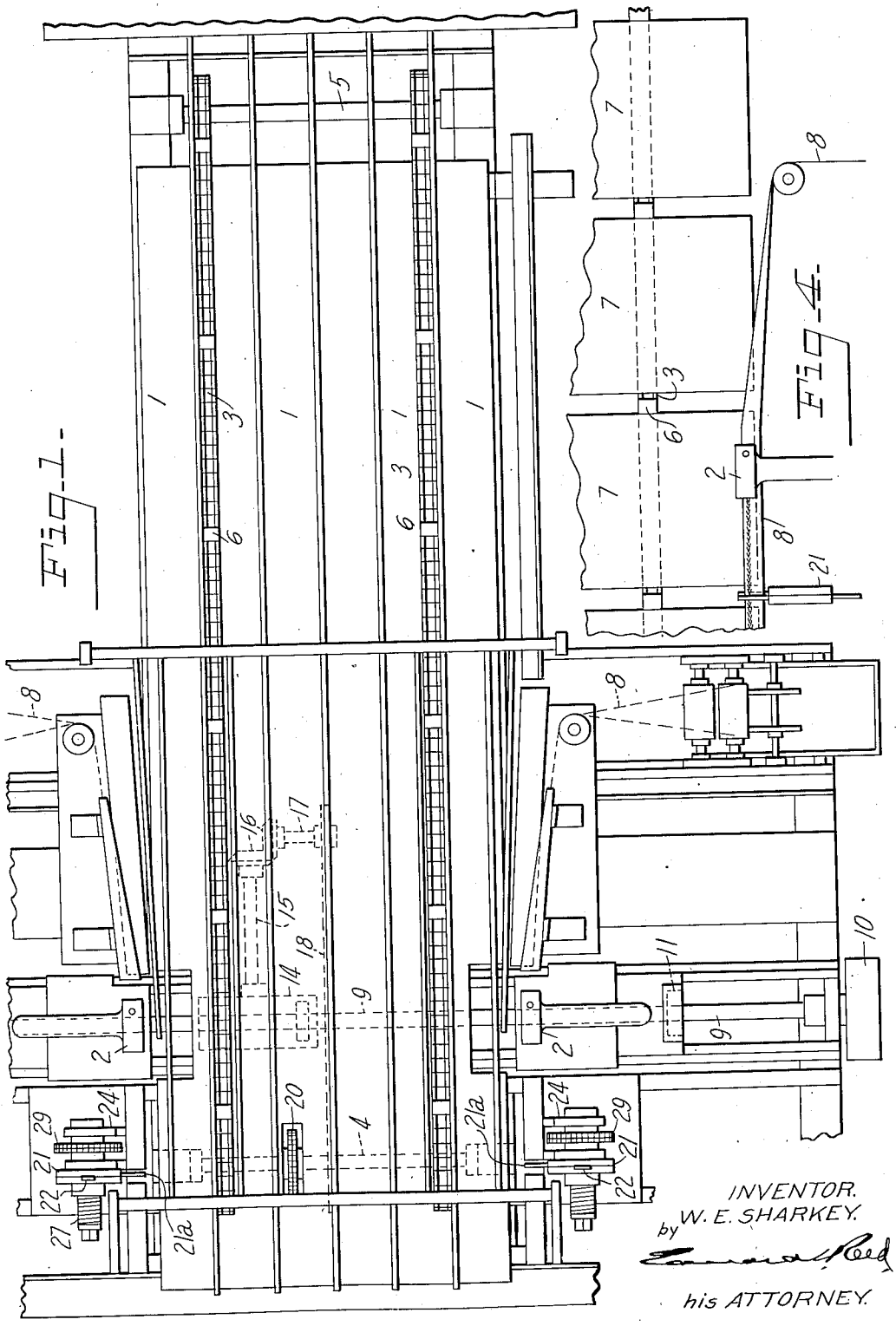
Nov. 1, 1932. W. E. SHARKEY 1,885,867

TAPE CUTTER

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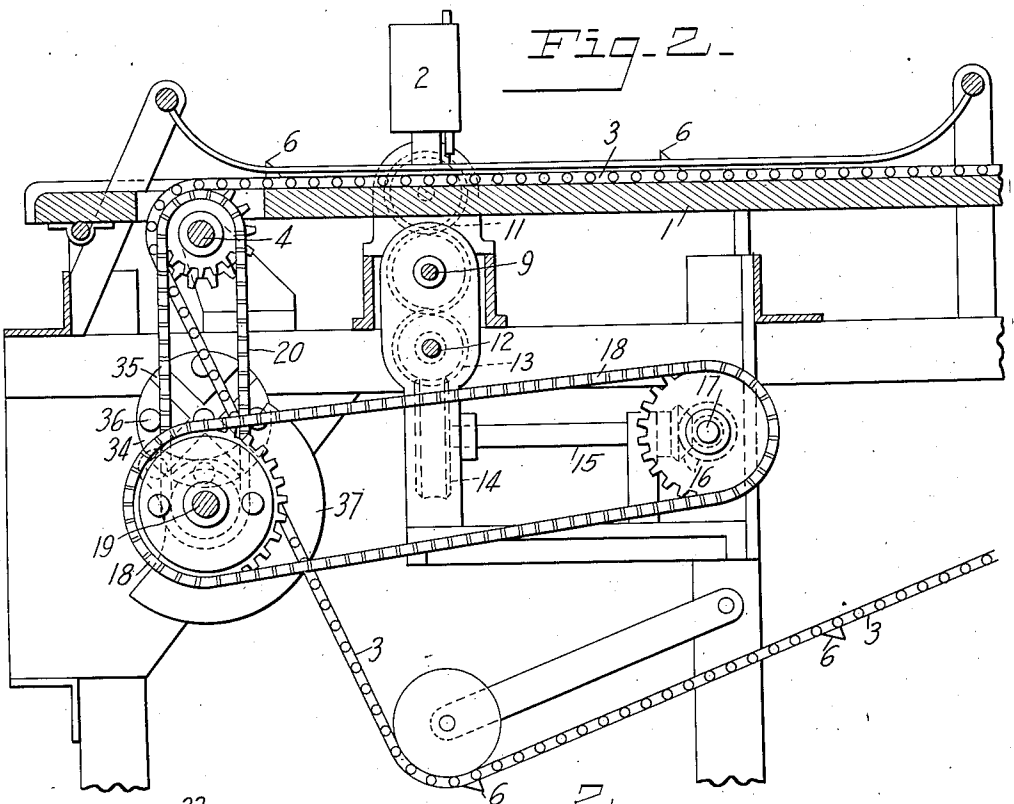


Nov. 1, 1932. W. E. SHARKEY 1,885,867

TAPE CUTTER

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Fig. 2.



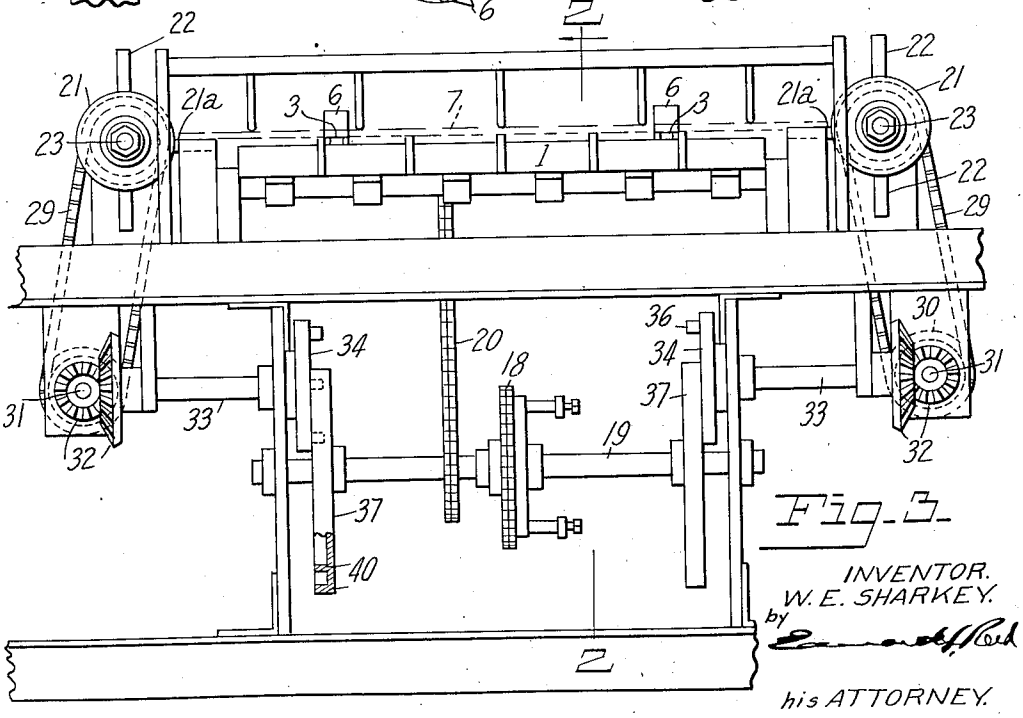


Fig. 3.

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Nov. 1, 1932. W. E. SHARKEY 1,885,867

TAPE CUTTER

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Fig. 5.

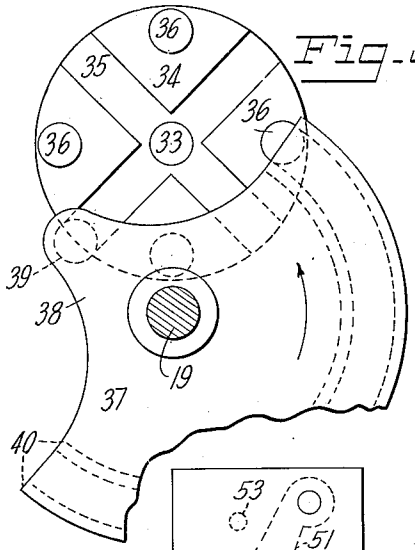


Fig. 6.

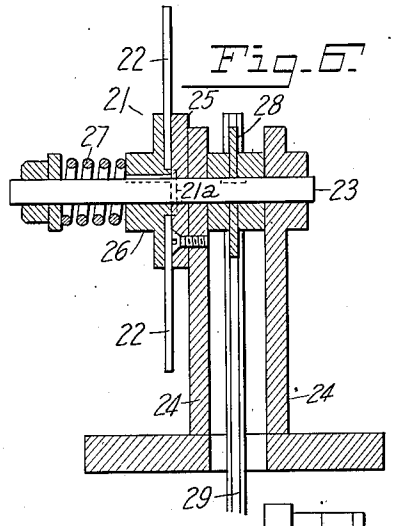


Fig. 7.

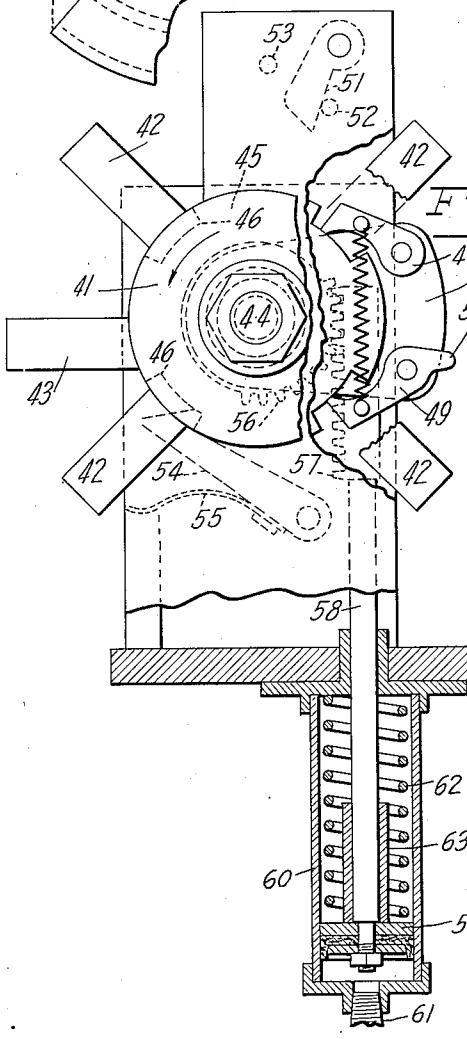


Fig. 8.

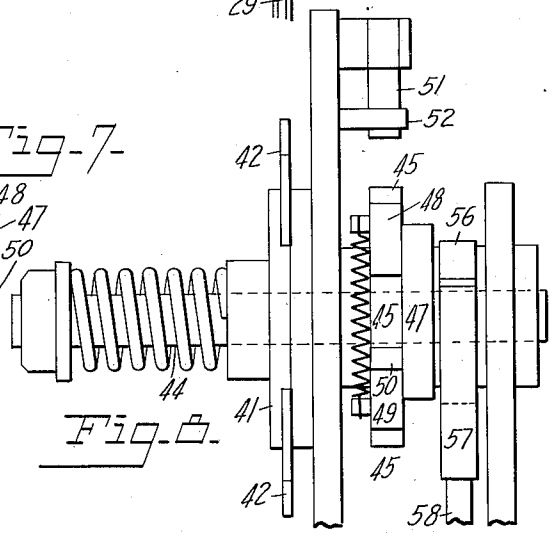
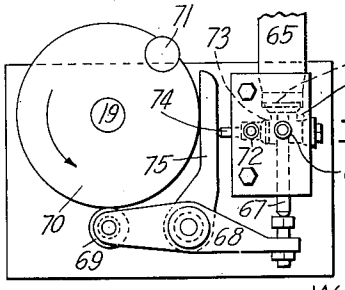


Fig. 9.



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Patented Nov. 1, 1932 1,885,867

UNITED STATES PATENT OFFICE

WILLIAM E. SHARKEY, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE RAYMOND BAG COMPANY, OF MIDDLETOWN, OHIO, A CORPORATION OF OHIO

TAPE CUTTER

Application filed February 9, 1931. Serial No. 514,377.

This invention relates to a tape cutter and is designed primarily for use in connection with bag sewing machines and the like.

In the manufacture of certain types of bags the bags are formed from sections of tubular material cut to bag length and then sewed across the ends to close the bag. In some forms of bag the bag section is sewed at both ends, one end being so shaped as to provide a filling opening or valve which will not be closed by the stitching. Continuous tapes are folded about the ends of the bag sections and sewed thereto by the same stitching which closes the ends of the bag. The bag sections are delivered to the sewing heads in spaced relation so that as they leave the sewing heads they are connected one to the other in spaced relation by the continuous tapes. In order to separate the bags it is therefore necessary to sever these tapes and the line of severance must be spaced proper distances from the respective bags. Various devices have been utilized for so severing the tapes but these have not been entirely satisfactory.

One object of the invention is to provide improved mechanism for severing the tape at the correct point between adjacent bag sections.

A further object of the invention is to provide such a mechanism comprising a cutter which will be operated intermittently and in timed relation to the movement of the bag sections so that it will operate on the tape between successive bag sections.

A further object of the invention is to provide such a mechanism comprising a cutter having a plurality of blades and having means for imparting to the cutter sufficient movement to cause a single blade to operate upon each operation of the mechanism.

A further object of the invention is to provide such cutting mechanism having means for positively controlling the operation thereof in accordance with the movement of the means which advances the bag sections to the sewing heads.

Other objects of the invention will appear as the mechanism is described in detail.

In the accompanying drawings Fig. 1 is a plan view of a sewing machine embodying my invention, partly broken away; Fig. 2 is a longitudinal sectional view taken through a portion of such a sewing machine; Fig. 3 is a front elevation of such a sewing machine; Fig. 4 is a plan view of a portion of the sewing machine, showing the bags on the conveyor; Fig. 5 is a detail view, partly broken away, of one form of actuating mechanism for intermittently operating the cutter; Fig. 6 is a sectional view of the mechanism shown in Fig. 5; Fig. 7 is a front elevation, partly in section, of another form of actuating mechanism for the cutter; Fig. 8 is a side view of the mechanism shown in Fig. 7; and Fig. 9 is a detail view of the valve controlling device for the mechanism of Fig. 7.

In these drawings I have illustrated one embodiment of my invention, with two forms of cutter operating mechanism, but it will be understood that this embodiment has been chosen for the purpose of illustration only and that the mechanism may take various forms and may be utilized for various purposes without departing from the spirit of the invention.

The sewing machine here illustrated is of a well known type and comprises a table 1 having near its forward end two sewing heads 2, arranged on the respective sides of the table. A conveyor 3 travels over the table to deliver the bag sections to the sewing heads. As here shown, this conveyor comprises a pair of sprocket chains supported at the forward end of the machine on sprocket wheels carried by a shaft 4 and supported at the rear end of the machine by sprocket wheels carried by a shaft 5. The conveyor is provided with a series of lugs 6 spaced apart lengthwise thereof and adapted to engage the bag sections and cause the same to advance with the conveyor. These lugs are spaced apart a distance somewhat greater than the width of the bags so that adjacent bags will be spaced one from the other as they are delivered to the sewing heads, as shown in Fig. 4, where the bag sections are indicated at 7. As the bags approach the sewing heads continuous tapes 8 are folded about the ends thereof and are stitched thereto as the bag sections pass the

sewing heads. Thus as the bags pass beyond the sewing heads they are connected one to the other in spaced relation by these tapes. The conveyor may be driven by any suitable mechanism. In the present machine a main drive shaft 9 extends transversely to the machine and is provided at one end with means, such as a belt pulley 10, for connecting the same with a source of power. This shaft is connected by gearing 11 with the sewing heads and is also geared to a shaft 12 having thereon a worm 13 which meshes with a worm gear 14 on a longitudinal shaft 15, the rear end of which is connected by beveled gearing 16 with a shaft 17. The shaft 17 is connected by a sprocket chain 18 with a transverse shaft 19 arranged near the forward end of the machine. This shaft 19 is connected by a sprocket chain 20 with a forward conveyor shaft 4 and thus serves as a driving shaft for the conveyor. Mounted on the respective sides of the machine, beyond the sewing heads 2, are cutters 21 adapted to sever the tape between adjacent bag sections. These cutters are identical in construction and operation and the description of one of them and its operating mechanism will apply to the other.

Each cutter is rotatably mounted on an axis substantially parallel with the line of movement of the bag sections and comprises a plurality of substantially radial blades 22 arranged to be moved across the path of travel of the tape which connects the adjacent ends of the successive bag sections and cooperating with a stationary cutter bar 21*a*, arranged beneath the line of travel of the tape, to sever the tape and which is, in the present instance, carried by a plate or disk 25 rigidly mounted on a frame member 24. As shown more particularly in Fig. 6, a short shaft 23 is rotatably mounted in suitable supports 24, forming part of the frame, and extends lengthwise of the machine adjacent to one side of the table. Mounted on this shaft is a cutter head which, in the present instance, comprises a disk 26 splined on the shaft and having recesses in which the blades 22 are mounted. The disk 26 is pressed against the face of the fixed disk 25 by a spring 27, thereby maintaining the blades 22 in proper cutting relation to the stationary cutter bar 21*a*. Rotary movement is imparted to this cutter head intermittently and in timed relation to the movement of the conveyor which advances the bag sections to the sewing heads and the amount of movement imparted to the cutter head is sufficient to move a single blade across the path of travel of the tape. The cutter is rotated in one direction only so that there is no return movement which would be interfered with by the tape and bag sections. Suitable mechanism is provided for actuating the cutter and this mechanism is so connected with the conveyor that its operation will be positively controlled thereby. In that form of the apparatus shown in Figs. 1 to 6 the actuating mechanism is positively driven by the same mechanism which drives the conveyor, while in Figs. 7 to 9 the actuating mechanism for the cutter embodies a motor the energization of which is controlled by the mechanism which drives the conveyor. As shown in Figs. 2, 3 and 6, the cutter shaft 23 has secured thereto a sprocket wheel 28 which is connected by a sprocket chain 29 with a sprocket wheel 30 on a shaft 31, arranged substantially parallel with the shaft 23. The shaft 31 is connected by beveled gears 32 with a transverse shaft 33 and this shaft 33 is connected through suitable actuating mechanism with the shaft 19. The actuating mechanism is of such a character as to intermittently operate the cutter at intervals controlled by the shaft 19 and therefore bearing a definite relation to the movement of the conveyor. The actuating mechanism here illustrated is a form of Geneva drive and comprises a disk 34 rigidly secured to the end of the shaft 33 and having in that face opposite the shaft a plurality of radial grooves 35. In the present instance, the face of the disk is provided with two diametrical grooves which intersect at the center of the disk and thus provide four grooves radiating from the center of the disk. Projecting from the face of the disk between the grooves 35 are studs 36. Rigidly mounted on the shaft 19, for rotation therewith, is a driving member 37 which is approximately semi-circular in shape and has a radial finger 38 projecting from the axis thereof and provided with a stud 39 adapted to enter any one of the grooves 35 in the disk or driven member 34. The semi-circular portion of the driving member is provided with a groove which is preferably formed between flanges 40 projecting from the face of the member 37 and described about the axis thereof. This groove is adapted to receive any one of the studs 36 on the driven member 34. As shown in Fig. 5, the member 37 is rotating in the direction of the arrow and the stud 39 is just leaving one of the slots 35 and the groove is moving into engagement with one of the studs 36 on the driven member 34. The groove in the driving member having embraced the stud 36 it will be obvious that the driven member is held positively against rotation and as the driving member continues its rotation it will also engage the stud 36 on the opposite side of the driven member 34 and the driven member will be held against rotation until the groove has moved out of engagement with this second stud. As the groove moves out of engagement with the second stud the stud 39 on the driving member will enter the next succeeding groove in the driven member 34 and, as the driving member continues its rotation, will impart a quarter rotation to the driven member and as it moves out of the slot

the groove will again engage one of the studs on the driven member. Preferably the groove in the driving member is of a length slightly greater than the semi-circle so that it will engage the stud on the driven member just before the stud on the driving member moves out of the groove in the driven member. In the form here shown, the cutter has but two blades and the driving connection between the shaft 33 and the shaft 23 is of a one to two ratio so that a half rotation will be imparted to the cutter for each quarter rotation of the shaft 33. Thus it will be apparent that the cutter will be operated through a half revolution periodically and in definitely timed relation to the movement of the bag sections and that it will be positively held against movement during the intervals between operations. In the present machine the conveyor moves a distance equal to the width of a bag section, plus the distance between two adjacent bag sections, upon each full rotation of the shaft 19. Consequently the cutter is caused to operate once for each bag section that passes the same and the arrangement of the controlling mechanism with relation to the conveyor is such that the operation of the cutter will take place when the tape connecting the two bag sections is approximately half way past the cutter, thus causing the tape to be severed at substantially equal distances from the two bag sections.

In that form of the apparatus shown in Figs. 7, 8 and 9 the cutter is operated by a motor and the operation of the motor is controlled by the mechanism which also controls the movement of the means for advancing the bags to the sewing heads. As here shown, the cutter, 41, is of substantially the same construction as that above described but is provided with four blades, 42, which successively cooperate with a stationary cutter bar 43. The cutter is carried by a shaft 44 to which is rigidly secured a ratchet wheel 45 which, in the present instance, is in the form of a circular disk having a plurality of elongated recesses 46 in the peripheral edge thereof, the end walls of these recesses constituting, respectively, forwardly and rearwardly facing teeth for the ratchet wheel. Rotatably mounted on the shaft 44 is a pawl carrier 47 and mounted on this pawl carrier is a pawl 48 the nose of which is adapted to enter any one of the recesses and engage the front or rearwardly facing wall of that recess to impart movement to the ratchet wheel and consequently to the cutter. In order to prevent objectionable overthrow of the cutter due to inertia a second pawl 49 is mounted on the pawl carrier 47 and extends rearwardly therefrom to enter a recess in the rear of the recess entered by the pawl 48 and thus constitute a stop which will engage the rear or forwardly facing wall of the recess to positively interrupt the movement of the ratchet wheel and cutter when the movement of the pawl carrier is interrupted. This stop pawl 49 has an outwardly extending finger 50 and mounted adjacent to the ratchet wheel is a trip member, here shown as a pivoted dog 51, the free end of which extends into the path of the finger 50 of the stop pawl 49. The movement of the pivoted dog 51 is limited by stops 52 and 53, the stop 53 being spaced such a distance from the normal position of the dog that when the latter is engaged by the finger 50 it will swing out of the path of the finger and permit the latter to pass. As soon as the finger has passed the dog, the latter will drop back into engagement with the stop 52 and upon the return movement of the pawl carrier the finger 50 of the stop pawl will again engage the dog, which is then held against movement, and the pawl will be moved about its axis to an inoperative position, thereby disconnecting the pawl carrier from the ratchet wheel and permitting it to be returned to its initial position, it being understood, of course, that the actuating pawl 48 will ride over the peripheral surface of the ratchet wheel during the return movement of the pawl carrier. The elongated recesses in the ratchet wheel permit of sufficient relative movement between the pawl carrier and the ratchet wheel to cause the stop pawl to be moved to its inoperative position. The arrangement of the two pawls is such that they will be positioned at the same ends of the respective recesses. If the ratchet wheel does not move ahead at the end of a forward operation of the pawl carrier the driving pawl 48 will remain in engagement with the forward end of its recess and the stop pawl 49 will be at the forward end of its recess. Consequently when return movement is imparted to the pawl carrier it can move far enough with relation to the ratchet wheel to cause the stop pawl to be tripped. If the ratchet wheel overthrows at the end of the forward operation of the pawl carrier the stop pawl may be in engagement with the rear end of its recess, at the beginning of the return movement of the pawl carrier. If so, the ratchet wheel will be moved in a reverse direction far enough to permit of the tripping of the stop pawl but this movement will not be sufficient to place any of the blades in an objectionable position. If desired, a detent pawl 54 may be provided to prevent objectionable reverse movement being imparted to the ratchet wheel and cutter. As here shown, this pawl is arranged beneath the ratchet wheel and is acted upon by a spring 55 which presses its nose into an adjacent recess 46 in the ratchet wheel. The detent pawl is so arranged that it will enter the recess at the end of the forward movement of the pawl carrier and if the ratchet wheel overthrows, or continues to move until it is checked by the stop pawl 49, the nose of the detent pawl will assume a posi-

tion at the rear end of its recess and will thus permit of the reverse movement of the ratchet wheel a sufficient distance to trip the stop pawl.

Any suitable means may be provided for periodically operating the pawl carrier and thus imparting periodic movement to the cutter. In the present arrangement, a pinion 56 is rigidly secured to the pawl carrier and a toothed rack 57 meshes with that pinion. The rack is preferably actuated by a fluid operated motor and, as here illustrated, it is connected by a rod 58 with a piston 59 mounted in a cylinder 60, the cylinder being connected at a point below the piston with a pipe 61 leading to a source of supply for air under pressure. A spring 62 tends to move the piston toward its lowermost position and thus return the pawl carrier to its initial position. A suitable stop, such as a sleeve 63, so limits the movement of the piston, under air pressure, as to cause the proper amount of movement to be imparted to the pawl carrier. The delivery of liquid to the cylinder 60 is controlled by a valve 64 which is interposed between the pipe 61 and the main supply pipe 65. An inlet valve member 66 is interposed in the valve casing between the pipes 61 and 65 and has a stem 67 which projects beyond the lower side of the casing and into the path of one end of a lever 68 which is pivoted between its ends and has at its other end a roller 69 which rides upon the periphery of a cam 70 rigidly secured to the shaft 19. In the present arrangement the cam has a single lobe or projection 71 and when this projection engages the roller 69 at the end of the lever 68 the valve 66 will be opened and held open for an interval long enough to permit the air to pass to the cylinder and actuate the pawl carrier and thus impart a quarter rotation to the cutter. As soon as the lobe 71 has passed the roller the valve will close. In order to relieve the pressure within the cylinder and permit the piston to be returned to its initial position by the spring 62 the valve 64 is provided with an exhaust port 72 controlled by a valve member 73 having a stem 74 projecting laterally from the valve into the path of a second lever 75 which is also arranged to be engaged and actuated by the lobe 71 of the cam 70. Thus the inlet valve is first opened by the action of the cam to admit air to the cylinder and the exhaust valve is then opened, also by the action of the cam, to exhaust the air from the cylinder. The cam being mounted on the shaft 19 is operated in fixed relation to the movement of the conveyor. Therefore, the motor will be energized to operate the cutter at definitely fixed intervals of such length that the successive operations of the cutter will cause the tape to be severed at exactly the right point.

While I have shown and described one embodiment of my invention, together with a modified form of actuating mechanism, I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, an actuating device for said cutter, and a device connected with said article advancing means for movement in timed relation thereto and having a part to periodically engage said actuating device and impart movement thereto and having another part to engage said actuating device and hold the same against movement while the first mentioned part is out of engagement therewith.

2. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a shaft connected with said article advancing means, actuating mechanism for said cutter comprising a rotatable member, and a member connected with said shaft for rotation thereby and having a part to periodically engage the first mentioned rotatable member and impart movement thereto.

3. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a shaft connected with said article advancing means, actuating mechanism for said cutter comprising a rotatable member, and a member connected with said shaft for rotation thereby and having a part to periodically engage the first mentioned rotatable member and impart movement thereto, and having a second part to engage said rotatable member and hold the same against movement while the first mentioned part is out of engagement therewith.

4. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, actuating mechanism for said cutter including a rotatable member having grooves in one face thereof and having studs projecting from said face, a second rotatable member having a part to enter one of said grooves and impart a partial rotation to the first mentioned rotatable

member and also having an arcuate groove to engage studs on said first mentioned member and hold the latter against rotation while the first mentioned part of said second member is out of engagement therewith, and means for rotating said second member in timed relation to said article advancing means.

5. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, and means including a Geneva drive for imparting intermittent movement to said cutter.

6. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a motor, means actuated by said motor to impart movement to said cutter, and means operated in timed relation to said article advancing means to periodically energize said motor.

7. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a fluid operated device to actuate said cutter, a valve to control the admission of fluid to said device, and means operated in timed relation to said article advancing means to periodically open said valve.

8. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a shaft connected with said article advancing means, a fluid operated device to actuate said cutter, a valve to control the admission of fluid to said device, a cam connected with said shaft, and means actuated by said cam to open said valve.

9. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a shaft connected with said article advancing means, a fluid operated device to actuate said cutter, valves to respectively control the admission and exhaust of fluid from said device, a cam connected with said shaft, and means actuated by said cam to successively open said valves.

10. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a ratchet wheel connected with said cutter, a pawl carrier, a pawl supported by said carrier in operative relation to said ratchet wheel, a motor to impart oscillatory movement to said pawl carrier, and means operated in timed relation to said article advancing means to periodically energize said motor.

11. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a ratchet wheel connected with said cutter, a pawl carrier, a pawl supported by said carrier in operative relation to said ratchet wheel, a pinion connected with said pawl carrier, a toothed rack meshing with said pinion, a motor to operate said rack, a cam, means controlled by said cam to control the operation of said motor, and means for operating said cam and said article advancing means in timed relation.

12. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a rotatable disk connected with said cutter and having parts arranged to provide a series of rearwardly facing teeth and a series of forwardly facing teeth, a pawl carrier, a pawl mounted on said carrier to engage said rearwardly facing teeth, a second pawl mounted on said carrier to engage said forwardly facing teeth, means for actuating said pawl carrier in timed relation to said article advancing means, and means for moving said second pawl to an inoperative position when return movement is imparted to said pawl carrier.

13. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a rotatable disk connected with said cutter and having a plurality of elongated recesses in the periphery thereof, a pawl carrier, an actuating pawl mounted on said pawl carrier engaging in one of said recesses, a stop pawl mounted on said pawl carrier to engage in another of said recesses and having a finger, a trip member arranged in the path of said finger of said stop pawl, said trip member being yieldable to permit the said finger to pass the same when said pawl carrier is moved in a forward direction and being held against movement by said finger when said pawl carrier is moved in a reverse direction, and means for operating said pawl carrier and said article advancing means in timed relation.

14. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a rotary cutter having a substantially radial blade arranged to be moved across the path of travel of said tape, a rotatable disk connected with said cutter and having a plurality of elongated recesses in the periphery thereof, a pawl carrier, an actuating pawl mounted on said pawl carrier engaging in one of said recesses, a stop pawl mounted on said pawl carrier to engage in another of said recesses and having a finger, a trip member arranged in the path of said finger of said stop pawl, said trip member being yieldable to permit the said finger to pass the same when said pawl carrier is moved in a forward direction and being held against movement by said finger when said pawl carrier is moved in a reverse direction, a detent pawl engaged in one of said recesses to limit the movement of said disk in a reverse direction, and means for operating said pawl carrier and said article advancing means in timed relation.

15. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continous tape, a rotary cutter having a blade arranged to be moved across the path of travel of said tape, mechanism to impart rotary movement to said cutter in one direction only and comprising a movable part to cause the operation thereof, and a device connected with said article advancing means for operation thereby and having means for actuating said movable part of said mechanism at intervals determined by the movement of said article advancing means.

16. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a cutter having a blade arranged to be moved across the path of travel of said tape, mechanism to impart operative movement to said cutter and comprising a movable part to cause the operation thereof, and a device connected with said article advancing means for continuous rotation thereby, and having means for actuating said movable part of said mechanism at intervals determined by the movement of said article advancing means.

17. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a cutter having a blade arranged to be moved across the path of travel of said tape, a shaft connected with said article advancing means, actuating mechanism for said cutter comprising a movable member operatively connected with said cutter, and a member connected with said shaft and arranged to periodically engage said movable member and cause said actuating mechanism to actuate said cutter in timed relation to the movement of said article advancing means.

18. In a machine comprising means for advancing a series of articles which are connected in spaced relation by a continuous tape, a cutter having a blade arranged to be moved across the path of travel of said tape, a shaft connected with said article advancing means, actuating mechanism comprising a part operatively connected with said cutter, and a part mounted for pivotal movement to cause operative movement to be imparted to the first mentioned part, and a member connected with said shaft for rotation thereby and arranged to periodically engage the last mentioned part of said actuating mechanism and impart pivotal movement thereto.

In testimony whereof, I affix my signature hereto.

WILLIAM E. SHARKEY.