April 18, 1933. J. ETTL 1,904,861

TAPE HANDLING APPARATUS

Filed June 12, 1931 5 Sheets-Sheet 1

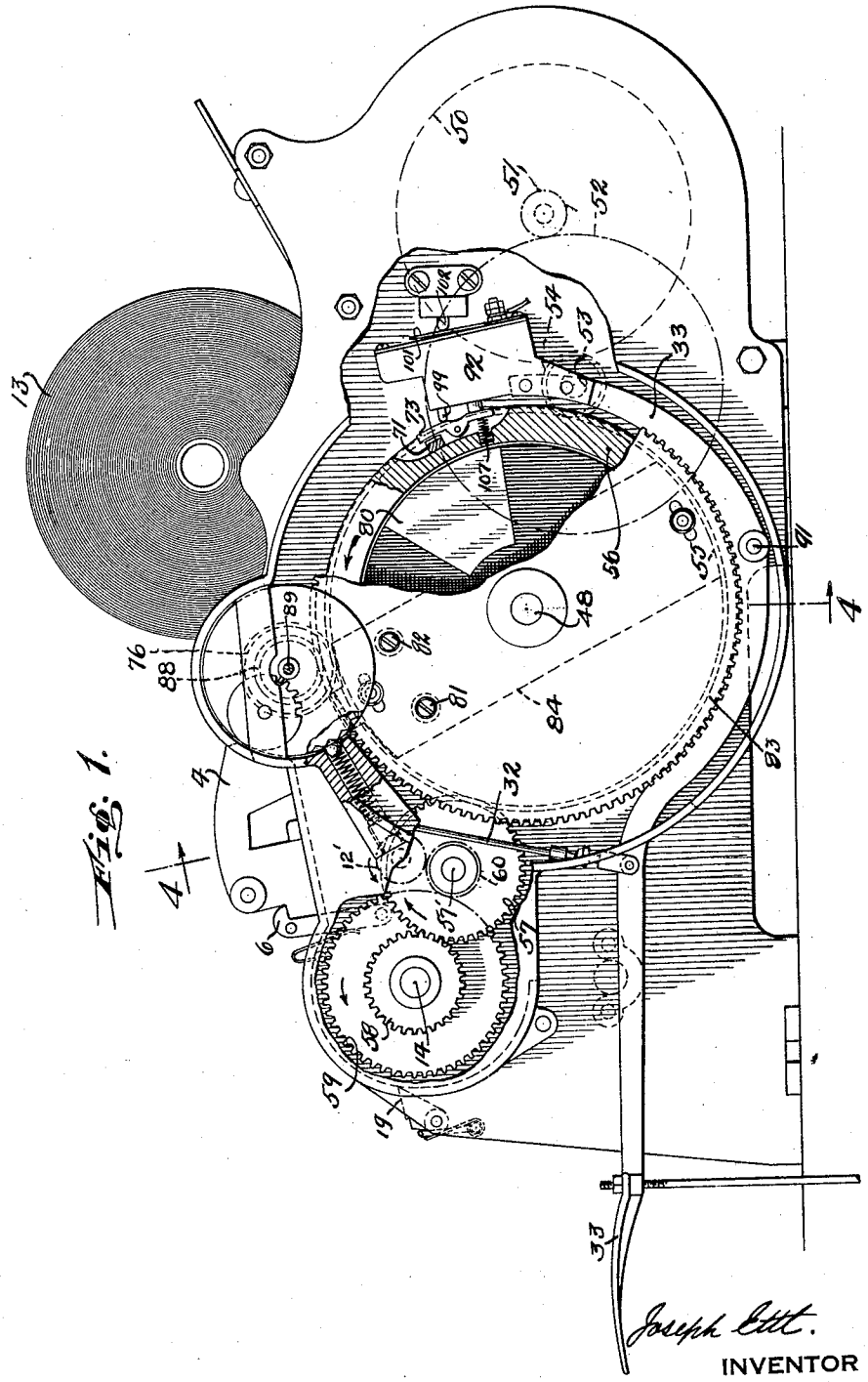


Fig. 1.

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TAPE HANDLING APPARATUS

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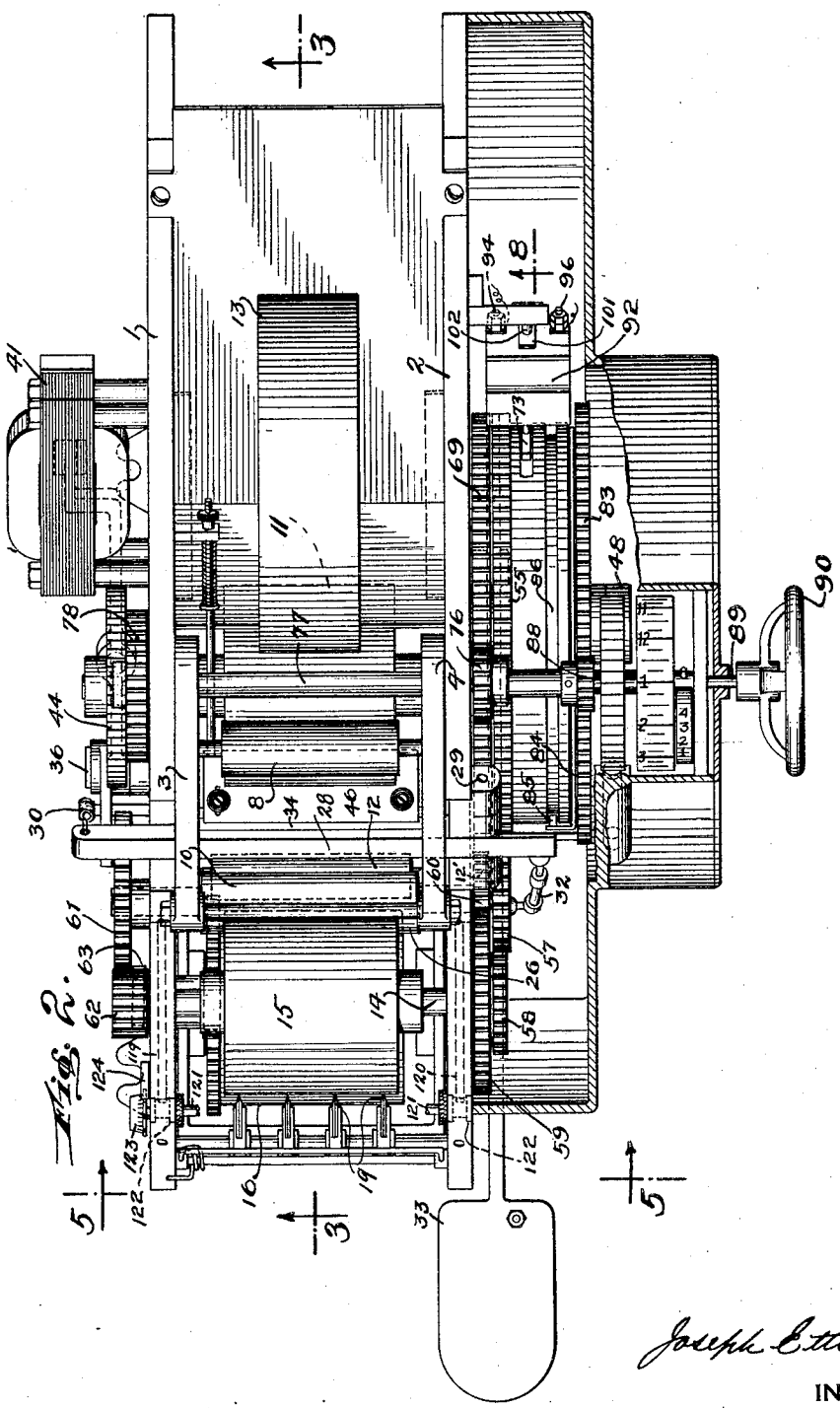


Fig. 2.

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TAPE HANDLING APPARATUS

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Fig. 10.

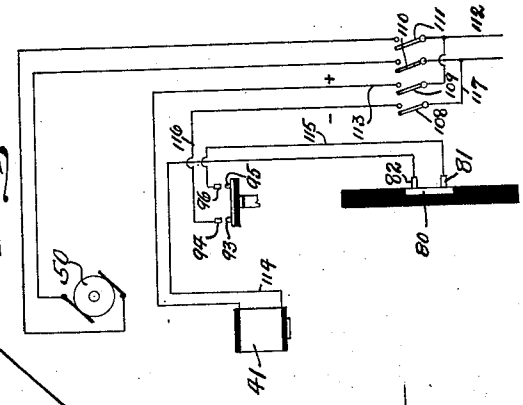


Fig. 3.

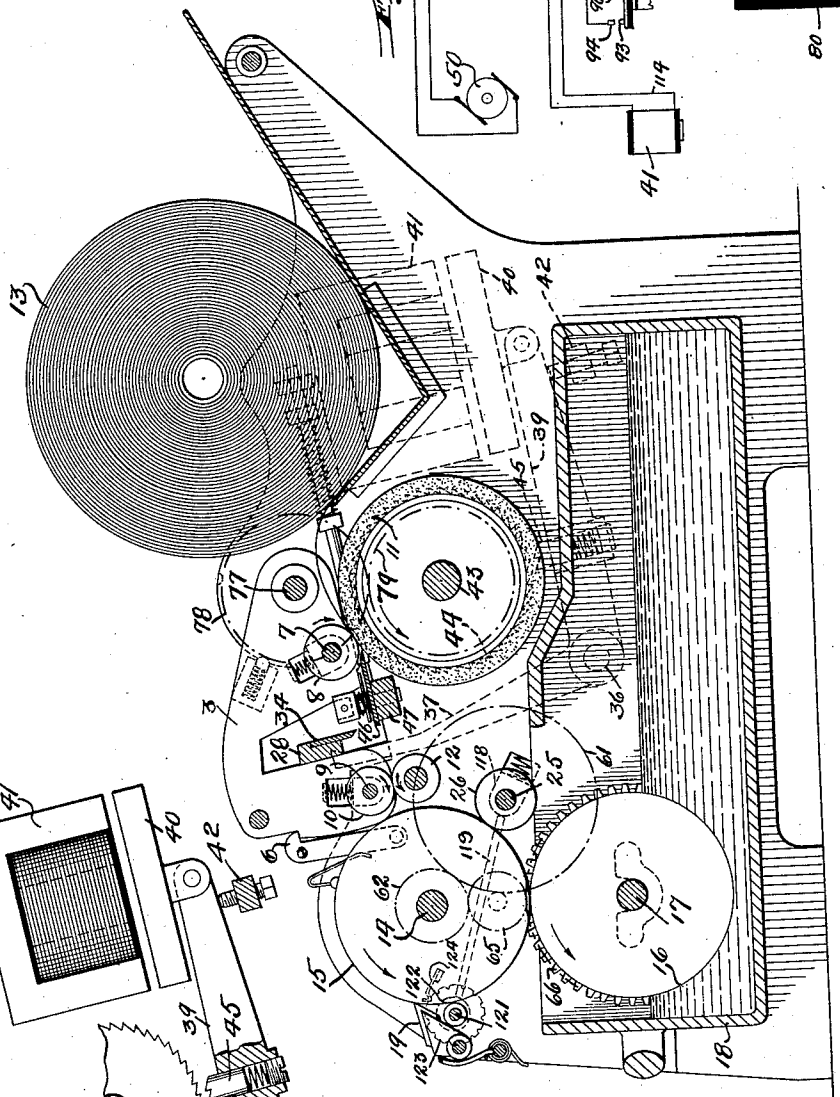
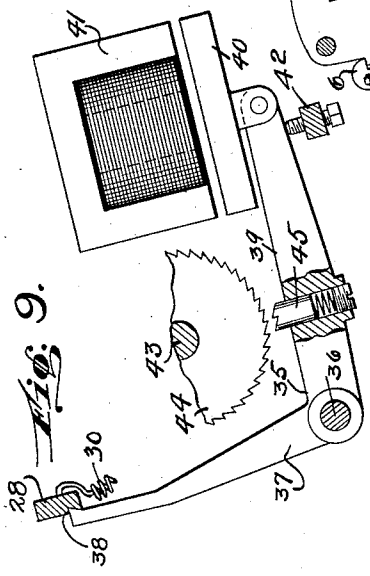


Fig. 9.



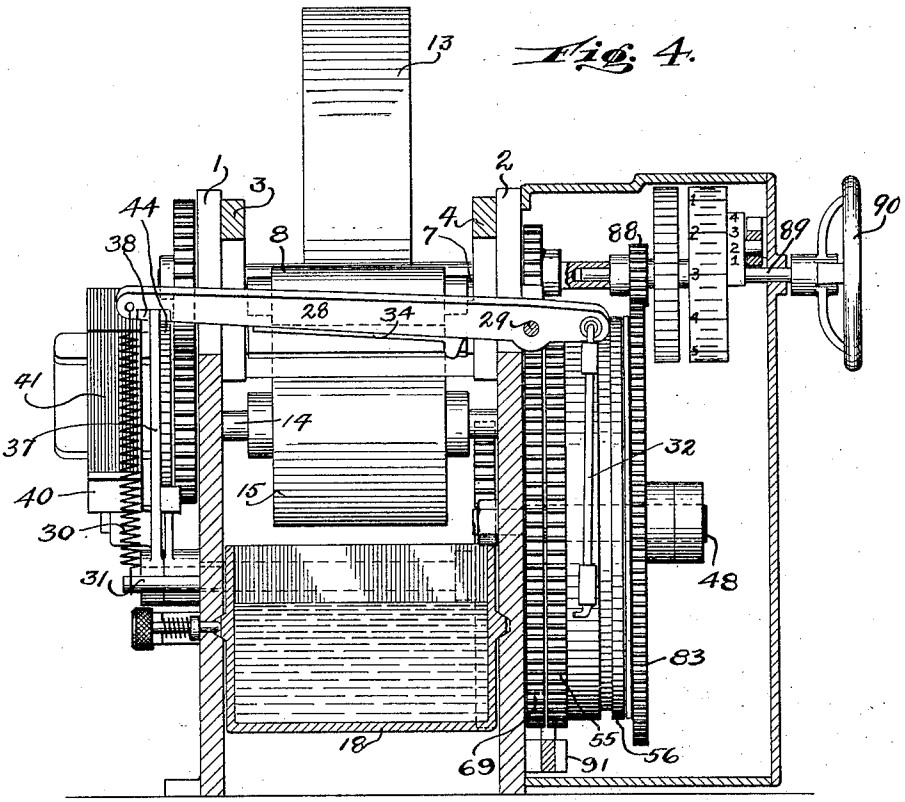
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TAPE HANDLING APPARATUS

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Fig. 4.



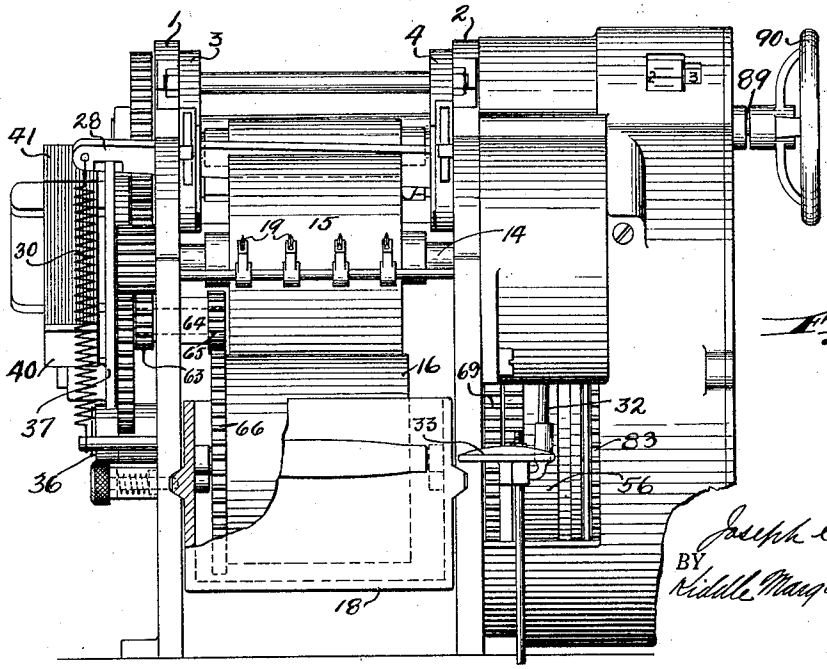


Fig. 5.

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TAPE HANDLING APPARATUS

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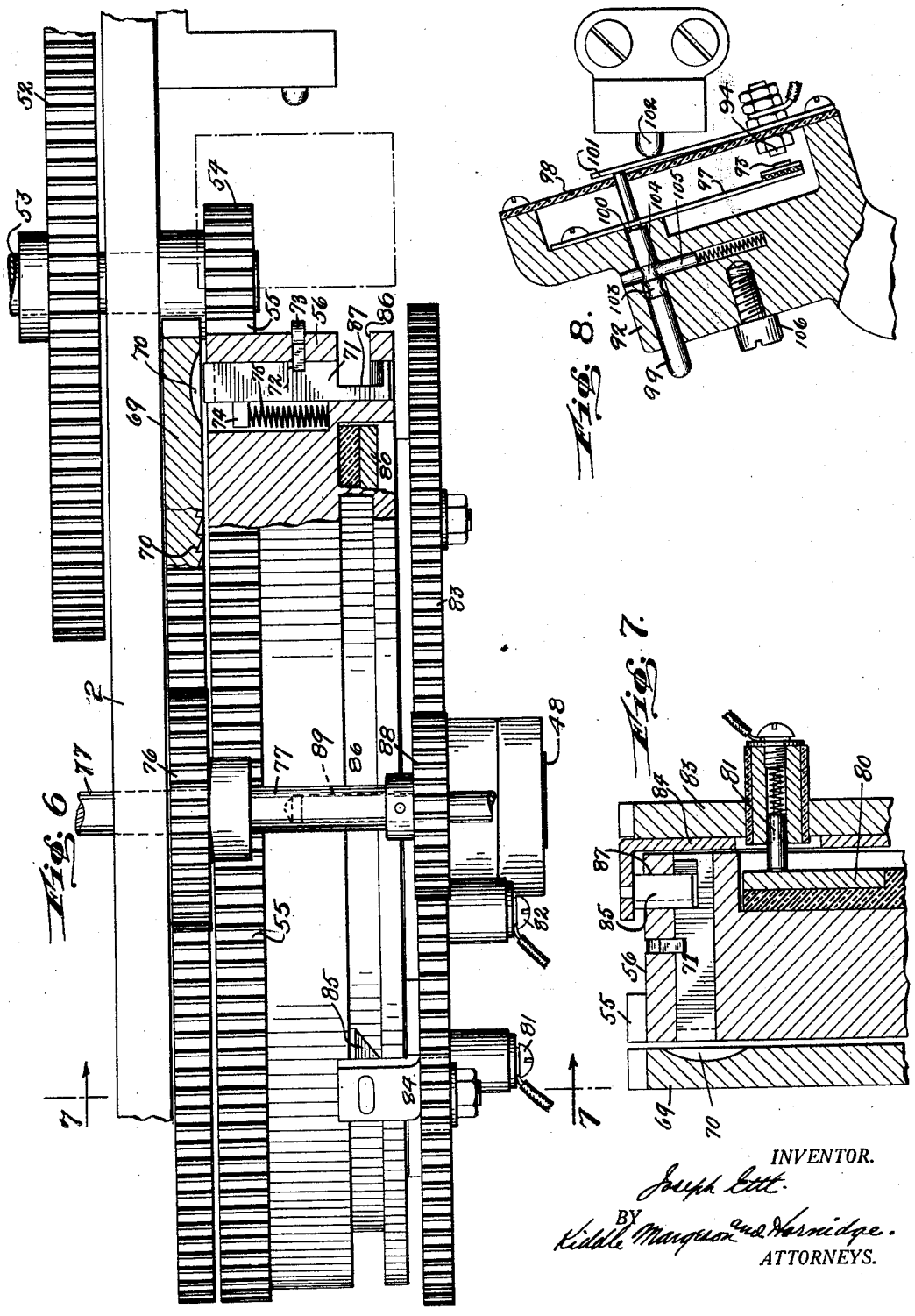


Fig. 6

Fig. 8.

Fig. 7.

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UNITED STATES PATENT OFFICE

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TAPE HANDLING APPARATUS

Application filed June 12, 1931. Serial No. 543,875.

This invention relates to an improvement in apparatus for dispensing glued paper tape and provides an improved construction in a machine in which the tape is fed to any desired length through the machine, depending upon the setting of the machine, cut off, glued and finally delivered from the machine automatically.

In the drawings:

Fig. 1 is a part sectional side elevational view of my improved machine, parts of the mechanism being shown in section;

Fig. 2 is a plan view;

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a part sectional view substantially on the line 4—4 of Fig. 1;

Fig. 5 is a view on line 5—5 of Fig. 2;

Fig. 6 is a plan view of part of the control mechanism;

Fig. 7 is a sectional view substantially on the line 7—7 of Fig. 6;

Fig. 8 is a sectional view somewhat enlarged of part of the control mechanism;

Fig. 9 is a view of the brake mechanism; and

Fig. 10 is a wiring diagram.

In general my improved machine comprises side frames 1 and 2 and frame sections 3 and 4, the latter being pivoted and held down by latches 6.

7 designates a shaft mounted in bearings in the hinged or pivoted frame members 3 and 4 and carrying a frictionally driven feed roller 8. The members 3 and 4 also carry a shaft 9 on which is mounted frictionally driven feed roller 10.

In the frames 1 and 2 are mounted a positively driven feed roller 11 cooperating with feed roller 8 and a positively driven feed roller 12 cooperating with roller 10. The feed roller 11 is intermittently rotated. The purpose of providing for pivoting of the frame members 3 and 4 is to enable the upper feed rollers 8 and 10 to be moved away from their cooperating feed rollers 11 and 12 so that the machine may be threaded.

The paper to be treated is furnished from supply rolls 13.

The frames 1 and 2 carry a shaft 14 mounting a driven gluing roller 15 cooperating with driven glue roller 16 on a shaft 17, this roller rotating in the glue or other adhesive contained in reservoir or tank 18. The paper as it goes over the top of the glue roller 15 is lifted therefrom by blades 19.

25 designates a shaft mounted in the lower side frames of the machine and carrying a doctor roller 26 engaging the periphery of the gluing roller 15.

The doctor roller 26 or rather the shaft 25 carrying the same is mounted in yielding bearings 118. The side frames of the machine are bored so as to receive rods 119 and 120.

121 designates a shaft extending transversely of the machine and this shaft which is mounted in bearings in each side frame of the machine is provided with an eccentric 122 which is in constant engagement with the rods 119 and 120. For convenience the outer end of the rod 121 is provided with an operating knob 123 the periphery of which may be notched and cooperate with a spring finger 124 so that the knob will be held in adjusted position. By rotating the knob 123 to impart rotation to the shaft 121 it will be apparent that the doctor roller 26 will be moved inwardly against the action of the springs of the bearings 25 away from the periphery of the gluing roller 15, or on opposite rotation of the knob the roller will be allowed to move toward the gluing roller 15.

Pivotally mounted on the frame of the machine is a cutter bar 28. This bar is pivoted at 29. To the outer end of this bar is attached a spring 30 the lower end of which is attached to a pin 31 mounted in side frame 1. The inner end of cutter bar 28, that is the end opposite the end of the spring 30, is provided with a rod 32 connected to operating hand lever 33. The bar 28 carries a cutter blade 34.

At the same end of the machine as the spring 30 is a bell crank lever 35 mounted on a stud 36 in the machine frame, the arm 37 of this lever extending upwardly to engage a notch 38 in the cutter bar 28. The arm 39 of this bell crank lever is attached to the armature 40 of an electromagnet 41, the movement of the armature 40 away from the poles

of the magnet being controlled by a stop 42 so that when the electromagnet is energized the arm 39 will be moved upwardly about the pivot 36 to draw the arm 37 away from the cutter bar 28 for a purpose to be hereinafter described.

The feed roller 11 which has already been referred to is carried on a shaft 43 and this shaft carries a ratchet 44 which is adapted to be engaged by a pawl 45 resiliently mounted in the arm 39, this pawl being engageable with the ratchet upon energization of the electromagnet 41. The pawl and ratchet mechanism constitutes a brake or stop for the feed roller.

The cutter blade 34 cooperates with a fixed blade or cutter bar 46 mounted in a block 47, the paper taken from the roll 13 passing between the feed rollers 8 and 11 along the top of the fixed cutter bar 46 to and between the feed rollers 10 and 12.

The motor for driving this machine is designated 50 and its armature shaft is provided with a pinion 51 meshing with gear 52 on shaft 53. The shaft 53 carries a pinion 54 meshing with gear 55 provided on a rotor or drum 56 on stud 48. The gear 55 in turn meshes with gear 57 on shaft 57′, the gear 57 in turn meshing with a gear 58 on the shaft 14 carrying the gluing roller 15. This drives the gluing roller. On this same shaft 14 is a gear 59 meshing with gear 60 on the shaft 57′ this gear meshing with gear 12′ on the shaft of the lower feed roller 12 whereby the feed roller is driven.

The shaft 25 of the doctor roll carries a gear 61 meshing with broad faced gear 62 on the end of the shaft 14. This gear 62 meshes with a gear 63 on a stub shaft 64 carrying gear 65 on its inner end meshing with gear 66 integral with glue roller 16.

The driving mechanism just described provides, as will be appreciated, apparatus for constantly driving the feed rollers 10 and 12, the gluing roller 15, glue roller 16 and the doctor roller 26 as long as the circuit of the motor 50 is closed.

The machine of this application is equipped to operate intermittently, that is to say, will run off a predetermined length of paper from the roller 13 and then stop, cut the paper off, the severed piece of paper being passed through the remainder of the machine, that is, over the gluing roller 15 to be discharged, the gluing roller and the feed rollers 10 and 12 which are between the gluing roller and the knife continuing in operation as just mentioned above until the motor circuit is opened. The mechanism whereby part of the apparatus is operated intermittently without interfering with the constant operation of the remainder of the apparatus will now be described.

The stud 48 carrying the gear 55 and rotor 56 is equipped with a gear 69 the side of which adjacent the gear 55 is equipped with ratchet teeth 70. This gear 69 is only rotated intermittently. To provide this intermittent operation of this gear the rotor 56 is equipped with a pawl 71 set into the periphery of the rotor 56. This pawl is provided with a slot 72 adapted to receive under certain conditions a pivoted locking lever or detent 73. The pawl 71 is provided with a finger 74 against which a spring 75 is constantly bearing, this spring being set into the rotor 56 as will be seen from Fig. 6. As long as the pivoted finger or locking lever 73 is in the slot 72 the pawl 71 is held inoperative position. It is shown in this position in Fig. 6. Under these conditions the spring 75 is compressed. When the locking finger or lever 73 is moved out of the slot 72 then the spring 75 functions to force the pawl 71 into engagement with the teeth or ratchet 70 on the side of the gear 69, thereby coupling the gear 69 to the gear 55 or rotor 56.

The gear 69 is in constant mesh with a gear 76 on a shaft 77. On the other end of this shaft is a gear 78 in constant mesh with gear 79 on the shaft 43 carrying the feed roller 11. Consequently rotation of the gear 69 will effect rotation of the feed roller 11 and inasmuch as the gear 69 is only rotated intermittently the roller 11 is so rotated.

The rotor 56 is provided on its face with a contact plate 80 suitably insulated from the rotor and this plate 80 is adapted to cooperate with contacts 81 and 82 carried by a gear plate 83. I might say at this point that the gear 83 is normally stationary and only is rotated to adjust the timing of the machine, as will be brought out hereinafter.

Secured to the inner side of the gear or plate 83 is a plate 84 carrying a shoe 85. This shoe is adapted to ride in a slot or groove 86 provided in the periphery of the rotor 56. This construction is indicated in Fig. 6. The shoe 85 is adapted to cooperate with a notch 87 cut in the pawl 71 and when the shoe engages this notch in the pawl the pawl will be retracted from contact with the ratchet teeth 70 on the side of the gear 69 so as to uncouple the gear 69 from the rotor 56.

The setting of the shoe 85 on the periphery of the rotor 56 as well as the setting of the contacts 81 and 82 with respect to the contact plate 80 is varied so as to vary the length of paper cut at each operation of the machine by means of a pinion gear 88 meshing with the teeth of the gear plate 83. This gear is carried on a shaft 89 operated by hand wheel 90 so that by rotating the hand wheel rotation is imparted to gear plate 83 with a corresponding change with respect to plate 80 and setting of shoe 85 with respect to the pawl 71.

The operating lever 33 which has been mentioned above and which when depressed will raise the knife 34 to its upper position, as il-

lustrated in Fig. 3, for instance, and in Fig. 9 is pivoted at 91 and at its inner end carries switch block 92. This switch mechanism comprises a pair of contacts 93, 94 and 95, 96. The contacts 93 and 95 are mounted on but insulated from a spring plate 97 in the switch block 92, the contacts 94, 96 being mounted on an insulating plate 98 carried by the same block.

Extending into this block is a switch operating pin 99 the tail end or rear end of which projects outwardly from the face of the block as shown in Figs. 1 and 8, the pin being shouldered at 100 to engage and deflect the plate 97 so as to close contact 93 on contact 94 and contact 95 on contact 96 when the pin is moved inwardly of the block. The forward end of this pin 99 projects through the insulating plate 98 and engages a resilient plate 101 carried on the face of this insulating plate. This plate 101 is adapted to engage a stop 102 mounted on the machine frame. The pin 99 is provided with two circumferential grooves 103 and 104 cooperating with a spring-pressed locking pin 105 mounted in the switch block 92, this pin being adapted to hold the switch operating pin 99 with the contacts 93 and 95 in open position as shown in Fig. 8 or in closed position as the case may be.

The rear of the switch block 92 is provided with a screw or pin 106 which is adapted to engage the tail of locking lever 73 when the lever 33 is depressed so as to move this locking lever out of its cooperating notch 72 in the coupling pawl 71. The locking lever 73 is backed by a spring 107 as shown in Fig. 1.

In operation the switches 108, 109, 110 and 111 are closed on their respective fixed contacts, see the wiring diagram of Fig. 10. This closes a circuit to the motor 50. The closing of the circuit of this motor will effect rotation of the feed rollers 10 and 12, gluing roller 15, doctor roller 26 and glue roller 16 through the driving mechanism which I have already described. The feed rollers 8 and 11, however, are at this time stationary. If the control lever 33 now be depressed the knife bar 28 and knife 34 will be raised to their up position against the action of the spring 30 to be latched in this position by the arm 37 of the bell crank lever 35. This depressing of the lever 33 will bring the screw or pin 106 into engagement with the tail of the locking detent or lever 73 to raise the other end of this detent out of the notch in the pawl 71 permitting the pawl to snap into coupling engagement with the ratchet 70 on the side of the gear 69. The gear 69 will now be driven and consequently the feed rollers 8 and 11.

The operation of the detent 73 unlocking the pawl 71 exerts a pressure on the switch operating pin 99 carried by the switch block 92 and forces the same forward from the position shown in Fig. 8 to a position where the contacts 93 and 95 are moved into engagement with fixed contacts 94 and 96. This also brings the spring plate 101 out and away from the plate 98.

The feed rollers 8 and 11 will continue to rotate as will the gear 69 until the rotor 56 has moved to such position that the shoe 85 will engage the notch 87 in the pawl 71 to uncouple the gear 69 from the gear 55 and until the contact plate 80 has engaged the fixed contacts 81 and 82. At the instant the shoe 85 disengages the clutch pawl 71 from the face of the gear 69 a circuit will be closed to the electromagnet 41. This circuit may be traced from one side of the line, conductor 112, switch 109, conductor 113, electromagnet 41, conductor 114, contact 82, plate 80, contact 81, conductor 115, contacts 96, 95, 93, 94, conductor 116, switch 108, conductor 117, to the other side of the line.

Consequently the electromagnet 41 will pull in its armature 40 to bring the detent or pawl 45 into engagement with the brake ratchet 44 on the shaft 43 of the feed roller 11 to stop the feed roller. The energizing of the electromagnet 41 will move the locking arm 37 of the bell crank 35 out of locking position with respect to the cutter bar 28 and the bar will descend under the action of the spring 30 to cut or sever the paper at the stationary knife 46 and the severed portion of the paper will be carried through the machine glued and discharged from the machine, the feed rollers 10 and 12, gluing roller 15, glue roller 16 and doctor roller 26 still rotating, the circuit of the motor 50 remaining closed.

The dropping of the cutter bar 28 raises the lever 33 to its original position, the bar being connected to this lever through the link or rod 32, as above described. Consequently the switch block 92 will be pivoted away from the face of the rotor 56, and the spring 107 will be allowed to function to move the detent 73 into locking position with respect to the clutching pawl 71. The pressure of the stop 102 on the plate 101 of the switch mechanism carried by the block 92 will force the switch operating pin 99 from the position it originally occupied with the pin 105 in the groove 103 to the position shown in Fig. 8. This opens the contacts 93, 94 and 95, 96 which in turn opens the circuit of the electromagnet 41, the armature 40 will move downwardly swinging the arm 37 of the bell crank lever 35 upwardly again into position to lock the cutter bar 28 when the same is again raised. The brake on the feed roller 11 is also released at the same time as will be appreciated.

The rotor 56, however, it will be appreciated, is still in rotation the circuit of the motor 50 having been left closed. If the lever 33 be again depressed the same cycle

of operation will be gone through as before, it being appreciated, however, that the detent or locking lever 73 will not be actuated by the pin 106 to release the clutch pawl 71 so that the feed roller 11 will again begin to rotate until the rotor 56 reaches the position shown in Fig. 1, in other words, reaches the position where the detent 73 is brought into engagement with the pin 106. Consequently if no adjustment is made the same length of paper is cut off at each operation of the knife.

If it is desired to vary the length of paper tape being cut off then the hand wheel 90 is rotated in one direction or the other to rotate the pinion gear 88, this gear rotating the gear plate 83 to vary the setting of the contacts 81, 82 with respect to the contact plate 80 and the position of the shoe 85 with respect to the time of its engagement with the notch 87 in the locking pawl 71.

What I claim is:—

1. In tape handling apparatus, the combination of tape feeding mechanism a tape cutting knife, a bell crank lever one arm of which provides a catch for holding the knife against operation, a brake for said feeding mechanism carried by the other arm of said lever and an electromagnet for actuating the lever to release the knife for operation and to simultaneously apply said brake to said feeding mechanism.

2. In tape handling apparatus, the combination of tape feeding mechanism, a brake therefor, tape cutting means, a catch for holding the tape cutting means against operation, and electrically operated means for simultaneously applying said brake to said feeding mechanism and actuating said catch to release the tape cutting means.

3. In tape handling apparatus, the combination of tape feeding mechanism, a tape cutter, a lever for holding the tape cutter against operation, pawl and ratchet mechanism for stopping the feeding mechanism, and an electromagnet for actuating said lever and pawl and ratchet mechanism to release the knife and to stop the feeding mechanism simultaneously.

4. In tape handling apparatus, the combination of tape feeding rolls, a ratchet on the shaft of one of said rolls, a knife for cutting the tape advanced by said rolls, a bell crank lever for latching the knife against operation, a pawl carried by said lever, and an electromagnet for actuating said lever to release the knife and to actuate said pawl into engagement with said ratchet to stop the feed rolls.

5. In tape handling apparatus, the combination of sets of spaced feeding rollers, a cut off knife intermediate said rollers, a motor for driving said rollers, a clutch intermediate said motor and one set of said rollers, a brake for the last mentioned rollers, a lever providing a latch for latching said knife against operation, and an electromagnet for actuating said lever to unlatch the knife and to actuate said brake, without interrupting the rotation of the other set of feed rollers, and means operative substantially simultaneously with the operation of said electromagnet to disconnect said clutch.

6. In tape handling apparatus, the combination of a rotor, a clutch pawl carried thereby, a stationary shoe adapted to be engaged by said clutch pawl to retract the same to non-clutching position, a gear adjacent said rotor adapted to be clutched thereto by said clutch pawl, a feed roller driven by said gear, and a brake for said feed roller operative to stop the feed roller upon retraction of the clutch pawl by said shoe.

7. In tape handling apparatus, the combination of a rotor, a clutch pawl carried thereby, a gear adjacent said rotor and adapted to be connected thereto by said pawl, a shoe in the path of said pawl to retract the same to non-clutching position upon predetermined rotation of said rotor, a feed roller driven by said gear, a brake for the feed roller, a manually operated detent for latching said clutch pawl in inoperative position, and electrically operated means for operating said brake substantially simultaneously with the disengagement of the clutch pawl with said gear.

8. In tape handling apparatus, the combination of a rotor, a motor for driving the same, a clutch pawl carried by said rotor, a gear adjacent the rotor and adapted to be clutched thereto by said pawl, a relatively stationary shoe in the path of said pawl for retracting the same on predetermined movement of the rotor, a feed roller driven by said gear, a brake therefor, an electromagnet for actuating said brake, contact mechanism carried by said rotor for controlling the circuit of said electromagnet, a pawl for holding the clutch pawl in inoperative position, a manual lever for actuating said last mentioned pawl to inoperative position, switch mechanism in the circuit of said electromagnet carried by said lever and moved to closed position when said lever is moved to release the clutch pawl, and stationary contact mechanism adapted to be engaged by the rotor carried contact mechanism to complete the circuit to the electromagnet upon movement of the rotor to position to actuate the clutch pawl to inoperative position.

9. In tape handling apparatus, the combination of tape cutting-off mechanism, tape feeding mechanism, a rotor, contact mechanism carried thereby, a pawl adapted to connect the feeding mechanism thereto, means for retaining said pawl out of operating position and manually operable means for releasing said pawl to connect said rotor to said feeding mechanism, means for retracting

said pawl to disconnect said rotor from said feeding mechanism, contact mechanism cooperable with the first mentioned contact mechanism, said contact mechanisms controlling said cutting-off mechanism, and means for adjusting said pawl retracting means and said second contact mechanism for varying the length of tape cut off upon operation of the cutting-off mechanism.

10. In tape handling apparatus, the combination of tape cutting-off mechanism, tape feeding mechanism, a brake therefor, a rotor, contact mechanism carried by said rotor, a pawl carried by said rotor and adapted to connect the feeding mechanism thereto, means for retaining said pawl out of operating position, manually operable means for releasing said pawl to connect said rotor to said feeding mechanism, and contacts carried by said manually operable means adapted to partially complete an electric circuit to said brake and cutting-off mechanism simultaneously upon the releasing of said pawl.

11. In tape handling apparatus, the combination of tape cutting-off mechanism, tape feeding mechanism, a brake therefor, a rotor, contact mechanism carried by said rotor, a pawl carried by said rotor and adapted to connect the feeding mechanism thereto, means for retaining said pawl out of operating position, manually operable means for releasing said pawl to connect said rotor to said feeding mechanism, contacts carried by said manually operable means adapted to partially complete an electric circuit to said brake and cutting-off mechanism simultaneously upon the releasing of said pawl, and a detent for closing said contacts simultaneously with the operation of said pawl releasing means.

12. In a tape handling apparatus, the combination of tape cutting-off mechanism, tape feeding mechanism, a rotor, contact mechanism carried thereby, a pawl carried by said rotor and adapted to connect the feeding mechanism thereto, a support, a shoe carried thereby for retracting said pawl to disconnect said feeding mechanism, contact mechanism carried by said support and cooperable with the first mentioned contact mechanism, said contact mechanisms controlling said cutting-off mechanism, said support being adjustable to vary the setting of said shoe and the second mentioned contact mechanism to vary the length of tape cut off upon operation of the cutting-off mechanism.

13. In a tape handling apparatus, the combination of tape cutting mechanism, tape feeding mechanism, a brake therefor, a rotor, an electric contact plate carried thereby, an electromagnet, an electric circuit therefor, a manually operated lever, contact mechanism carried thereby for partially closing said circuit upon operation of said lever, said contact plate completing the closing of said circuit upon predetermined rotation of said rotor for operating said electromagnet to release said cutting-off mechanism for operation and to apply said brake to stop said feeding mechanism.

14. In a tape handling apparatus, the combination of tape cutting-off mechanism, tape feeding mechanism, a brake therefor, a rotor, contact mechanism carried thereby, an electromagnet, a circuit therefor, a manually operated lever, contacts carried thereby for partially closing said circuit upon operation of said lever, said contact mechanism completing said circuit upon predetermined rotating of said rotor to energize said electromagnet to release said cutting-off mechanism and simultaneously apply said brake to said feeding mechanism.

15. In tape handling apparatus, the combination of tape cutting-off mechanism, tape feeding mechanism, a brake therefor, a rotor, contact mechanism carried thereby, an electromagnet, said contact upon predetermined rotation of said rotor closing the circuit to said electromagnet to release said cutting-off mechanism for operation and simultaneously applying said brake.

16. In a tape handling apparatus, the combination of a tape feeding mechanism, a tape cutter bar, a bell crank lever, one arm of said lever engaging said cutter bar for holding the same against operation, the other arm of said lever carrying a brake for said feeding mechanism, and electrically operated means for locking said arm to release said cutter bar for operation and for simultaneously applying said brake.

17. In a tape handling apparatus, the combination of a rotor, a clutch pawl carried thereby, a gear adjacent said rotor and adapted to be clutched thereto by said pawl, tape feeding mechanism driven by said gear, a brake therefor, a tape cutter, a stationary shoe in the path of said clutch pawl for disengaging the same from said gear, a detent carried by said rotor for latching said pawl out of engagement with said gear, electrically operated switch mechanism for simultaneously actuating said brake to stop said feeding mechanism and to release said cutter for operation, and a manually operated lever for simultaneously withdrawing said detent to release said pawl and for actuating said switch mechanism.

This specification signed this 5 day of June, 1931.

JOSEPH ETTL.