

[54] RECIPROCATING TWISTER PIPE CLEANER MACHINE

[72] Inventor: Eugene J. Boyd, Elmhurst, Ill.

[73] Assignee: United States Tobacco Company, Nashville, Tenn.

[22] Filed: July 13, 1970

[21] Appl. No.: 54,483

[52] U.S. Cl.57/5, 57/10, 57/34 R,
57/156

[51] Int. Cl.B21f 77/00, A24f 9/06, B21f 45/00

[58] Field of Search57/1 R, 5, 6, 10, 12, 34 R,
57/24, 156; 131/245

[56] References Cited

UNITED STATES PATENTS

2,131,598 9/1938 Obermaier57/5
2,451,881 10/1948 Siegel et al.57/5 X

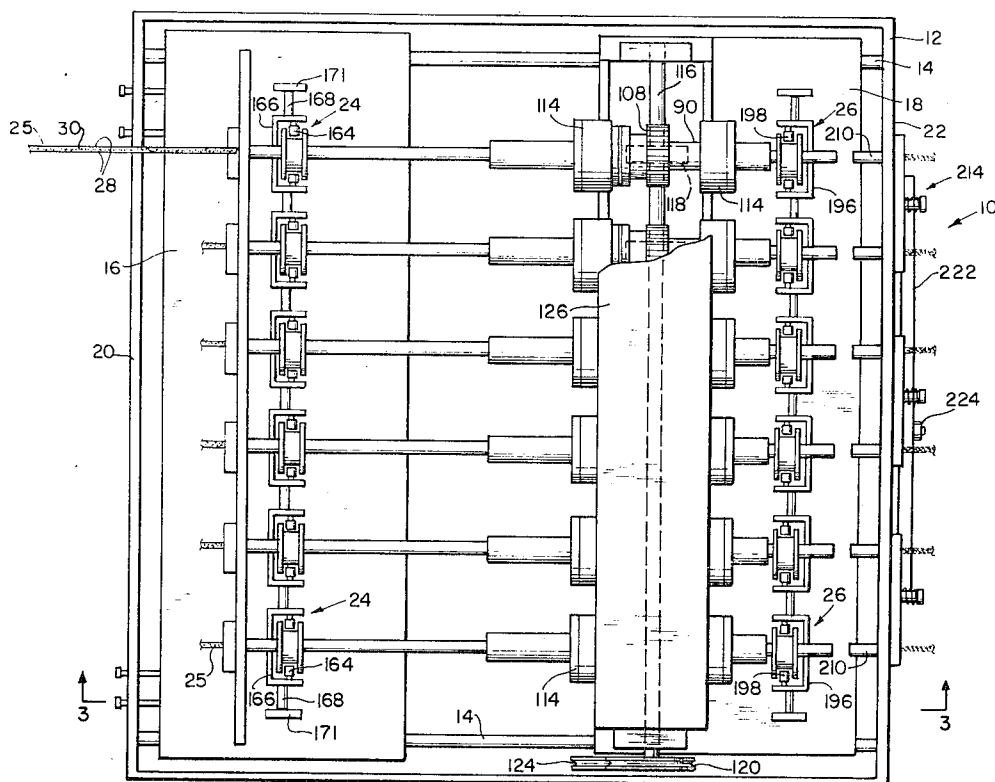
2,576,430 11/1951 Weller57/24
2,931,366 4/1960 Siegel131/245

Primary Examiner—John Petrakes
Attorney—Curtis, Morris & Safford

[57] ABSTRACT

A machine for the continuous production of pipe cleaners includes first and second carriage members slidably mounted on a frame and adapted to be reciprocated between a first position wherein the carriages are located at opposite ends of the frame and a second position wherein the carriages are located adjacent each other and has chuck members thereon for gripping the pipe cleaner components in accordance with the respective positions of the carriages and mounted for rotation on the carriages whereby the wires of the pipe cleaners are twisted about each other to lock short cotton fibrils therebetween and advance the pipe cleaner strand through the machine.

15 Claims, 4 Drawing Figures



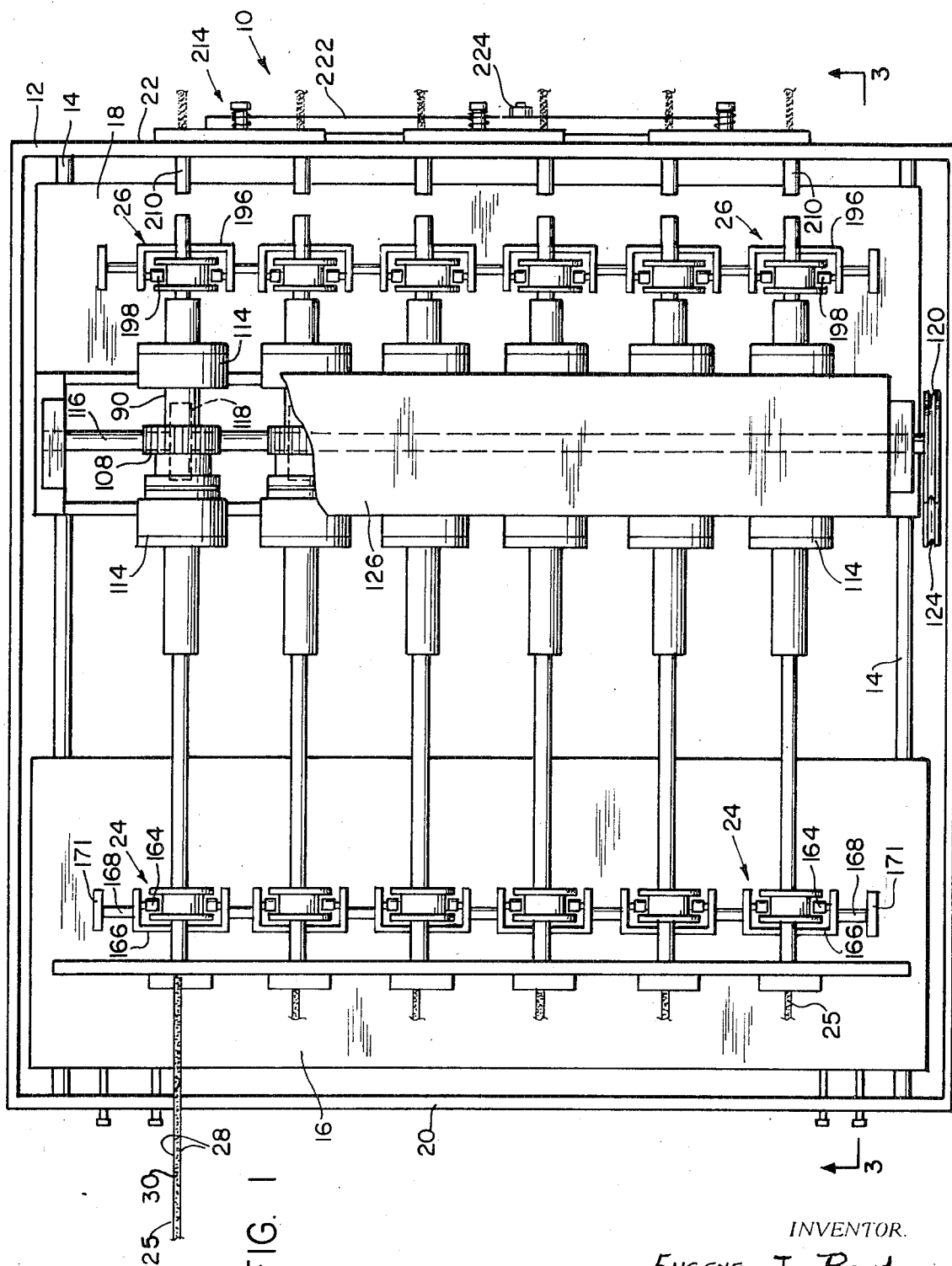


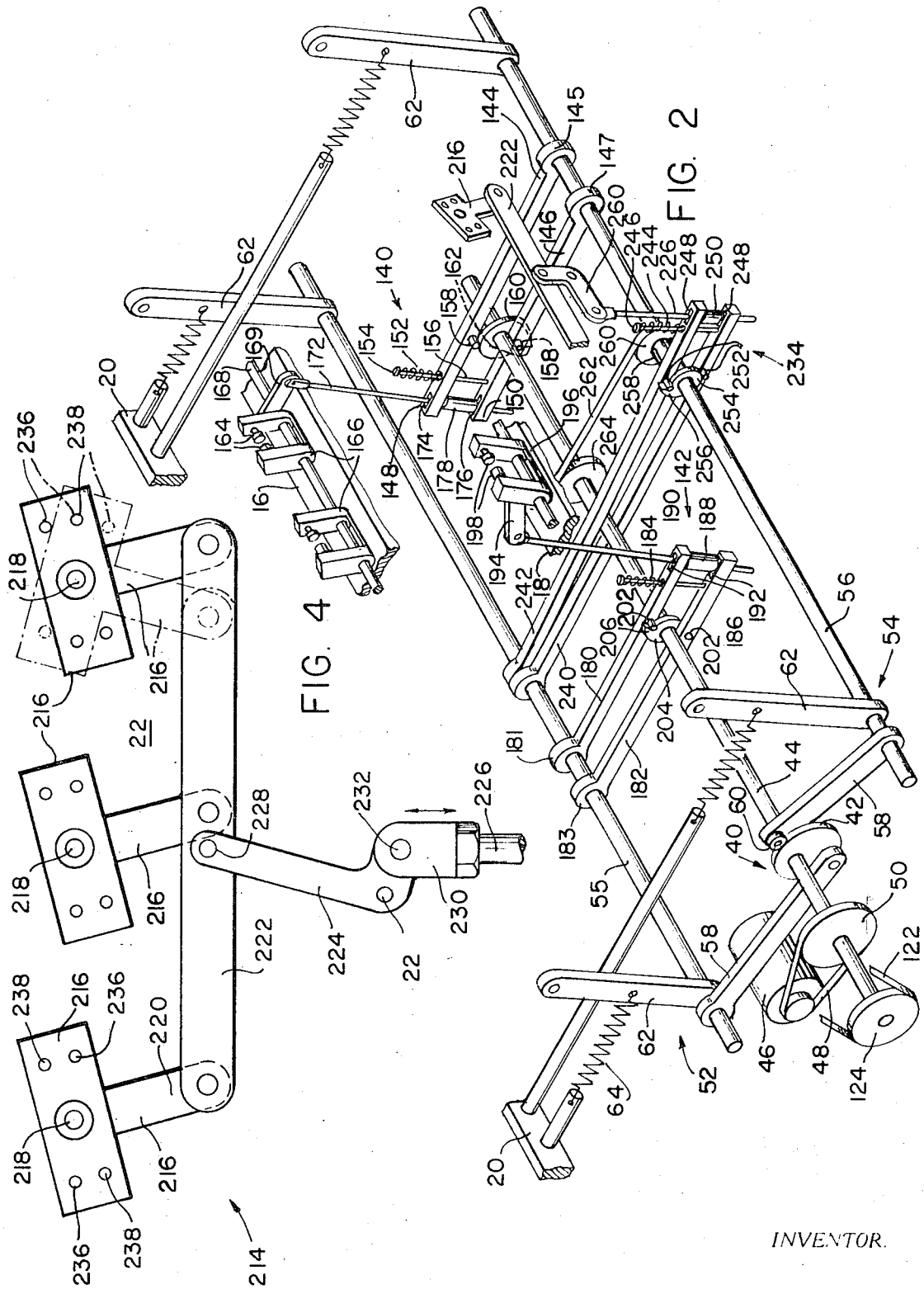
FIG. 1

INVENTOR.

EUGENE J. Boyd

BY

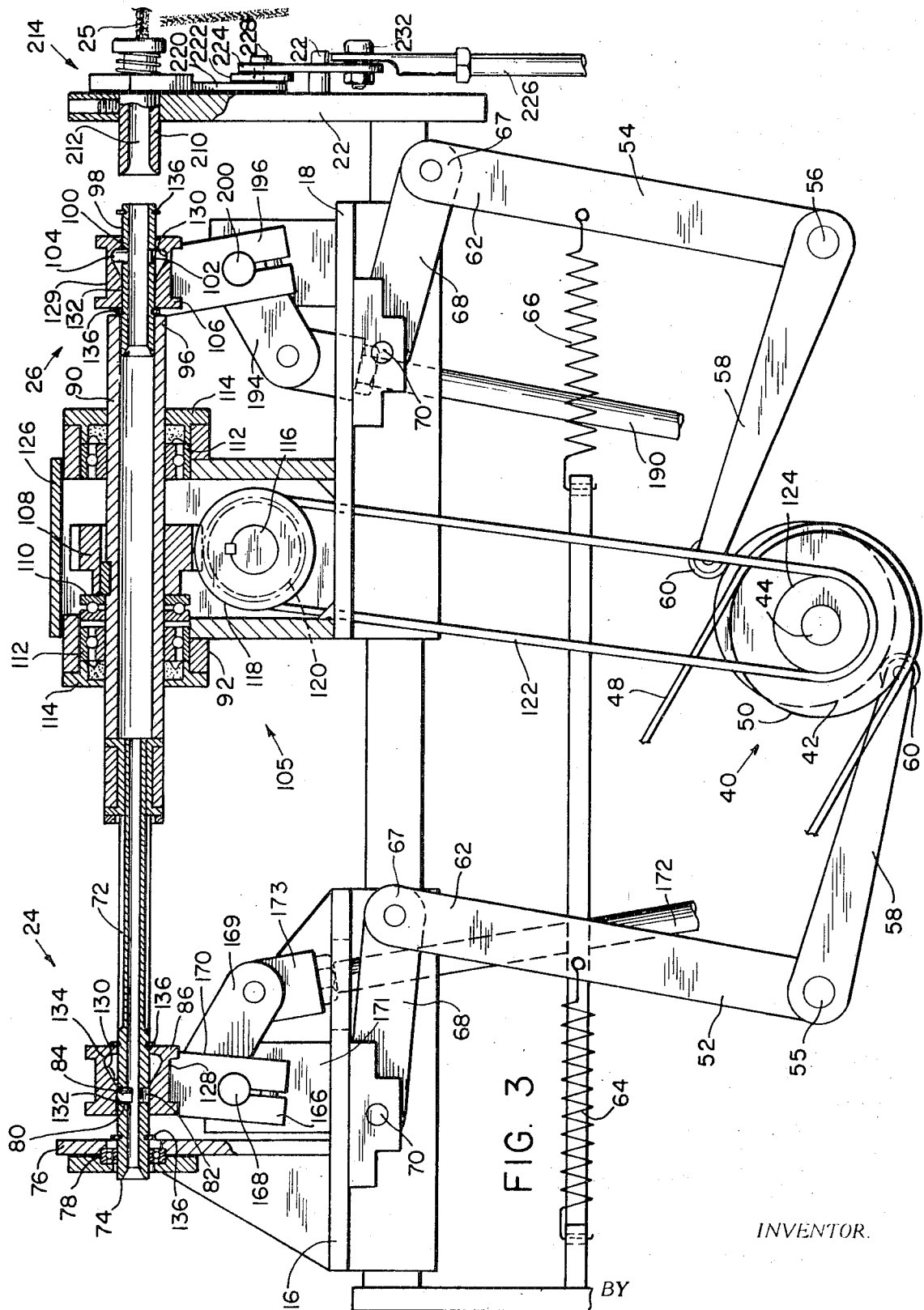
Curtis, Morris & Safford
Attorneys



INVENTOR.

BY

Curtis, Morris & Safford
Attorneys



INVENTOR.

BY

Curtis, Morris & Safford
Attorneys

RECIPROCATING TWISTER PIPE CLEANER MACHINE

This invention relates to a device for making pipe cleaners, and more particularly to apparatus for twisting a pair of wires about short cotton strands or fibrils.

Apparatus has previously been proposed in which pairs of adjacently arranged wires are twisted about each other to lock short cotton strands or fibrils therebetween to form pipe cleaners. Generally, in such apparatus, a pair of wires are fed to a position adjacent a storage bin containing short cotton strands or fibrils which are thence positioned between the wires and the combined wire and fibril element is supported in a manner to provide a reaction force against a twisting force which is generally applied by a rotating chuck in which the free ends of the wires are gripped. Typically, the chuck is mounted on a reciprocating carriage which is adapted to be moved away from the reaction force applying mechanism. The chuck pulls the wires with the fibrils held therebetween and either during or at the end of the reciprocating stroke, the chuck is rotated to impart a twist to the wires. Upon completion of the operating stroke, the twisted element is cut by a knife and the chuck returned to its initial position adjacent the reaction force applying mechanism wherein the operation is repeated. While generally satisfactory pipe cleaners have been produced by machines of this character, the process of making the pipe cleaners is not continuous and requires an individual operator to supervise each machine. The repeated return of the chuck is time consuming and results in a decrease in the efficiency of the process and moreover, these machines require long runways for the reciprocating chuck, some of which extend in the order of 65 feet, thus necessitating excessive factory space.

Accordingly, it is an object of the present invention to provide apparatus for continuously twisting wires about short cotton strands to form pipe cleaners. It is a further object of the invention to produce pipe cleaners in a continuous automatic process. It is a further object of the invention to provide a machine for making pipe cleaners which is compact, economical and simple in construction.

In accordance with an aspect of this invention, a machine for continuously fabricating pipe cleaners from components including a pair of wires and a plurality of fibrils positioned therebetween includes first and second carriage members slidably mounted on a frame for movement between a first position wherein the carriages are located at opposite ends of the frame and a second position wherein the carriages are located in substantially adjacent relation intermediate the frame ends. The pipe cleaner components are advanced and twisted in the device by first and second telescopically engaged pipe cleaner guide members rotatably mounted respectively on the first and second carriage members and each of which is provided with gripping means for engaging the pipe cleaner elements as the carriages are moved between their first and second positions in a sequential gripping process whereby the pipe cleaner elements are moved through the machine and the wires are twisted about each other to lock the fibrils therebetween.

In one embodiment of the invention a plurality of first and second pipe cleaner guide means are mounted on the carriages whereby a plurality of pipe cleaner elements may be simultaneously twisted and advanced to form completed pipe cleaner strands. A cutter member is mounted adjacent the rear end of the machine having a blade mounted for pivotal movement between first and second positions and having a plurality of apertures adapted to be positioned in alignment with the guide means at each of its first and second positions to receive respective pipe cleaner strands therein, whereby the pipe cleaner strands are engaged with the edges of the apertures as the blades are pivoted to form pipe cleaners of a convenient length.

The above, and other objects, features and advantages of this invention, will be apparent in the following detailed description of an illustrative embodiment of this invention which is to be read in connection with the accompanying drawings, wherein:

FIG. 1 is a plan view, with parts broken away, of a pipe cleaner fabricating mechanism, in which the present invention is employed;

FIG. 2 is a perspective view of the drive mechanism for the pipe cleaner fabricating mechanism illustrated in FIG. 1;

FIG. 3 is a partial sectional view taken on lines 3—3 of FIG. 1; and

FIG. 4 is an end view of the pipe cleaner cutting mechanism.

Referring now to the drawings in detail, and initially to FIG. 1 thereof, it will be seen that a pipe cleaner fabricating mechanism 10 of the type in which the present invention may be employed generally comprises a frame 12 having longitudinally extending rails 14 on which a pair of carriages 16 and 18 are slidably mounted for movement between a first position adjacent the ends 20 and 22 respectively of the frame and a second position adjacent each other intermediate the frame ends. Each of the carriages 16 and 18 includes a plurality of gripping members 24 and 26 respectively, which are rotatably mounted thereon and driven in the manner more fully described hereinafter, which serve to sequentially engage the pipe cleaner components of pipe cleaner strands 25, which include a pair of wires 28 having a plurality of short cotton strands or fibrils 30 therebetween. In the embodiment illustrated in the drawings, six gripping members are illustrated for the simultaneous twisting and production of pipe cleaner strands, however it is foreseen that machines of the character described herein may have a varying number of such members.

Strands 25 are supplied in a conventional manner from a device (not shown) wherein the pair of wires 28 are fed to a position adjacent a storage bin containing the short cotton strands or fibrils which are thence positioned between the wires and guided towards the twisting and advancing mechanism. The gripping members 24 mounted on carriage 16 engage the strands 25 when the carriages 16 and 18 are at their first position, and hold the strands as the carriages are moved towards their second position. At the second position the gripping members 24 on carriage 16 are released and gripping members 26 on carriage 18 are engaged with pipe cleaner strands 25 whereby the strands are continuously advanced through the machine as the carriages are moved from their second position towards their first position adjacent edges 20 and 22 of the frame 12. During the advancing operation gripping members 24 and 26 are continuously rotated so that the wires 28 are twisted about each other to lock the cotton fibrils 30 therebetween.

Carriages 16 and 18 are moved along rails 14 between their first and second positions by a drive system 40 including a cam 42 fixed to shaft 44. Shaft 44 comprises the main drive shaft of the device and is rotated by the motor 46 through chain 48 and sprocket wheel 50 fixed on the shaft.

Drive system 40 includes a pair of bellcrank levers 52 and 54 driven by cam 42 and fixed to shafts 55 and 56 respectively which are pivotally mounted in frame 12. The arms 58 of each of the bellcranks 52 and 54 are fixed at one end to their respective associated shafts 55 and 56 and have cam followers 60 on their free ends which are adapted to engage the cam surface of cam 42. Bellcranks 52 and 54 are further provided with pairs of spaced upstanding arms 62 rigidly attached to rock shafts 55 and 56 and urged in a generally counter-clockwise direction by spring members 64 and 66 which are connected between the arms 62 and frame 12 as seen in FIG. 3. In this manner arms 58 of each of the bellcranks are urged towards cam 42 whereby cam followers 60 are maintained in engagement with the cam surface thereof. The upper ends 67 of arms 62 are operatively engaged with respective platforms 16 and 18 by links 68 which are pivotally connected by their respective ends to carriages 16 and 18 and arms 62.

In this manner, as shaft 44 and cam 42 are rotated their respective shafts 55 and 56 will be rocked to move the carriages 16 and 18 towards and away from each other and thereby cooperate with gripping members 24 and 26 to advance the pipe cleaner strands 25 through the machine.

Gripping mechanisms 24 and 26 are of similar construction and therefore only one of each of these devices will be described in detail herein. As seen in FIG. 3, gripping member 24 includes a pipe strand guide tube 72 which is rotatably mounted at its forward end 74 in vertically extending support member 76, mounted on carriage 16, by bearing 78. Guide 72 includes a transverse bore 80 therein which contains a threaded plug member 82 at one end and a slidable detent member 84 at the opposite end thereof which is adapted to cooperate with a detent actuator member 86, more fully described hereinafter, for engaging the pipe cleaner strand 25 as carriage 16 is moved from its first to its second position.

Gripping member 26, mounted on carriage 18, includes a first hollow shaft 90 which is telescopically keyed to shaft 72 of gripping member 24 and is rotatably mounted in a housing 92. The rear end 96 of tube 90 is provided with an extension tube 98 fixed therein which includes a transverse bore 100 having a threaded plug 102 in one end thereof and a slidable detent 104 at the other end thereof, which correspond substantially to members 82 and 84 of gripping member 24 and which cooperate with a detent actuator member 106, more fully described hereinafter, whereby detent member 104 is adapted to engage the pipe cleaner strand 25 as the carriages are returned from their second position to their first position to advance pipe cleaner strand 25 through the mechanism.

Each of the pipe cleaner gripping elements 24 and 26 are rotated by a drive mechanism 105 contained within housing 92 which includes side closure plates 114 and a top cover plate 126. Drive mechanism 105 includes a worm gear 108 fixed to tube 90 and held in position by thrust bearing 110. The tube itself is rotatably mounted in housing 92 by bearings 112 which are positioned adjacent the side closure plates 114. A transversely extending shaft 116 is also rotatably mounted in housing 92 and a plurality of worm gears 118 are mounted thereon which are adapted to engage the teeth of gears 108 to rotate these gears and thus tube 90. Shaft 116 is provided with a pulley 120 at one end thereof which is engaged by belt 122 driven from a pulley 124 (FIG. 2) fixed on main drive shaft 44.

Due to the keyed telescopic arrangement of tubes 90 and 72, the rotational motion applied to tube 90 is transmitted to tube 72, and thus as the pipe cleaner strand 25 is gripped by either of the detent members 84 or 104, a continuous twisting motion is applied to the wires thereof to twist the wires 28 about each other and lock the fibrils 30 therebetween.

Detent actuators or chucks 86 and 106 are similar in construction and comprise annular members slidably received on their associated tubes 72 and 98, and having peripheral grooved surfaces 128 and 129 respectively. Each of the actuators also includes an inner annular cam-shaped surface 130 which is adapted to engage detents 84 and 104 respectively to urge the detents into engagement with the pipe cleaner elements in accordance with the position of the actuator member with respect to the detent. Chucks 86 and 106 are slidable on their associated tubes between positions wherein a first portion 132 of cam surface 130 depresses its associated detent (note actuator 86) into engagement with the pipe cleaner elements, and a second position wherein a second portion 134 of the cam surface 130 is adjacent the detent member whereby the pressure on detent member is relieved and the pipe cleaner elements are released from engagement therewith. The limits of movement of the actuator members are defined by pairs of stop rings 136 which are adapted to engage the ends of their associated actuator member to limit the motion thereof and the gripping force applied by the detents may be adjusted by means of threaded plug members 82 and 102.

The detent actuator members are moved between their first and second positions in accordance with the location of the carriages 16 and 18 by means of cam guide systems 140 and 142 illustrated in FIG. 2. Guide system 140 is associated with detent actuators 86 on carriage 16 and includes a pair of arms 144 and 146 respectively which are pivotally mounted at their ends 145 and 147 on rock shaft 56. The opposed ends 148 and 150 respectively, of these members, are urged towards each

other by a compression spring member 152 which is operatively engaged between head 154 of a stud 156 which is fixed to arm 146.

Arms 144 and 146 are each provided with a cam follower 158 which is adapted to engage cam 160 fixed on drive shaft 44. Cam 160 has an elevation portion 162 which engages the cam followers 158 to independently move the arms 144 and 146 as described hereinafter.

The grooved portion 128 of each of the actuators 86 is engaged by a pair of cam followers 164 mounted on yoke members 166. Each yoke member 166 is rigidly mounted on rock shaft 168 which is pivotally mounted on the upstanding frame members 171 of carriage 16. A lever arm 169 is fixed at one end 170 to one of the yokes 166 and is operatively engaged with the arms 144 and 146 by connecting rod 172 to rock shaft 168 about its pivot axis and thereby move each of the detent actuator members 86 between their first and second positions as defined by the rings 136. Connector 172 is pivotally attached at one end 173 to lever 168 and at its lower end is received within slots 174 and 176 formed in arms 144 and 146 respectively. Bearing or spacing block 178, fixed to connector 172 between arms 144 and 146, defines the spacing between the arms 144 and 146 and limits the movement of the arms towards each other under the influence of spring 152.

As shaft 44 is rotated, elevation portion 162 of cam 160 initially engages, for example, cam follower 158 on arm 144 to raise arm 144 with respect to arm 146, however, spring 152 will maintain the fixed spacing between the arms and the engagement of arm 146 with the lower surface of block 178 will move connector 172 generally upwardly to pivot lever 168 in a generally counterclockwise direction as seen in FIG. 2 to move detent actuators 86 towards the left and release detent members 84 from pipe cleaner strands 25. Continued rotation of shaft 44 and cam 160 will cause engagement of elevation portion 162 with the cam follower 158 of arm 146, thereby urging arm 146 downwardly in FIG. 2, however, again spring 152 maintains the predetermined distance between arms 144 and 146 and thus urges arm 144 downwardly against the top surface of spacing block 178 to urge connector 172 downwardly as seen in FIG. 3 and pivot lever 168 and rock shaft 169 in a generally clockwise direction to move detent actuators 86 towards the right and depress detents 84 against pipe cleaner strands 25. The configuration of cam 160 and the speed of rotation of shaft 44 are coordinated with the configuration of cam 42 so that detent actuators 86 are moved towards the right to depress detent members 84 into engagement with pipe cleaner strands 25 when the carriages 16 and 18 are in their first positions adjacent the ends of frame 12 and to move actuators 86 towards the left to relieve detents 84 and release strands 25 when the carriages 16 and 18 are at their second positions adjacent each other intermediate the ends of the frame.

The actuator mechanism 142 for detent actuator 104 is similar in construction to actuator system 140 and includes a pair of arms 180 and 182 pivotally mounted at their ends 181 and 183 respectively, on rock shaft 55 and urged towards each other by the compression spring 184 which engages the head of a stud 186 fixed in arm 182. A spacing block 188 corresponding to block 178 limits the movement of arms 180 and 182 towards each other under the influence of spring 184 and is fixed to a connector rod 190 which extends into slots 192 formed in the free arms 180 and 182 respectively. Connector 190 is pivotally attached at its free end to a lever 194 which is fixed to one of the arms of the U-shaped yokes 196, which correspond to previously described yokes 166 mounted on carriage 16, and which include cam followers 198. Yokes 196 are fixed to rock shaft 200 which is pivotally mounted on carriage 18.

Arms 180 and 182 are each provided with cam followers 202 which are adapted to engage the peripheral surface of cam 204 fixed on shaft 44 and which includes an elevation portion 206 corresponding to elevation portion 162 of cam 160. Cam 204 is 180° out of phase with cam 160 so that when

the carriages 16 and 18 are in their first positions detent actuators 106 are moved to the left in FIG. 3 so that detents 104 are released from engagement with pipe cleaner strands 25 when the carriages are in their first positions adjacent the ends of frame 12, and upon completion of the movement of the carriages to their second positions adjacent each other intermediate the ends of frame 12, detent actuators 106 are moved towards the right against rings 136 whereby their surfaces 132 engage detents 104 and urge them into gripping contact with their associated strand 25. Detents 104 are held in contact with strands 25 during movement of carriages 16 and 18 from their second positions towards their first positions wherein the detents 104 are again released and detents 84 are again engaged with the strands 25 to provide a continuous gripping action on the strand during the operation of the device.

As noted above, as carriages 16 and 18 are reciprocated between their first and second positions on frame 12, tubes 72 and 90 are continuously rotated. Thus, it is seen that since each of the pipe cleaner strands 25 are continuously gripped during the operation of the device, this gripping action, in conjunction with the rotational movement of tubes 72 and 90 will twist outer wires 38 about each other to lock the short cotton strands or fibrils 30 therebetween, and yet the reciprocal movement of the carriages 16 and 18 and the sequential gripping and releasing of detents 84 and 104 provide a continuous advancement of the twisted pipe cleaner strand through the machine.

The twisted pipe cleaner strands 25 produced by the rotation of gripping mechanisms 24 and 26 are directed towards frame member 22 of frame 12 in which is mounted a guide tube 210 adjacent the free ends of each of the tubes 98. Each of the guide tubes 210 defines an aperture 212 through which its associated pipe cleaner strand is discharged from the device. A cutting mechanism 214 is provided on frame member 22 adjacent apertures 212 for continuously cutting the continuous pipe cleaner strand 25 into lengths convenient for pipe cleaner use. Cutter mechanism 214 includes a plurality of generally T-shaped blade members 216 which are pivotally mounted on shafts 218 in frame member 22. The structure of these blade members is illustrated in FIG. 4, wherein three such members are shown for use in the illustrated embodiment of the invention wherein six gripping mechanisms 24 and 26 are provided.

Each of the T-shaped members 216 includes a depending leg member 220 which is pivotally attached to a connector bar 222. The latter is adapted to be reciprocated laterally of the device by a bellcrank 224 pivoted on frame member 22 by shaft 226 and pivotally connected at its respective free ends to connector bar 222 by pivot pin 228 and to an actuator member 230 by pin 232.

Actuator member 230 is adapted to be vertically reciprocated by a drive system 234 more fully described hereinafter, whereby bellcrank 224 is pivoted about shaft 226 to reciprocate bar 222 laterally of the machine. Each of the cutter members 216 includes two pairs of apertures 236 and 238 as seen in FIG. 4, wherein apertures 236 are in alignment with the discharge apertures 212 of tubes 210 and as the blade is reciprocated from the position shown in FIG. 4, the engagement of the respective pipe cleaner strands with the edges of the apertures 236 cuts the strands. At the end of the reciprocal stroke, the other pair of apertures, 238 are presented in alignment with the adjacent apertures 212 and the pipe cleaner strands are thence guided through apertures 238 and cut by engagement therewith upon the return stroke of the bar 222. This second step in the cycle of operation of cutter mechanisms 214 is partially illustrated in dotted lines in FIG. 4.

To reciprocate connector 230, a pair of arm members 240 and 242 are pivotally mounted at one end on rock shaft 55 and are connected at their free ends in a manner similar to arms 142 and 146 by spring member 244 and stud 246. Connector 226 extends through slots 248 in arms 240 and 242 and the distance between the arms is defined by spacing block 250

which is fixed to connector 226 and limits the movement of arms 240 and 242 towards each other under the influence of spring 244.

Arms 240 and 242 are each provided with a cam follower member 252 which is adapted to engage the peripheral surface of a cam 254 having an elevation portion 256. Cam 254 is fixed to a collar 258 which is rotatably received on rock shaft 56 and has a sheave member 260 fixed at the opposed end thereof. Sheave 260 is operatively connected by belt 262 with sheave 264 fixed on drive shaft 44 whereby sheave 260 and thus cam 254 are rotated independently of shaft 56. As the elevation portion 256 of cam 254 engages cam follower 252 on arm 240, the arm is urged downwardly and similarly arm 242 is urged downwardly under the influence of spring 244 and against the top surface of spacer block 250 whereby connector 226 is drawn downwardly and bell crank 260 is rotated in a clockwise direction. As elevation portion 256 engages cam follower 252 on arm 242, that arm is pivoted about shaft 55 in an upward direction as is arm 240, under the influence of spring member 244. Arm 240 is thus urged upwardly against the bottom surface of block 250 to move connector 226 in an upward direction and pivot bell crank 220 in a counter-clockwise direction thereby completing the reciprocal motion of linkage 222. It is thus seen that a continuous reciprocal motion of linkage 222 and cutters 216 is produced to provide a continuous timed cutting action of the pipe cleaner strand 25. The desired length of the pipe cleaners thus produced may be controlled by the ratio and the diameters of pulleys 260 and 264 which determine the speed of rotation of cam 254 and thus the timing of the reciprocation of cutters 216 with respect to the speed strands 25 are advanced through the machine.

It is thus seen that a compact and relatively simple pipe cleaner fabrication mechanism is provided which requires relatively little factory space and supervision and which produces complete pipe cleaners in a continuous and efficient operation. The pipe cleaner strand 25 comprising a pair of wires 28 having a plurality of short cotton strands or fibrils 30 therebetween is supplied to the gripping mechanism 24 on carriage 16 which engages the strand when carriage 16 is in its first position whereby the detent members 84 engage the strands and draw them towards the right in FIG. 3 as the carriages 16 and 18 are moved towards their second position adjacent each other intermediate the ends of frame 12. During this process tube 72, and thereby detent 84 is continuously rotated by the drive mechanism 105 contained within housing 92 so that the wires 28 are twisted about each other to lock fibrils 30 therebetween. At the second position of the carriages 16 and 18, detent 84 is released and detent 104 is engaged with the strand 25 to continue drawing the strand through the machine, and since tube 90 is also continuously rotated with tube 72, the twisting process is continued.

Upon return of the carriages 16 and 18 to their first position, detents 104 are released and detents 84 are again engaged with strands 25, and the operation is repeated to continuously draw the strands through the machine and twist the wires about each other. During the process the twisted strands exiting tubes 210 are guided through apertures 236 or 238 of cutter blades 212 which are continuously reciprocated in a predetermined timed relation to cut strands 25 into the desired pipe cleaner lengths.

It has been found that by the relatively simple design and construction of the above described device which incorporates the present invention, a single operator may supervise three or more such devices during a continuous pipe cleaner forming operation, as compared with devices in the prior art wherein at least one operator was required to continuously observe and control the machine.

Although an illustrative embodiment of the present invention has been described herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to this precise embodiment, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of this invention.

What is claimed is:

1. A machine for continuously fabricating pipe cleaners from components including at least a pair of wires and a plurality of fibrils therebetween, said machine comprising, a frame, first and second carriage members slidably mounted on said frame, means for reciprocating said carriages between a first position wherein said carriages are located at opposite claim 1 of said frame and a second position wherein said carriages are located adjacent each other, means on said first carriage for gripping said pipe cleaner components as said carriages are moved from said first to said second position, means on said second carriage for successively gripping said pipe cleaner as said carriages are moved from said second to said first position, and means for rotating each of said gripping means, whereby said pipe cleaner is advanced through said machine and said wires are twisted about each other to lock said fibrils therebetween.

2. A device as defined in claims 1 wherein each of said gripping means comprises a chuck member having releasable detent means for gripping and releasing said pipe cleaner components in accordance with the position of their respective carriages.

3. A device as defined in claim 2 wherein each of said chuck members comprises, a hollow tube having a transverse bore receiving said detent means for movement therein, an annular collar having a cam-shaped interior wall, a portion of which is adapted to urge said detent means into engagement with said pipe cleaner components, and means for moving said collar on said tube in accordance with the position of its associated carriage whereby said detent means are successively urged against and released from said pipe cleaner components.

4. A device as defined in claim 3 wherein said means for rotating comprises, a hollow connecting member rotatably mounted on said second carriage between and in axial alignment with the respective tubes of each of said chucks said connecting member being connected at each of its ends to a respective one of said tubes for transmission of rotation therebetween and telescopically receiving the tube mounted on said first carriage whereby a closed path is defined between said carriages for said pipe cleaner components, and means for rotating said connecting member whereby said tubes and detent means are similarly rotated to twist said wires and lock said fibrils therebetween.

5. A device as defined in claim 4 including means mounted on said frame adjacent the first position of said second carriage for cutting the twisted pipe cleaner components in predetermined lengths.

6. In a machine for continuously fabricating pipe cleaners from components including at least a pair of wires and a plurality of fibrils therebetween and including a support frame, first and second carriage members slidably mounted on said frame for movement between a first position wherein said carriages are located at opposite ends of said frame and a second position wherein said carriages are located in substantially adjacent relation intermediate said frame ends and means for moving said carriage between said first and second positions, means for advancing and twisting said pipe cleaner components, comprising, first pipe cleaner guide means rotatably mounted on said first carriage, second pipe cleaner guide means rotatably mounted on said second carriage operably and telescopically engaged with said first pipe cleaner guide

means for transmission of rotation therebetween during movement of said carriage, means for rotating said guide means, gripping means mounted on said first guide means for engaging said pipe cleaner elements as said carriages are moved towards each other from said first position to said second position, and means on said second carriage for successively gripping said pipe cleaner elements as said carriages are moved away from each other from said second to said first position, whereby said pipe cleaner elements are advanced through said machine and said wires are twisted about each other to lock said fibrils therebetween.

7. A machine as defined in claim 6 including a plurality of said means for advancing and twisting said pipe cleaner components.

8. A machine as defined in claim 6 wherein said first and second guide means comprise a pair of telescopically engaged tubular members through which said pipe cleaner elements move during the pipe cleaner twisting and advancing process.

9. A machine as defined in claim 8 wherein each of said gripping members comprises a chuck member slidably mounted on its associated tubular member and adapted to cooperate with releasable detent means extending into said tubes for engaging and releasing said pipe cleaner components in accordance with the position of said carriage.

10. A machine as defined in claim 9 wherein each of said chuck members comprise an annular collar having a cam shaped interior wall, a portion of which is adapted to urge said detent means into engagement with said pipe cleaner components.

11. A machine as defined in claim 10 including means moving said collars on said tubular members in accordance with the position of said carriages.

12. A machine as defined in claim 6 including means mounted on said frame adjacent the first position of said second carriage for cutting the twisted pipe cleaner components in predetermined lengths.

13. A machine as defined in claim 12 wherein said cutting means comprises cutter blade mounted for pivotal movement between first and second positions and having a plurality of apertures therein positioned in alignment with said guide means at each of said positions and adapted to receive said pipe cleaner therein, and means for pivoting said cutter whereby said pipe cleaner is cut by engagement with the edges of said apertures as said blade is moved between its first and second positions.

14. A method for continuously fabricating pipe cleaners from components including at least a pair of wires and a plurality of cotton fibrils therebetween, comprising, the steps of, gripping said pipe cleaner components at a first station with a first component engaging means, advancing said first engaging means to a second station, releasing said first engaging means from said components at said second station, gripping said pipe cleaner components at said second station with a second component engaging means, advancing said second engaging means to a third station, and continuously rotating each of said engaging means during said advancing steps to twist said wires about each other and to lock said fibrils therebetween.

15. The method as defined in claim 14 including the step of intermittently cutting said pipe cleaner components at said third station.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,646,743

Dated March 7, 1972

Inventor(s) Eugene J. Boyd

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, line 8, (Claim 1, line 7) wherein
"claim 1" should be--ends--.

Signed and sealed this 20th day of June 1972.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents