No. 871,241. PATENTED NOV. 19, 1907.

S. SCOGNAMILLO.

MACHINE FOR FORMING FLEXIBLE TUBING.

APPLICATION FILED FEB. 27, 1905.

2 SHEETS—SHEET 1.

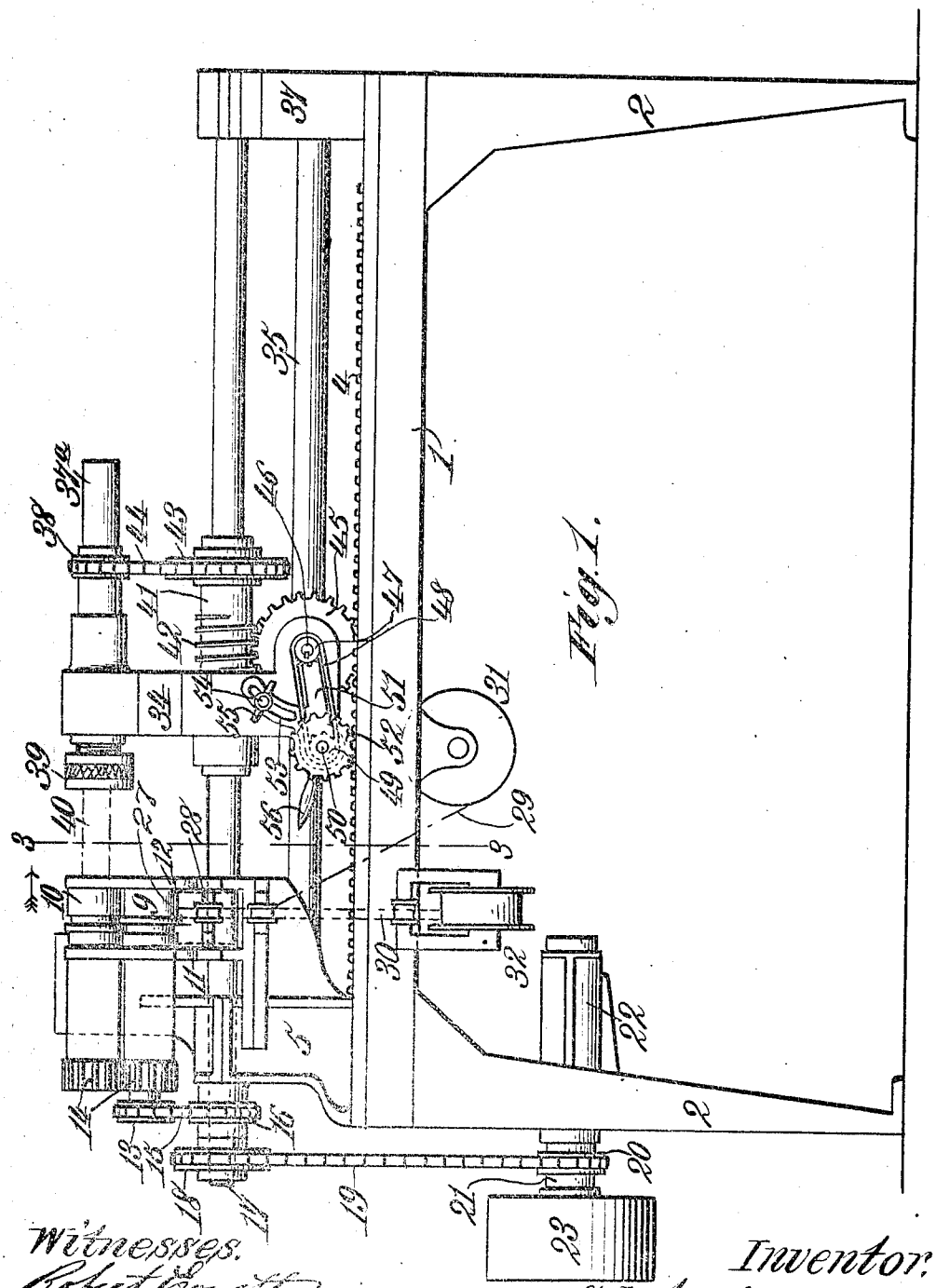


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

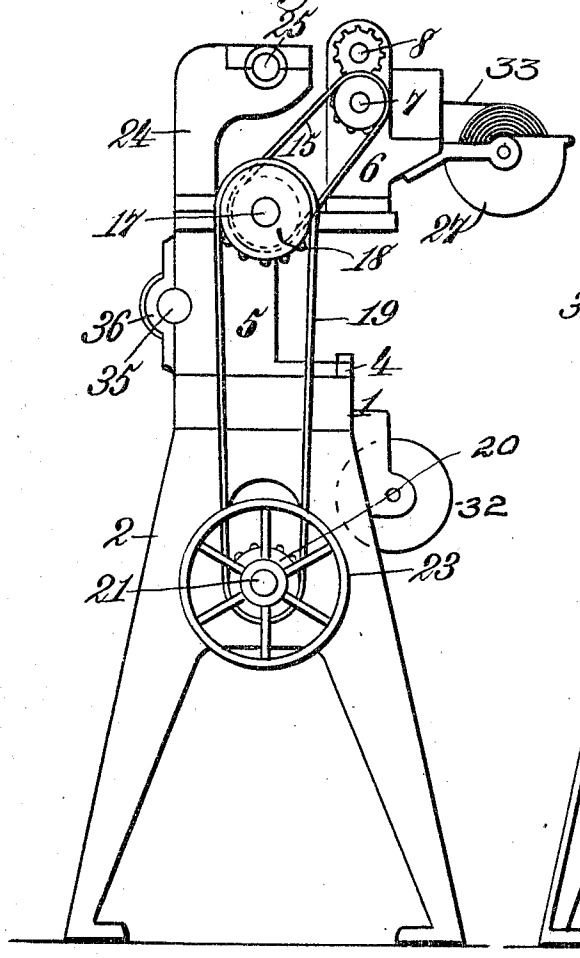


Fig. 3.

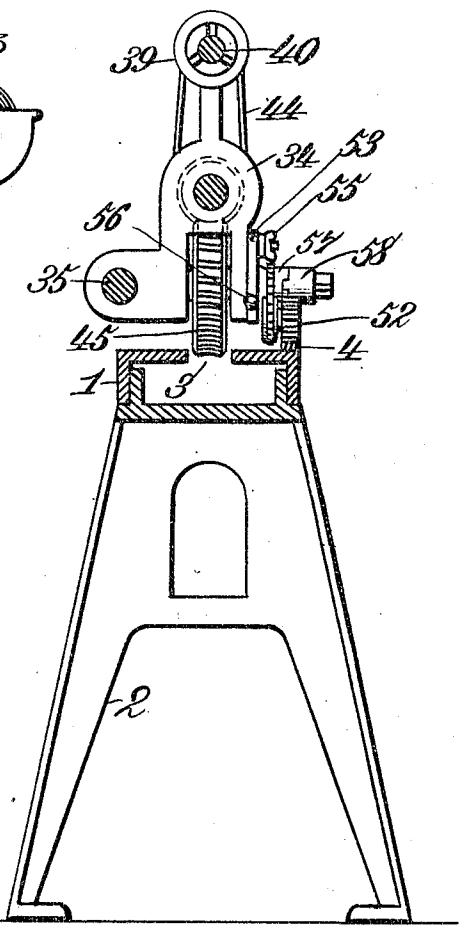
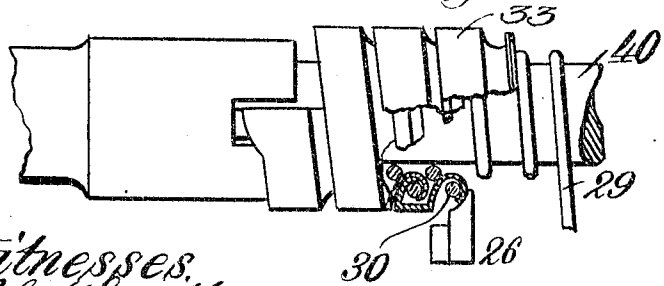


Fig. 4.



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UNITED STATES PATENT OFFICE.

SALVATORE SCOGNAMILLO, OF NEW YORK, N. Y.

MACHINE FOR FORMING FLEXIBLE TUBING.

No. 871,241. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed February 27, 1905. Serial No. 247,529.

To all whom it may concern:

Be it known that I, SALVATORE SCOGNAMILLO, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Machines for Forming Flexible Tubing, of which the following is a specification.

This invention relates to a machine for forming flexible tubing or metallic spiral hose, and the primary object of the same is to provide a comparatively simple mechanical organization for longitudinally moving the mandrel or analogous receiving means for the tubing or on which the tubing is formed or completed in contradistinction to machines of this class as heretofore constructed in which the mandrel remains longitudinally stationary and the feeding means for the several elements or components of the tubing are movable, the feeding and bending devices coöperating with respect to the components of the tubing being immaterial and subject to variation or modification. The means for feeding the components of the tubing to the mandrel in this instance remains stationary, and the mandrel by its progressive longitudinal movement receives the tubing components or elements regularly to spirally dispose the said components or elements in close interlocked relation, and after the desired length of tubing is completed the means for longitudinally moving the mandrel, as well as imparting a rotation thereto are thrown out of gear or disconnected from the operative mechanism and returned to normal position, the several components of the elements of the tubing being severed prior to the return of the mandrel and the feeding mechanism for the latter to normal position. After the parts are returned to normal position the mandrel is disconnected and detached and the completed tubing withdrawn therefrom, and subsequently the mandrel may be again reset for a further similar operation.

In the drawings, Figure 1 is a side elevation of a machine embodying the features of the invention. Fig. 2 is an end elevation looking towards the starting end of the machine. Fig. 3 is a transverse vertical section on the line 3—3, Fig. 1. Fig. 4 is a detail elevation showing the mode of applying the several components of the tubing to the mandrel.

Similar characters of reference indicate corresponding parts in the several views.

The numeral 1 designates the machine bed, having legs 2 extending downwardly therefrom at opposite extremities for disposition on a suitable base rest. The bed 1 has a central longitudinal slot 3 extending through the body portion thereof and a rack 4 adjacent to one side. On one end of the bed is an upwardly projecting bracket or support 5, having a front member 6 at a suitable elevation and projecting over the front side of the frame or bed of the machine below, said member providing means for receiving the extensions of shafts 7 and 8, of suitably grooved and ribbed bending rolls 9 and 10, held between uprights 11 and 12 located at the inner extremity of said support, as clearly shown by Fig. 1. The extension of shaft 7 of the lower roll 9 has a sprocket wheel 13 fixed on its outer end, and the outer ends of both the extensions of shafts 7 and 8 have intermeshing gears 14 to impart to the rolls 9 and 10 a proper motion for feeding the tube component which passes therebetween. The sprocket wheel 13 is engaged by a sprocket chain 15, which also surrounds a sprocket wheel 16 on a stub shaft 17, also carrying a main driving sprocket 18, actuated by a chain belt 19, which is actuated by a sprocket 20, on a driving shaft 21, having bearing in a suitable support 22, held between the legs 2 at the front end of the machine, and provided with a band pulley or like device 23, on its outer end to receive a belt from a motive medium. The bracket or support 5 also has a rear mandrel supporting member 24, disposed in proper spaced relation with respect to the member 6, and having a mandrel opening 25 in the upper portion thereof and extending longitudinally therethrough. A bending anvil 26, of any preferred form, is suitably supported by a rearwardly projected portion of the member 6 in operative relation to the feed of the tubing component through the roller 9 and 10, said bending anvil being of such form and occupying such position with relation to the mandrel of which the tubing is formed as to reliably and accurately insure the interlock of the several components of the tubing of the mandrel, as will be more fully hereinafter specified. The member 6 also has a receptacle or holder 27 applied thereto and projecting outwardly towards the front to

receive a metallic strip which is fed therefrom between the rolls 9 and 10, the rolls imparting to the strip a primary angular contour similar to tubing as ordinarily formed and to produce angularly disposed edges in the strip for interlocking engagement of the successive coils of the strip on the mandrel. A wire 29 and packing strip 30 are fed from suitable reels 31 and 32 upwardly with the metallic strip 33 to the mandrel by suitable guide pulleys or rollers 28, the wire 29 and packing strip 30 continually coöperating with the said metallic strip 33 after the latter has been shaped by the rolls 9 and 10. These reels may be suitably applied to the frame or bed of the machine and will have such position as to insure a regular feed of the wire and packing strip carried thereby with respect to the mandrel, and furthermore, the bending anvil 26 for the metallic strip 33 may be varied in its contour or disposition to accommodate modifications in the formation of the tubing or the bending of the edges of the successive coils or convolutions of the metallic strip, as may be desired. The character of the wire 29 and packing strip 30 is not essential nor is it to be understood that the machine is confined to the formation of any particular construction of tubing.

A carriage 34 moves over the bed 1 of the machine and engages a guide rod or cylindrical bar 35 terminally held in the rear edge portion of the bracket or support 5, as at 36, and in a bracket 37 at the opposite end of the bed, said guide rod 35 being located over the rear edge of the bed. The purpose of this guide rod is to steady the movement of the carriage 34 and always maintain the said carriage in proper position on the bed. In the upper part of the carriage a rotating spindle 37^a is located, and has a sprocket wheel 38 fixed thereon. The outer end of the spindle 37^a, or that nearest to the bracket or support 5 has a suitable chuck head 39, secured thereon similar to that ordinarily used in a lathe to removably receive the inner terminal of a mandrel 40, which is longitudinally slidable or movable through the guide opening 25 in the upper portion of the rear member 24 of the bracket or support 5. The chuck head 39 is not limited to any precise structure, but may be varied at will so long as it can be readily manipulated to grasp or release the end of the mandrel. The carriage 34 has an intermediate driving shaft or spindle 41, carrying a worm 42 and a sprocket wheel 43, which is connected to the sprocket wheel 38 of the spindle 37^a above by a chain belt 44. In the lower part of the carriage below the spindle 41, and disposed centrally with respect to the bed 1, is a worm wheel 45, which is held in continual mesh with the worm 42 and clears the bed by moving in the slot 3, as shown by Fig. 3. The shaft 46 of the worm wheel extends transversely through the lower part of the carriage 34, and on the front extremity has a sprocket wheel 47, which is engaged by a chain belt 48, also surrounding a sprocket wheel 49, on the front projected end of a shaft 50, having bearing in a swinging frame 51 fulcrumed on the shaft 46 of the worm wheel. The shaft 50 is rotatable in the free end of the frame 51, and coöperating therewith is a pinion 52 adapted to mesh with the rack 4. The rear part of the frame 51 has an upwardly projecting segmental slotted extension 53, through which projects a pin or stud 54, held by the carriage and suitably screw threaded to receive a wing or thumb nut 55. To raise and lower the frame 51 the outer free end in rear of the pinion 52 is supplied with a handle or grip device 56.

The sprocket wheel 47 runs loosely on the shaft 46, and is carried by a clutch member 57, see Fig. 3, which is adapted to interlock with a clutch member 58 splined on the outer extremity of the shaft. The purpose of this arrangement is to stop the operation of the movable parts of the carriage at any time desired during the travel of said carriage over the bed and when found necessary to control a proper formation of the tubing on the mandrel 40, and such cessation of movement of the carriage may be accomplished by drawing outwardly on the clutch member 58 to release the sprocket 47 from the shaft 46. At other times, for instance, when the carriage is returned to normal position after the tubing is completed on the mandrel, the frame 51 is swung upwardly by releasing the thumb nut 55 and said frame can be held elevated by again tightening the nut and thereby holding the pinion 52 clear of the rack 4. Under this released condition of the carriage the latter may be manually pushed forwardly to the starting point and carry the mandrel therewith, and the mandrel subsequently released from the chuck head 39, and the completed tubing detached from such mandrel. Afterwards the mandrel may be reset for a similar operation.

The mandrel will be provided with suitable openings for receiving the ends of the wire and metallic strip in the starting operation of forming the tubing, it being understood that the wire is first applied to the mandrel slightly in advance of the application of the tubing, and after the components of the tubing have been properly started with respect to the mandrel the latter is moved longitudinally and at the same time rotated to establish a proper coiling of the components of the tubing. In some instances the wire may be dispensed with and where practical the metallic strip alone may be suitably coiled, and the coils interlocked at their contiguous edges for after-treatment, the machine not being confined, as before

noted, to the formation of any specific arrangement of the parts of the tubing, nor to any special character of tubing, the essential feature being the provision of mechanism for longitudinally shifting and rotating the mandrel, and with respect to which the mandrel may be quickly assembled or disassociated.

It will be understood that changes in the proportions, dimensions, and minor details may be resorted to without departing from the spirit of the invention.

Having thus described the invention, what is claimed, is:—

1. In a machine of the class set forth, the combination with devices for feeding components of tubing, of a longitudinally slidable and rotatable mandrel disposed to receive said components, a guide means, a carriage movable longitudinally on the guide means and supporting an upper rotating spindle, the latter having means to removably engage one end of the mandrel, an operating shaft for the carriage provided with a worm, means for progressively feeding the carriage and operatively controlled by the worm, and means for causing a cessation of movement of the carriage.

2. A machine for forming tubing having devices for feeding and shaping components of tubing, a longitudinally shiftable mandrel on which the parts of the tubing are assembled, a carriage having rotatable means for engaging one end of the mandrel, a guide rod on which the carriage moves, and mechanism for feeding the carriage longitudinally over the machine and operative to disengage the carriage and cause a cessation of movement of the mandrel.

3. In a machine of the class set forth, the combination with devices for feeding components of tubing having a fixed position, of a longitudinally slidable and rotatable mandrel to receive the said components, a guide rod, a carriage movable on the guide rod and having a rotatable member engaging one extremity of the mandrel, and mechanism for feeding the carriage longitudinally over the machine and operating the said member, the mechanism being under manual control to disengage the carriage and cause a cessation of movement of the parts thereof.

4. In a machine of the class set forth, the combination of a bed having a rack thereon, devices for feeding and shaping the component parts of tubing having a fixed position, a longitudinally movable and rotatable mandrel to receive the said components, a guide rod, and a carriage movable on the guide rod and having a spindle and carrying gear means and a rotatable support, the gear means engaging the rack and the spindle, and the support engaging one extremity of the mandrel.

5. In a machine of the class set forth, the combination with a bed having a rack thereon, devices for feeding and shaping tubing components having a fixed position on the bed, a guide rod, a carriage movable on the guide rod and having operating devices including a pinion to engage the rack, means for throwing the pinion into and out of engagement with the rack, and a mandrel detachably associated with the carriage and longitudinally shifted and rotated by the latter, the mandrel being disposed in operative position to the tubing components and feeding devices to receive the several components, and also removably held at one extremity by a part of the carriage.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SALVATORE SCOGNAMILLO.

Witnesses:

AUGUSTO P. STILLI,

ANTONINO DE ANGELI.