July 25, 1939. W. C. GEORGE 2,167,357

TAPING MACHINE

Filed Aug. 1, 1938 4 Sheets-Sheet 1

Fig. 1.

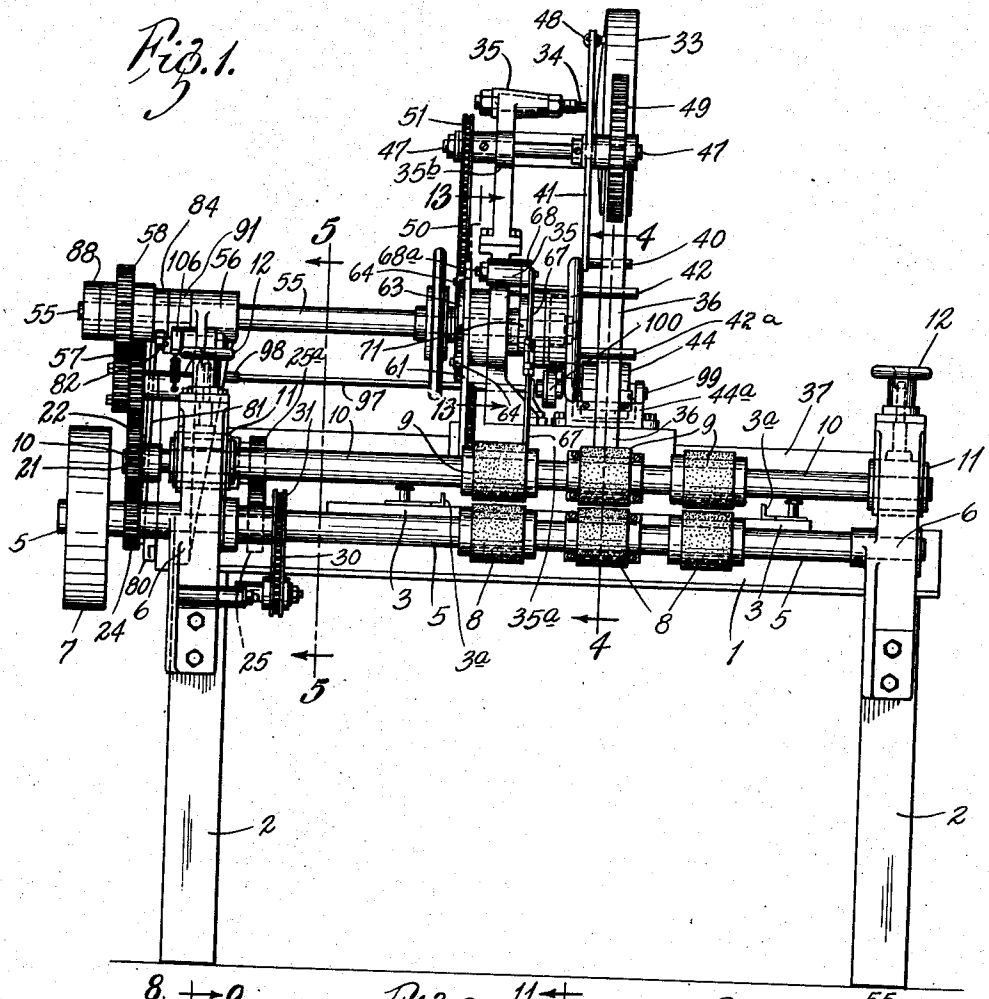


Fig. 7.

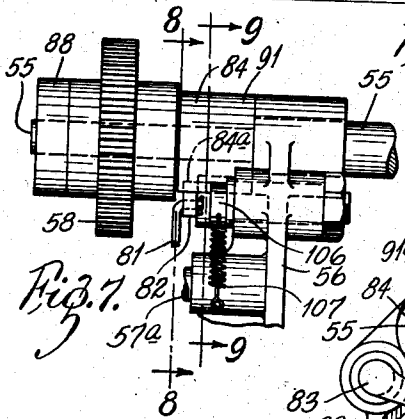


Fig. 8.

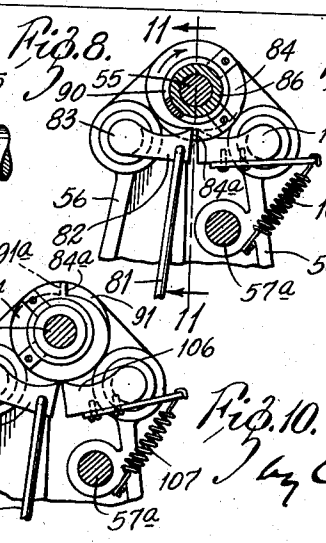


Fig. 9.

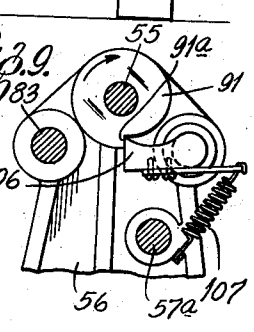


Fig. 10.

INVENTOR:
W. C. George
By Cam & Cam
& Gravely
HIS ATTORNEYS.

July 25, 1939. W. C. GEORGE 2,167,357

TAPING MACHINE

Filed Aug. 1, 1938 4 Sheets-Sheet 2

Fig. 2.

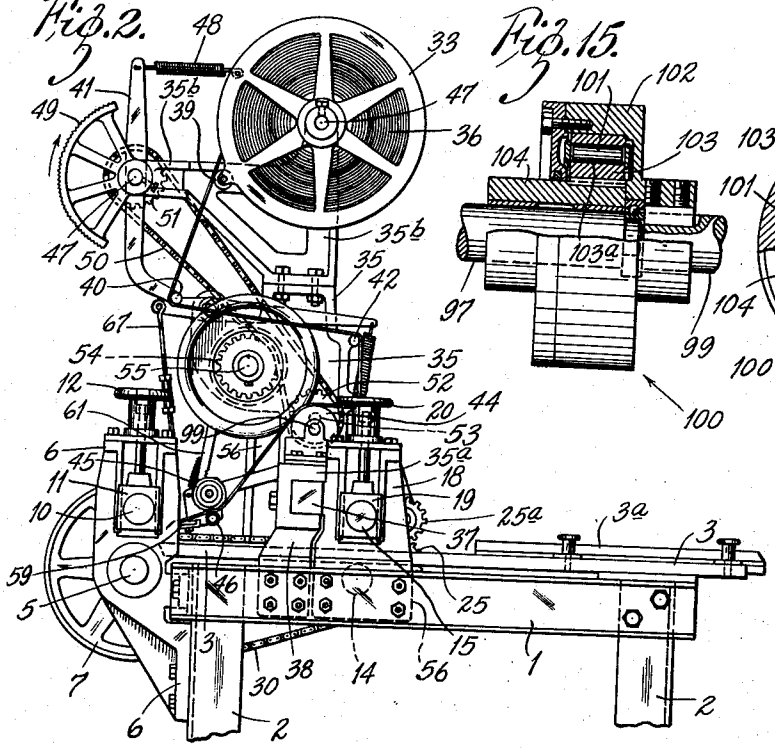


Fig. 15.

Fig. 16.

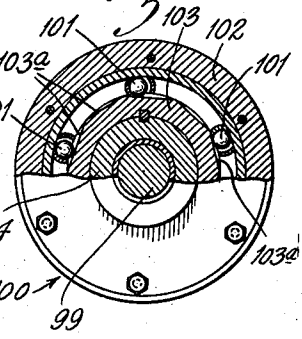


Fig. 3.

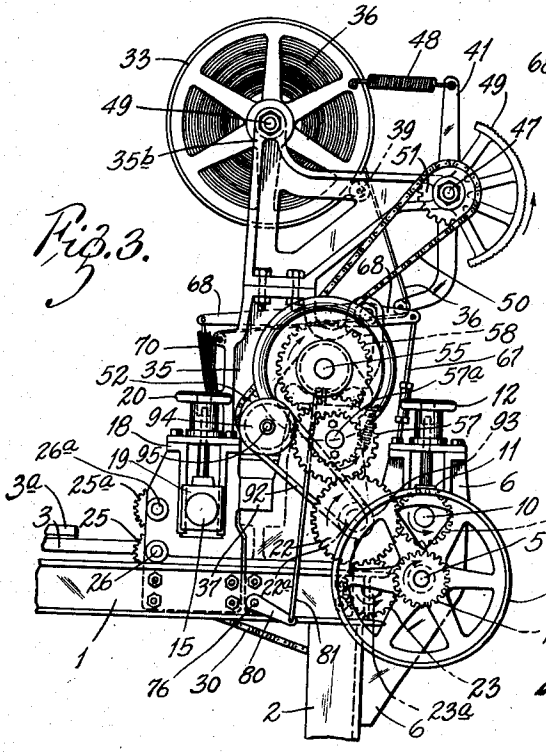
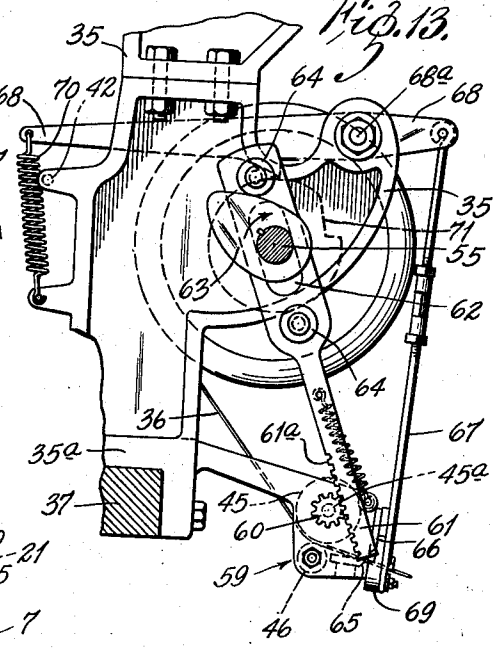


Fig. 13.



INVENTOR:

Walter C. George

by Cameron & Cameron

HIS ATTORNEYS.

July 25, 1939. W. C. GEORGE 2,167,357

TAPING MACHINE

Filed Aug. 1, 1938 4 Sheets-Sheet 3

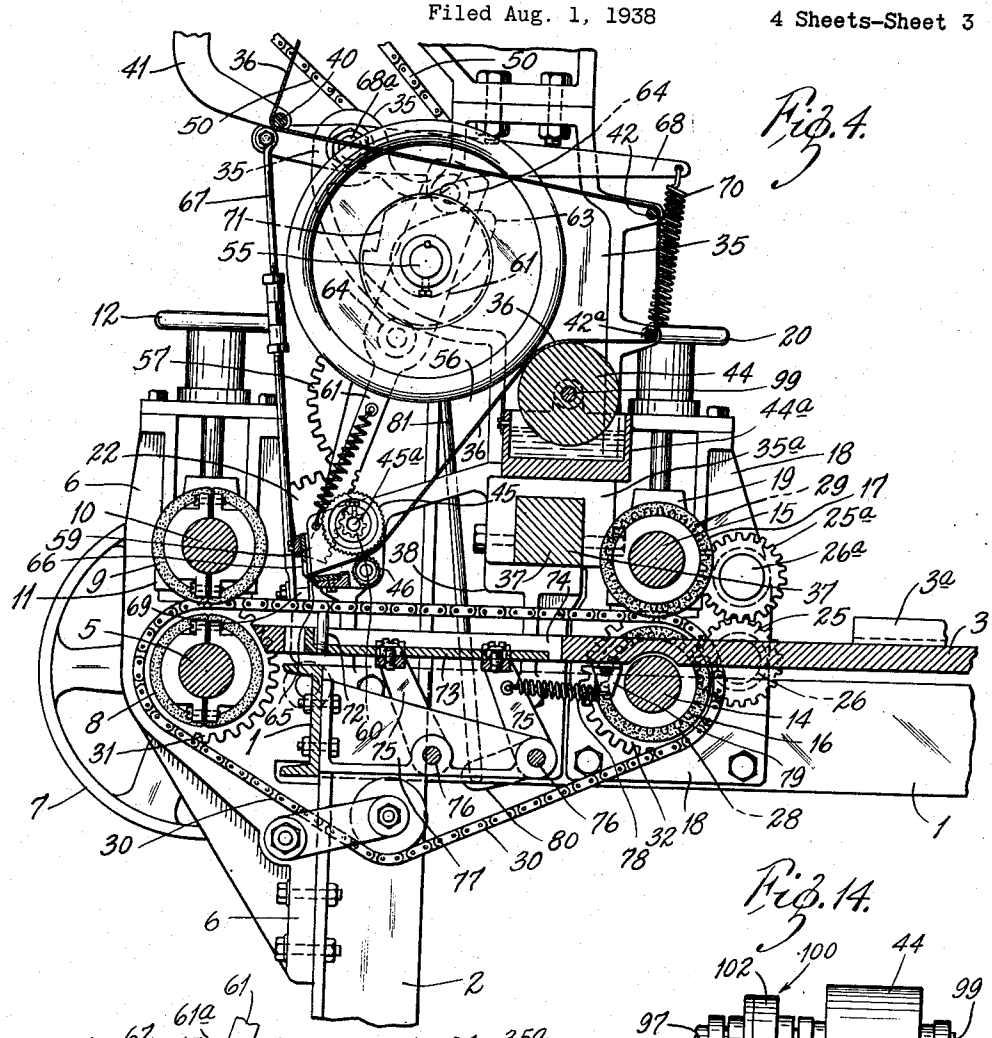


Fig. 4.

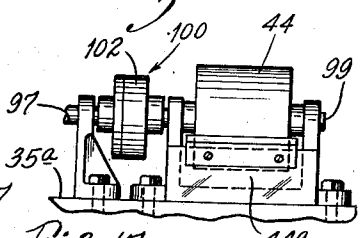


Fig. 14.

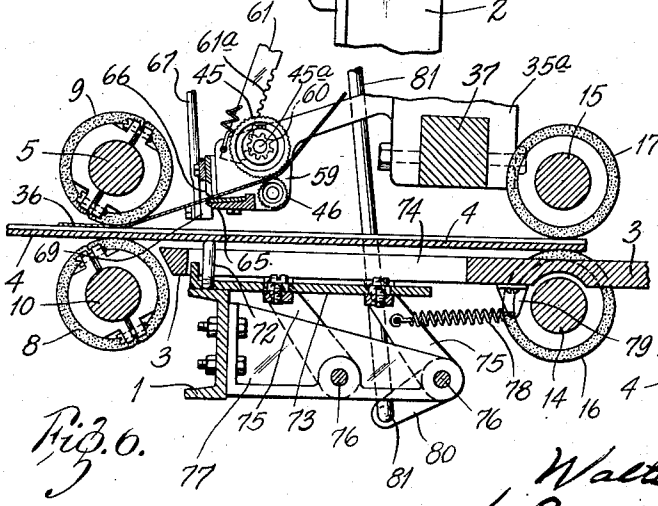


Fig. 6.

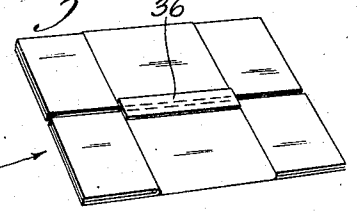


Fig. 17.

INVENTOR:
Walter C. George
by Cornet Cornet & Brady
HIS ATTORNEYS.

July 25, 1939. W. C. GEORGE 2,167,357

TAPING MACHINE

Filed Aug. 1, 1938 4 Sheets-Sheet 4

Fig. 5.

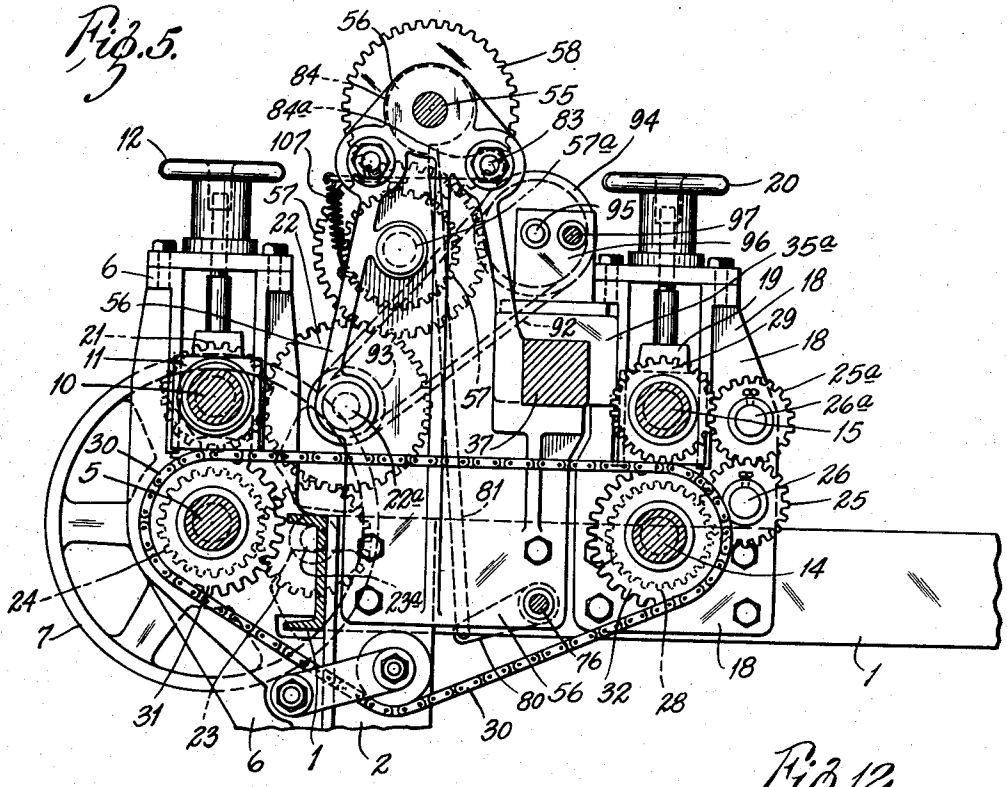


Fig. 11.

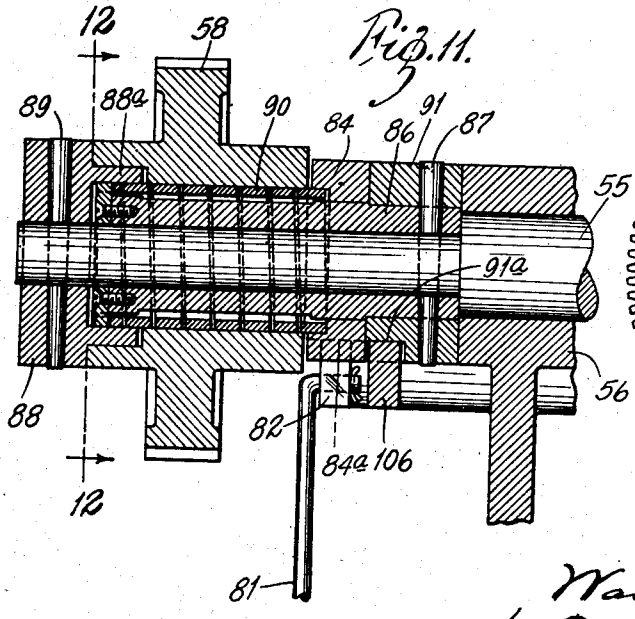
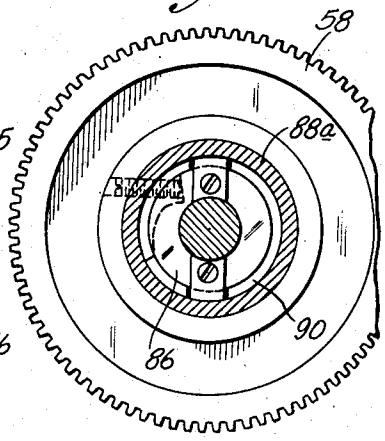


Fig. 12.



INVENTOR:
Walter C. George
by Burnett Burnett & Brumley
HIS ATTORNEYS.

Patented July 25, 1939

2,167,357

UNITED STATES PATENT OFFICE

2,167,357

TAPING MACHINE

Walter C. George, St. Louis, Mo., assignor to Gaylord Container Corporation, St. Louis, Mo., a corporation of Maryland

Application August 1, 1938, Serial No. 222,406

10 Claims. (Cl. 93—56)

This invention relates to machines for applying adhesive tape over the joints of folded fiber board containers and the like. It has for its principal objects to provide means operable by the article to be taped for automatically starting the taping mechanism; to provide for automatically stopping said mechanism upon completion of the taping cycle; to prevent the tape from sticking to the roll which applies the water or adhesive thereto; and to provide for simplicity and economy of construction. The invention consists in the taping machine and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, which form part of this specification and wherein like symbols refer to like parts wherever they occur:

Fig. 1 is a rear elevation of a taping machine embodying my invention;

Fig. 2 is a right side elevation of said machine;

Fig. 3 is a left side elevation of said machine;

Figs. 4 and 5 are enlarged fragmentary vertical longitudinal sections on the lines 4—4 and 5—5, respectively, in Fig. 1;

Fig. 6 is a fragmentary section, similar to Fig. 4, showing the tape being applied to the folded box;

Fig. 7 is a fragmentary side view of the box controlled clutch mechanism for starting and stopping the taping mechanism;

Figs. 8 and 9 are cross-sections on the lines 8—8 and 9—9, respectively, in Fig. 7;

Fig. 10 is a section similar to Fig. 8 showing the clutch in operative position;

Fig. 11 is a central longitudinal section on the line 11—11 in Fig. 8;

Fig. 12 is a cross-section on the line 12—12 in Fig. 11;

Fig. 13 is a fragmentary cross-section on the line 13—13 in Fig. 1;

Fig. 14 is a fragmentary rear elevation of the tape moistening roll and the overrunning driving clutch therefor;

Fig. 15 is a part elevational and part longitudinal sectional view of said overrunning clutch;

Fig. 16 is a part end elevation and part cross-sectional view of said overrunning clutch; and

Fig. 17 is a perspective view of the folded box with the tape applied thereto.

The accompanying drawings show my invention embodied in a machine for taping the joints of folded fiberboard boxes. Said machine comprises a table including a frame 1 provided with legs 2, a top 3 upon which the boxes 4 that are to be taped are folded by the operator and fed into a taping mechanism located at the rear end of the table, and guides for said boxes adjustable crosswise of said top. Said taping mechanism comprises a main drive shaft 5 that is disposed crosswise of the table at the rear or delivery end thereof and is journaled in suitable bearings provided therefor in brackets 6 rigid with said table at the rear corners thereof. The drive shaft 5 is provided beyond one side of the table with a drive pulley 7 and intermediate between the brackets 6 with three longitudinally spaced rubber-covered feed rolls 8 that cooperate with similar feed rolls 9 on a horizontal shaft 10 that is located directly above said drive shaft. The feed roll shaft 10 is journaled in bearing blocks 11 that may be adjusted vertically in the brackets 6 by means of hand wheels 12 to accommodate boxes of different thickness.

Located forwardly of the feed roll shafts 5 and 10 is another pair of vertically spaced feed roll shafts 14 and 15 that are provided with cooperating rubber-covered feed rolls 16 and 17, respectively, that are journaled in bearings provided therefor in brackets 18 secured to the respective side rails of the frame 1 of the table. The upper feed roll shaft 15, like the upper feed roll shaft 10, is journaled in bearing blocks 19 that are adjusted vertically in the brackets 18 by means of hand wheels 20.

The upper feed roll shaft 10 is provided with a gear 21 that intermeshes with and is driven by a gear 22 that is fixed to a stub shaft 22a journaled in a bracket 56 fixed to the right hand side rail of the frame 1 of the table. The gear 22 is driven by a gear 23 which is mounted on a stud 23a supported in the adjacent bracket 6 and is driven by a gear 24 on the drive or bottom feed roll shaft 5. The upper feed roll shaft 15 is driven from the lower feed roll shaft 14 through a train of gears including a pair of intermeshing idler gears 25, 25a journaled on studs 26, 26a fixed to one of the brackets 18, the lower gear 25 being driven by a gear 28 on the shaft 14 and the upper gear 25a driving a gear 29 on the upper shaft 15. The drive is transmitted to the forward or take-in rolls 16 and 17 by means of an endless sprocket chain 30 that passes around sprocket wheels 31 and 32 fixed to the drive shaft 5 and lower, forward feed roll shaft 14, respectively. By this arrangement, the folded box 4 is drawn into the taping mechanism by the front feed or take-in rolls 16 and 17 and is discharged therefrom by the rear feed rolls 8 and 9 with the joint that is to be taped in line with the middle feed roll of each feed roll shaft.

Enclosed in a hollow cylinder cage 33 fixed to a non-rotary spindle 34 that projects from an upright 35 is a roll 36 of tape that is mounted for rotation on said spindle. The base portion 35a is suitably secured to a bar 37 that extends from side to side of the table above the top thereof with its ends supported in brackets 38 fixed to the side rails of the frame 1 of said table. The tape, upon leaving the roll, passes over a guide roller 39 journaled on the roll cage 33, thence downwardly beneath a guide pin 40 fixed to the lower end of an upright lever 41, thence forwardly over a guide pin 42 on the upright 35, thence downwardly beneath a second guide pin 42a fixed to said upright, thence rearwardly over a moistening roll 44, and thence rearwardly and downwardly between a pair of feed rolls 45 and 46. The moistening roll 44 is journaled for free rotation by the tape in a reservoir 44a mounted in the pedestal 35a of the upright 35. This reservoir is adapted to contain water, if the tape is adhesive, or a liquid adhesive, if the tape is plain. The lever 41 is mounted on a shaft 47 journaled in a rearward extension 35b of the roll supporting upright 35; and a tension spring 48 has one end connected to the upper end of said lever and its other end anchored to the roll cage or case 33, whereby said lever draws the tape taut. The shaft 47 is also provided with a sector-shaped member 49 which is adapted to wipe across the roll 36 to draw from the roll of tape a length corresponding to the length required for covering the joint in the box. This wiper supporting shaft 47 is driven by an endless sprocket chain 50 which passes around a sprocket wheel 51 fixed to said shaft and an idler sprocket wheel 52 fixed to a shaft 53 journaled in the upright 35. One stretch of this sprocket chain intermeshes with and is driven by a sprocket wheel 54 fixed to a horizontal cam shaft 55, one end of which is journaled in the bracket 56 and the other end of which is journaled in the upright 35. The cam shaft is driven from the continuously rotating gear 22 through a double gear 57 journaled on a stub shaft 57a supported on the bracket 56 and a gear 58 on said cam shaft.

The tape feeding rolls 45, 46 are mounted in a head 59 formed on the upright 35, the roll 45 being fixed to a shaft 45a having a pinion 60 thereon that is driven by a rack 61a formed on the lower end of a bar 61. The upper end of this bar has an elongated slot 62 therein through which the cam shaft 55 extends and said bar is reciprocated by an edge cam 63 that is fixed to said shaft and cooperates with cam rollers 64 journaled on said bar above and below said shaft. The tape feeding device also includes a tape cut-off mechanism including a fixed knife 65 and a movable knife 66 that is actuated by a rod 67 whose upper end is attached to one end of a cam lever 68 that is journaled for vertical swinging movement on a stub shaft 68a that projects horizontally from the upright 35, and whose lower end is pivoted to one end of a lever 69 that is fulcrumed on the head 59 and has its other end pivotally connected to the knife 66. The other end of the cam lever has one end of a tension spring 70 attached thereto whose other end is anchored to the upright 35. This spring holds the cam lever 68 in engagement with an edge cam 71 fixed to the cam shaft 55. By this arrangement, the cam lever 68 is actuated to move the knife 66 to cut-off position whenever said lever is in engagement with the drop of the tape cut-off cam 71.

By the arrangement described, the folded box is drawn into the machine by the front feed rolls and is discharged therefrom by the rear feed rolls. During the passage of the box through the machine, the tape is drawn from the roll 36 by the pre-feeding sector 49 and is drawn by the rack operated feed rolls 45, 46 over the moistening roll 44 and fed out of the feeding head 59 onto the upper surface of the box 4 over the joint therein. The tape is pressed down over the joint by the discharge rolls; and when the tape has covered the joint throughout its entire length, the movable knife 66 is actuated by the cam 71 to cut off the tape.

The above described taping mechanism is automatically started by the movement of the box 4 through the front and rear pairs of feed rolls. The mechanism for starting the taping mechanism preferably comprises a trip in the form of a vertically disposed pin 72 mounted on a horizontal plate 73 working in a vertical opening 74 provided therefor in the table top 3. This plate is pivotally supported on the upper ends of parallel links 75 whose lower ends are pivotally supported on a pair of horizontal shafts 76 that are journaled in bearings provided therefor in a bracket frame 77 secured to the rear rail of the table. A coiled tension spring 78 has one end secured to one of the links 75 and the other end anchored to a bracket 79 fixed to the underside of the table top 3. This spring serves to yieldably hold the plate 73 in its uppermost position with the pin 72 thereon disposed in the path of travel of the box as it advances through the feed rolls. This shaft is also provided with the rock arm 80 whose free end is pivotally connected to the lower end of a link 81, the upper end of which is pivotally connected to the free end of a pawl 82 that is pivoted, as at 83, on the bracket 56 for vertical swinging movement towards and away from the shaft into and out of the path of a shoulder 84a on a collar 84 that forms one element of a normally disengaged coil friction clutch for connecting the continuously rotating gear 58 with the cam shaft 55. The remaining elements of said clutch comprise a sleeve 86 which is pinned on the cam shaft 55, as at 87, and rotatably supports the collar 84, a collar 88 secured by a pin 89 to the outer end of said shaft and having an annular flange 88a forming a bearing for the hub of the gear 58, and a helical coil spring 90 interposed between said sleeve and the hub of said gear with one end anchored to said sleeve and the other end anchored to said collar. The spring is held in compressed position free of the hub of the gear 58 by the engagement of the pawl 82 and, when released by said pawl, expands into engagement with the hub of said gear and thus transmits the drive to the cam shaft 55. A second pawl 105 is also pivoted to the bracket 56 and is held by a spring 107 in engagement with the shoulder 91a of the collar 91 that is secured to the sleeve 86 by the pin 87 and serves as a safety brake for the clutch.

By this arrangement, when the box operated pin 72 is in raised position, the clutch operating link 81 is also raised and the spring 90 is tightened whereby the gear 58 rotates without imparting any rotary movement to the cam shaft 55. When, however, the pin 72 is depressed by the engagement therewith with the underside of a box passing through the feed rolls, the link 81 is pulled downwardly thereby freeing the pawl 82 controlled thereby from the shoulder 84a of the clutch spring collar 84, with the result that that clutch

spring 90 expands into contact with the hub of the rotating gear 58 and thereby transmits the rotary motion of said gear to the cam shaft 55. Rotation of this shaft puts the taping mechanism into operation and this operation continues until the collar 84 makes one complete revolution, whereupon the pawl 82 is again engaged by the shoulder 84a on said collar, which engagement prevents further rotation of said collar and causes the spring to tighten and free itself from driving engagement with the hub of the gear 58. When the spring is thus freed from the hub of the gear, rotation of the cam shaft 55 ceases, thus stopping the operation of the taping mechanism. This cycle of events is repeated each time a box is fed into the machine.

The moistening roll 44, which is driven by the movement of the tape thereover during the taping cycle, is also driven in the inoperative position of the taping mechanism. This drive comprises an endless belt 92 that passes around a pulley 93 fixed to the continuously rotating stub shaft 22a and a pulley 94 fixed to a shaft 95 that extends into a suitable speed reducing gear box 96 mounted on the bracket 56. A shaft 97 has a universal joint connection 98 with the take-off shaft of speed reducer 96 and is connected to the shaft 99 of the moistening roll 44 by an overrunning clutch 100. This clutch comprises rollers 101 interposed between the peripheral rim of the clutch casing 102 and the flat peripheral faces 103a of a ring or collar 103 keyed to a sleeve 104 that rotates with the shaft 99. With this arrangement, when the roll 44 is rotated at a higher speed than its flat faced driving collar 103, as when the tape is being drawn over the roller by the feed rolls 45, 46, the rollers 101 are are inoperative and said roll rotates independently of said driving collar. When, however, the roll 44 is not driven by the movement of the tape thereover, the driving collar 103 continues to rotate, thus clamping the rollers 101 between said collar and the rim of the clutch casing 102 and causing said collar and casing to rotate together at the same speed. By this arrangement, when the taping cycle has been completed and the tape moistening roll is not being rotated by the tape, the roll continues to slowly rotate and thus prevents the tape from sticking thereto and inerfering with the operation of the machine when the taping mechanism is again started.

Obviously, the hereinbefore taping machine admits of considerable modification without departing from the invention. Therefore, I do not wish to be limited to the precise construction shown and described.

What I claim is:

1. In a machine of the kind described, an intermittently operated tape feeding mechanism, a tape moistening roll in continuous contact with said tape in both operative and inoperative positions of said mechanism, a power driven shaft, and a clutch connection between said shaft and said roll adapted to permit rotation of said roll relative to said shaft by engagement of the moving tape with said roll and to positively rotate said roll in the stationary position of the roll engaging portion of said tape to thereby prevent said portion of said tape from sticking to said roll in such stationary position.

2. In a machne of the kind described, a tape feeding mechanism, a continuously operating drive means therefor, a normally disengaged clutch for operatively connecting said tape feeding mechanism to said drive means to be actuated thereby, means operable during the passage through said machine of the article to be taped for actuating said clutch to operatively connect said drive means with said tape feeding mechanism, a tape moistening roll adapted to be rotated by engagement of the moving tape therewith and a connection between said roll and said drive means for rotating said roll during the disengaged position of said clutch.

3. In a machine of the kind described, a tape feeding mechanism, continuously rotating feed roll for the article to be taped, a normally disengaged clutch operable by the passage through said machine of the article to be taped for operatively connecting said tape feeding mechanism to said feed roll to be actuated thereby, a tape moistening roll adapted to be rotated by engagement of the moving tape therewith and an operative connection between said feed roll and said moistening roll for rotating the latter during the idle position of said tape feeding mechanism.

4. In a machine of the kind described, a tape feeding mechanism, a continuously driven feed roll, two gears driven thereby, a normally disengaged clutch operable by the passage through said machine of the article to be taped for operatively connecting said tape feeding mechanism to one of said gears to be actuated thereby, a tape moistening roll adapted to be rotated by engagement of the moving tape therewith and an operative connection between said roll and the other gear for rotating said roll during the idle position of said tape feeding mechanism.

5. In a machine of the kind described, continuously rotating power driven rolls for feeding the article to be taped, mechanism for applying the tape to the article being fed by said feed rolls, a normally disengaged clutch for operatively connecting said tape feeding mechanism to said roll driving mechanism, and means operably connected to said clutch and operable by the article being fed through said machine for engaging said clutch, said means comprising a pen extending upwardly into the path of the article being fed, downwardly yieldable means located entirely below the level of said article for supporting said pin in the path of said article and an operative connection between said supporting means and said clutch, whereby said clutch is engaged when said pin is depressed by said article and is disengaged at a predetermined point in the rotary movement of said clutch.

6. In a machine of the kind described, continuously rotating power driven rolls for feeding the article to be taped, mechanism for applying the tape to the article being fed by said feed rolls, a clutch connecting said tape feeding mechanism to said drive mechanism, and means operable by the article being fed through said machine for engaging said clutch, said means comprising a pin disposed in the path of the article being fed, a plate for supporting said pin, a pair of parallel arms pivoted to said machine and having their free ends pivotally connected to said plate, means for yieldably holding said pin in the path of said article, and a connection between said arms and said clutch, whereby said clutch is engaged when said pin is depressed by said article and is disengaged at a predetermined point in the rotary movement of said clutch.

7. In a machine of the kind described, continuously rotating power driven rolls for feeding the article to be taped, mechanism for applying the tape to the article fed by said feed rolls, a clutch for operatively connecting said tape applying

mechanism to said drive mechanism, a pin disposed in the path of the leading edge of the article being fed, a plate for supporting said pin, a pair of parallel arms pivoted to said machine and having their free ends pivotally connected to said plate, an arm movable with one of said arms, a spring for yieldably holding said pin in the path of said article, and a connection between said last mentioned arm and said clutch, whereby said clutch is engaged by the engagement of the article with said pin and is automatically disengaged upon completion of a complete cycle of said tape applying mechanism.

8. In a machine of the kind described, a tape feeding mechanism, a continuously operating drive means therefor, a normally disengaged clutch for operatively connecting said tape feeding mechanism to said drive means to be actuated thereby, means for actuating said clutch to operatively connect said drive means with said tape feeding mechanism, a tape moistening roll in contact at all times with said tape and adapted to be rotated by engagement of the moving tape therewith, and a connection between said roll and said drive means for rotating said roll during the disengaged position of said clutch to prevent the stationary tape from sticking to said roll.

9. In a machine of the kind described, a tape feeding mechanism, a continuously rotating feed roll for the article to be taped, a normally disengaged clutch for operatively connecting said tape feeding mechanism to said feed roll to be actuated thereby, a tape moistening roll adapted to be rotated by engagement of the moving tape therewith, and an operative connection between said feed roll and said moistening roll for rotating the latter during the idle position of said tape feeding mechanism.

10. In a machine of the kind described, a tape feeding mechanism, a continuously driven feed roll, two gears driven thereby, a normally disengaged clutch for operatively connecting said tape feeding mechanism to one of said gears to be actuated thereby, a tape moistening roll adapted to be rotated by engagement of the moving tape therewith, and an operative connection between said roll and the other gear for rotating said roll during the idle position of said tape feeding mechanism.

WALTER C. GEORGE.