper being fed by gripping the same at substantially the middle portion thereof. While moving through this channel the tobacco filler is showered by hand or by means of an automatic feeder onto the U form paper. While in the filling channel the filler moves under a compacting wheel, the latter moving at a peripheral speed equal to the speed of the paper, the wheel giving a preliminary compression to the tobacco to prevent it being piled up too high on the paper. The paper or wrapper and the filler therein are then fed through a tapering channel of U form, this tapering channel effecting a progressive forming of the paper and filler and functioning to compress the sides of the U-shaped paper for reducing the width thereof to substantially final form, the tobacco filler rising without substantial compression in the paper. After the reduced width of paper and filler is obtained, the tobacco is compressed in a direction normal to its width for compacting the tobacco to cause it to assume substantially its final dimensions. The paper with its filler is fed by means of an endless tape engaging or gripping the same after it emerges from the tapering channel, the endless tape carrying the paper of reduced width and its filler through a forming channel where the compacting of the tobacco referred to takes place and where the continuous rod is finally formed.

Referring now to the drawings, and more particularly to Figures 1 and 2 thereof, the paper is first passed through the filling channel F and then through the intermediate or tapering channel T connected to the filling channel and finally through the forming channel G.

The paper or wrapper 10 is unreeled or unwound from the usual bobbin (not shown), roller 11 being provided for guiding the paper from the bobbin to the first or filling channel. The filling channel F comprises preferably a base or body portion 12 provided preferably centrally thereof, with a trough or channel 13 of dished or substantially U configuration. The channel 13 may be a standard groove of semi-circular or semi-oval section to form either round or oval cigarettes, as may be desired. Associated with the base 12 and the channel 13 I provide the oppositely arranged cheek

plates 14 and 15 running longitudinally of the channel, the said cheek plates extending over the channel to provide the two guiding shoulder portions 16 and 17 respectively, the shoulder portions 16 and 17 further functioning for effectively preventing particles of dust or tobacco from getting underneath the paper, as will appear clearer hereinafter.

The cheek plate 15 is preferably movably mounted on the base 12, the said cheek plate being hingedly connected to the base by means of the hinge constructions 18 and 19 respectively, the cheek plate 15 being hingedly mounted for the purpose of obtaining access to the channel 13 where cleaning of the channel and where threading of the paper through the channel is desired to be obtained. The paper strip 10, after being threaded through the channel, is guided by the shoulder portions 16 and 17 and by the walls of the channel, the paper assuming U-shaped configuration as clearly shown in Figure 4 of the drawings.

Formed preferably integrally with the base 12 I provide the support 20 and on the said support is provided the chute 21, the chute comprising guide means for directing a charge of tobacco showered thereon either by hand or by an automatic feeder, the shower of tobacco being directed into the channel with the tobacco deposited on the U-shaped paper 10 therein.

With the above recited construction the paper is given the natural form for receiving the tobacco charge or filler. The paper is fed through the channel F as will appear further hereinafter, by a pull exerted at the bottom of the U or in other words at the middle portion of the paper or wrapper, this method of feeding the paper resisting pulling stresses in a manner superior to the feeding of the paper in flat condition, the paper by this method of feeding and forming being prevented from tearing or warping as is the case in prior constructions. The paper when so formed furthermore holds its full charge with none of the charge or filler touching the walls of the channel 13 and by this means the charge is not unevenly distributed, as in the constructions where the paper is fed in a flat condition with an uneven drag on the charge caused by the walls of the channel. By feeding the paper in this condition a more uniform cigarette product results and intermittent stoppages of the machine resulting from the stopping up of the tobacco in the filling channel are avoided. Moreover, with this construction the paper is not torn when the tobacco migrates between the paper and the channel, since even in the event that some of the tobacco will move between the paper surface and the side walls of the channel, the paper provides a yielding surface and tearing is thereby avoided. The manner of feeding the paper by pulling at the middle portion thereof, as described hereinafter, causes the side walls of the paper to closely, yet lightly, hug the side walls of the channel, with the resulting minimizing of tobacco creeping or migrating between the paper side walls and the side walls of the channel. With this construction, therefore, the loose tobacco filler is received in a logical and natural condition, and is fed with the paper with the latter in a condition to resist relatively great stresses and to withstand relatively great strains, a more uniform resulting cigarette product being obtainable than in machines of prior constructions.

The paper 10 and its filler or charge designated as 22, in being moved through the channel F, is brought under the action of a compressing wheel 23, moving at a peripheral speed equal to the speed of the paper and its charge, the wheel 23 giving a preliminary compression to the tobacco to prevent it being piled up too high on the paper. The wheel 23 moves between the cheek plates 14 and 15, as shown particularly in Figure 5 of the drawings, the width of the wheel being somewhat less than the width of the U-shaped paper in the channel 13 for the obvious purpose of effecting the compression of the tobacco without interfering with the side walls of the U-shaped paper 10.

After the paper 10 and its charge 22 leaves the filling channel F the paper and filler are fed through the tapering channel T. The purpose of the channel T is to effect a progressive forming of the filler and wrapper and to arrive at a cross section of tobacco and paper of convenient size to enter the channel G. This size may be substantially the size of the resulting cigarette rod desired. In the filling channel F the U-shaped cross section of the paper and filler is substantially greater than the dimensions of the continuous rod to be obtained and the tapering channel is intended to reduce the dimensions of the paper and filler not only, but to reduce such dimensions without placing too great a stress on the paper being fed through the channels. Referring more particularly to Figures 1, 2 and 6 to 9 of the drawings, the tapering channel T connected to the forming channel F, as by means of the securing elements 24, comprises an intermediate section of U-shaped configuration, the U configuration at the end connected to the filling channel F being of a dimension substantially the same as the dimension of the said filling channel and the U cross sectional dimension of the end of the tapering channel adjacent the forming channel G being substantially of the dimension of the latter, the progressive reduction in dimension being particularly shown in Figures 1, 6, 8 and 9 of the drawings. As the paper 10 and the filler 22 move

through the tapering channel the side walls of the paper 10 are progressively compressed, the filler 22 rising with the rising of the side walls 10, the reduction in the width of the paper and filler being effected substantially without compression or compacting of the filler, as will clearly appear upon comparing Figures 8 and 9 of the drawings, the reduction in size of the paper and filler being therefore effected without putting strain upon the moving paper 10 while the same moves through the tapering or reducing channel T.

The paper of reduced U cross section and the filler enclosed thereby are then fed from the tapering channel T through the forming channel G. For feeding the paper through the various channels I provide the endless belt or tape 25 moving over rollers, one of which, 26, is shown in the figures, one bight of the endless tape moving through the forming channel G, the said tape functioning as a feeding and also as a forming tape, as will appear presently.

The moving endless tape 25, as it enters the forming channel G, frictionally grips the paper 10, as shown particularly in Figure 7, the paper 10 being gripped substantially at the middle portion thereof and this gripping or contacting of the paper or wrapper by the endless tape provides means for pulling the paper and its charge through the forming channel F and the tapering or reducing channel T.

After the paper is securely gripped by contact with the endless tape, compacting pressure is exerted on the tobacco filler to compress the same to the proportions desired. To this end is provided the tongue 27, the said tongue extending into the forming channel G, compression of the tobacco charge 22 being effected mainly in the forming channel G. Although I prefer to effect compression of the tobacco in the forming channel G the pressure of the tongue 27 may be made to begin on the tobacco before its exit from the channel T, care being taken, however, not to cause sufficient drag to break the paper.

After the tobacco is compacted by the tongue 27 the opposite edges of the paper or wrapper are caused to encircle or completely enclose the compacted filler, the paper edges being overlapped, as usual, and pasted or crimped in a manner well known in the art. To this end the forming channel G is provided with spaced plate means 28 and 29, these plates acting on the opposite edges of the endless tape 25, the tape 25 in turn acting as a forming means for turning the edges of the wrapper or paper 10 in overlapped relation over the tobacco filler, the turning of one edge of the paper by the plate 28 being particularly shown in Figures 6 and 10 of the drawings, the overlapping of the other edge being effected by plate 29, the edges being pasted or crimped in a manner similar to prior constructions.

After the pasting or crimping operation the paper and enclosing filler emerges, as is usual, from the forming channel G, the completed continuous rod being shown in Figures 1, 2 and 6 and designated 30.

The manner of feeding, filling and forming the paper and filler into continuous rod form will be fully apparent from the above detailed description thereof. It will be further apparent that with the provision of my novel method and apparatus for feeding the cigarette paper and filling the same, that I eliminate the disadvantages incident to prior methods of feeding the paper when combined with the depositing of the tobacco in loose condition or in other words with the showering of the tobacco onto the paper, more uniform filling results and a higher speed machine with a minimum of stoppages and breakdowns resulting in my construction. It will be further apparent that in my method and apparatus the paper is fed in a logical and natural manner, the paper when fed in a U section having greater strength, due to its shape, than when the paper is fed in the flat, the paper being capable of resisting greater stresses incident to the feeding thereof, high speed operation and quantity production of cigarettes being thereby permitted. It will be further apparent that my method of progressively reducing the size of the paper and its filling charge and progressively compacting the charge and forming the rod is carried on with a minimum of strain on the tobacco paper, a more uniform operation and more consistent results being thereby effected. It will be further seen that the apparatus is of a relatively simple character and may be produced at low cost not only, but may be operated and controlled with a great degree of facility.

While I have shown my device in the preferred form, it will be obvious that many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention, defined in the following claims.

I claim:

1. In a cigarette machine of the continuous rod type, a filling channel or trough of U cross sectional form, a tapering channel of U cross sectional form associated therewith, a forming channel, means for feeding a continuous strip of cigarette paper through the filling and tapering channels, the said means comprising mechanism moving through the forming channel only and gripping the wrapper or paper therein.

2. In a cigarette machine of the continuous rod type, a filling channel or trough of U cross sectional form, a tapering chan-

nel of U cross sectional form associated therewith, a forming channel, means for feeding a continuous strip of cigarette paper through the filling and tapering channels, the said means comprising an endless tape moving through the forming channel only and gripping the wrapper or paper therein, the said paper being gripped by the tape at substantially the middle portion thereof and the said paper being fed through the filling and tapering channels in contact with the walls of said channels.

3. In a cigarette machine of the continuous rod type, a filling channel or trough of U cross sectional form, means for guiding a shower of tobacco into the said filling channel, a compacting wheel overlying the said channel and arranged subsequent to the said guiding means, a tapering channel of U cross sectional form associated with the filling channel and located at a point subsequent to the said compacting wheel, a forming channel, means for feeding a continuous strip of cigarette paper through the filling and tapering channels, the said means comprising mechanism moving through the forming channel and gripping the wrapper or paper therein.

4. In a cigarette machine of the continuous rod type, a tapering channel of U cross sectional form, the U cross section at one end being substantially greater than the final cigarette rod dimensions and the cross section at the other end being substantially the same as the said final rod dimensions, a forming channel associated therewith, one end of the forming channel being arranged adjacent to the reduced end of the tapering channel, an endless belt movable through the forming channel only and a compressing tongue overlying adjacent ends of the tapering and forming channels and adapted to effect compression in the forming channel only.

Signed at Lynchburg, in the county of Campbell and State of Virginia this 21st day of November A. D. 1921.

FELIX RUAU.