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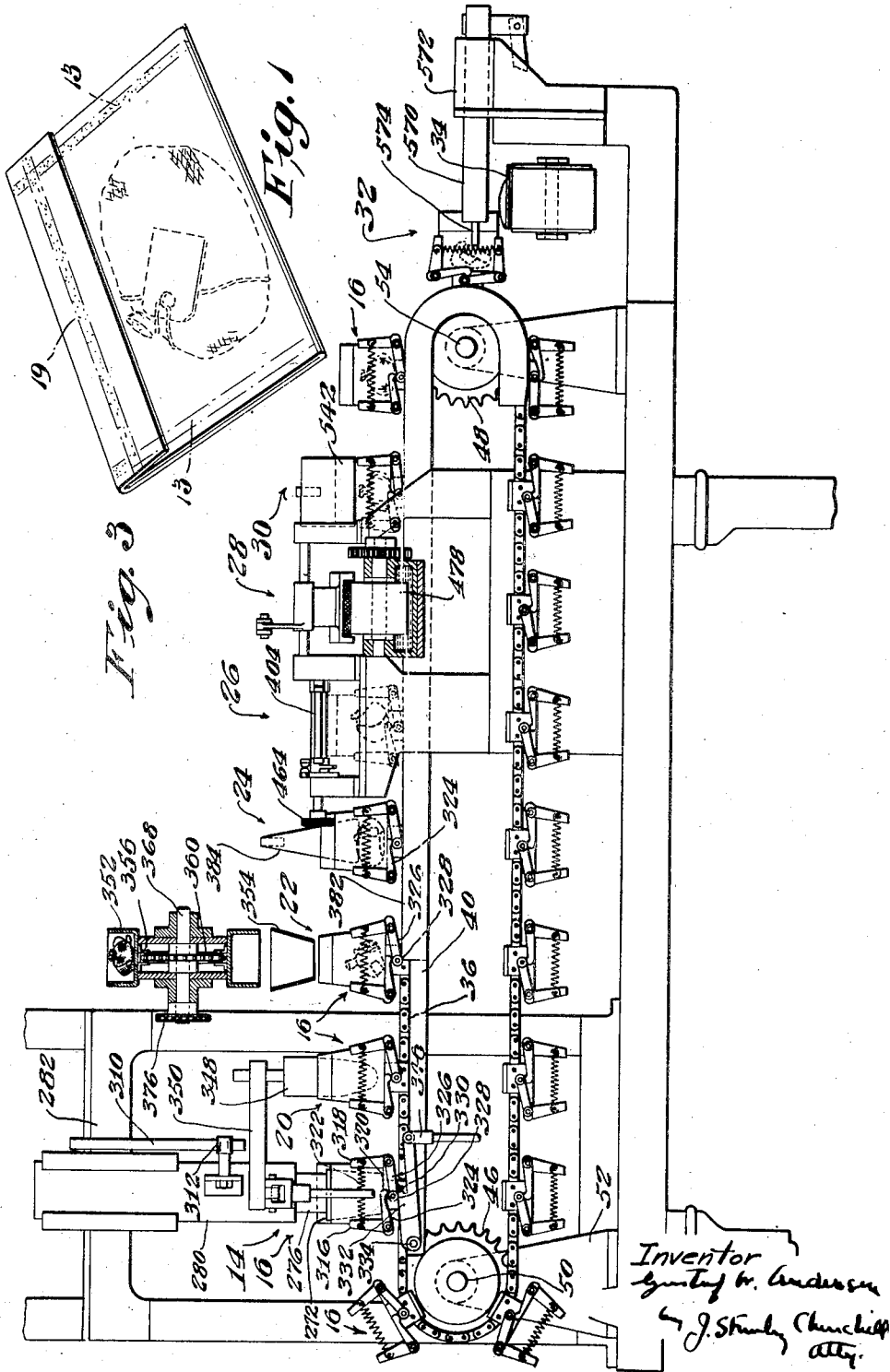
G. W. ANDERSON

2,311,017

ENVELOPE MACHINE

Original Filed Dec. 5, 1936

4 Sheets-Sheet 1



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ENVELOPE MACHINE

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4 Sheets-Sheet 2

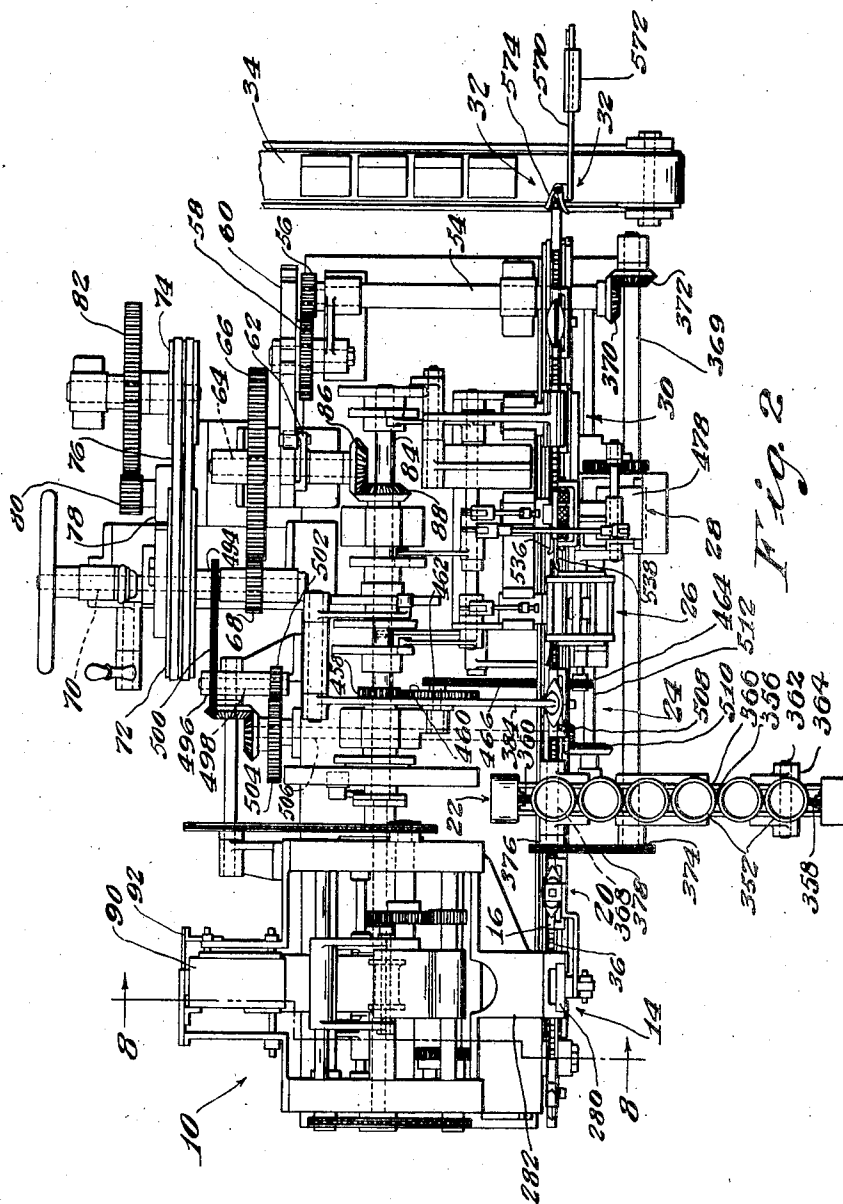


Fig. 2

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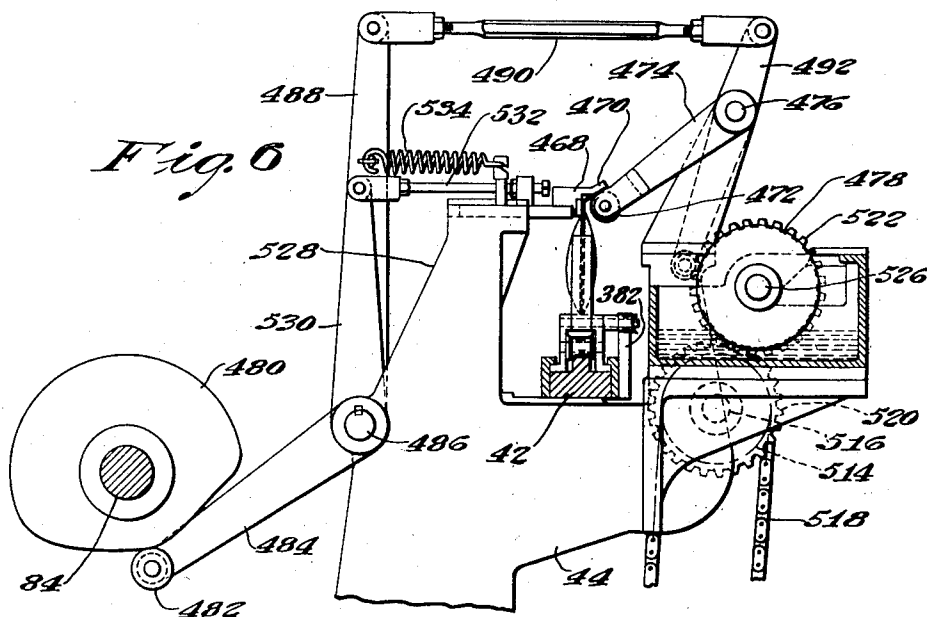
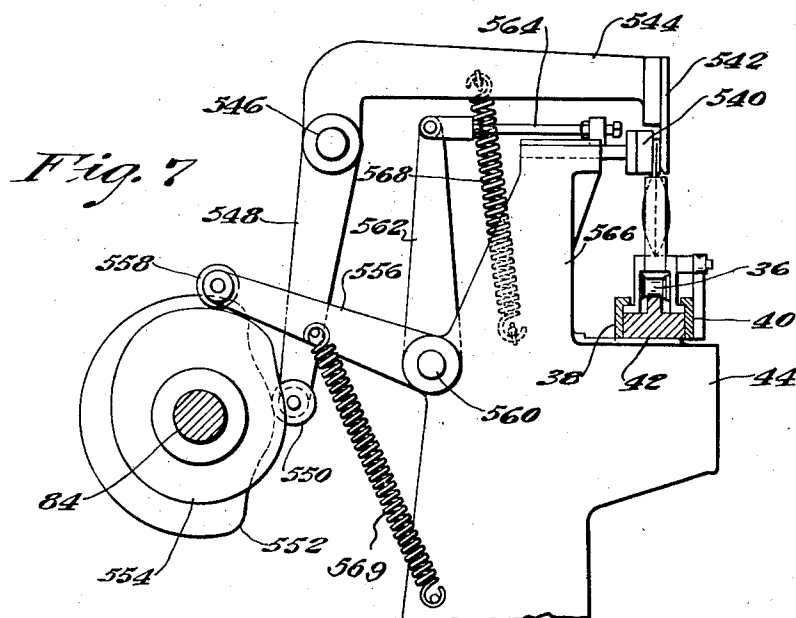
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## UNITED STATES PATENT OFFICE

2,311,017

## ENVELOPE MACHINE

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Original application December 5, 1936, Serial No. 114,422. Divided and this application January 10, 1940, Serial No. 313,186

6 Claims. (Cl. 226—56)

This invention relates to an envelope machine and more particularly to a machine for inserting an article in an envelope.

In general, the object of the invention is to provide a novel and improved machine of the character specified in which provision is made for handling, filling and closing successive envelopes in a novel and improved manner and by a novel and positively operated mechanism.

With this object in view and such others as may hereinafter appear, the invention consists in the envelope machine, in the forming, filling, closing and sealing machine for envelopes and in the various structures, arrangements and combination of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a perspective view of an envelope with a tea-bag inserted therein; Fig. 2 is a plan view of the machine embodying the present invention; Fig. 3 is a diagrammatic view in front elevation of the machine; Fig. 4 is a view in side elevation of the mechanism for folding the sealing flap of the envelope; Fig. 5 is an enlarged detail of part of the mechanism shown in Fig. 4; Fig. 6 is a view in side elevation of the sealing flap adhesive applying mechanism and Fig. 7 is a side elevation of the press mechanism for firmly setting the sealing flap.

For purposes of illustration the different features of the invention have been illustrated as embodied in a machine for inserting individual tea bags into individual envelopes.

Heretofore it has been the general practice to supply the trade with commercial tea bags packed loosely or in bulk in cartons which after being opened are subject to contamination by dust or other particles in the air, or by handling. To overcome this objection the present invention contemplates a machine for packing the tea bags in individual envelopes of "Glassine" or similar paper to the end that the tea bags are fully protected both in transit and in storage from contamination and are delivered to the customer in a pure and sanitary condition. Inasmuch as the tea bag must be deposited bodily into the tea pot or cup of hot water to brew the tea, the cleanliness of the material in which the tea is packed is an important factor and the individually packaged tea bag is greatly preferred by patrons of the better hotels and restaurants.

Referring now to the drawings which illustrate the different features of the invention as embodied in a unitary machine for forming, filling,

closing and sealing envelopes, the machine in general comprises an envelope forming section 10 which deposits the formed envelopes into a magazine, not shown, from which the envelopes are extracted individually by a stripping mechanism generally indicated at 14. The stripping mechanism deposits the envelopes into pockets or holders 16 carried by an endless chain 36 and provision is made for intermittently moving the conveyer chain to present the envelope to succeeding stations. As herein illustrated, after leaving the stripper station 14 the open envelope is delivered to a plunger station 20 where the mouth of the envelope is shaped or rounded out to facilitate the insertion of an article into the envelope at station 22. The envelope is then delivered to station 24 where the article, which has been loosely dropped into the envelope, is thrust deeper into the envelope to permit the operations of folding the top flap at station 26, and applying adhesive to the flap at station 28. The flap is then firmly pressed to seal the envelope at station 30 and thereafter the sealed envelope is moved into an ejecting station herein shown at 32 where the filled and closed envelope is discharged from the machine to be carried away on an outgoing conveyer 34.

The above mechanisms are all correlated and timed to operate in their proper relationship with respect to each other and to the envelope as it progresses through the machine in the pocket or holder 16. As illustrated herein the pocket 16 comprises one of a series of such pockets operatively supported upon the conveyer chain 36 and provision is made for intermittently moving the conveyer chain to present the pocket to succeeding stations. The conveyer chain 36 runs in guides 38, 40, operatively supported upon frame members 42 secured to the platen 44 of the machine. The conveyer chain 36 is arranged to run over sprockets 46, 48 and the sprocket 46 is loosely mounted on a stud 50 secured to a bracket 52 fastened to the platen or frame 44 of the machine. The sprocket 48 is fast on a shaft 54 and is arranged to be driven by mechanism including cooperating gears 56, 58 and the usual Geneva driving members, Geneva wheel 60 and Geneva driving arm 62. The Geneva driving arm is fast on a shaft 64 which is provided with a gear 66 which is driven by a gear 68 fast on a driving shaft 70. The driving shaft 70 is provided with a pulley 72 which is connected to a pulley 74 by a belt 76. The pulley 74 is connected to a motor 78 through reduction gearing 80, 82.

A shaft 84, driven from the driving shaft 64

through cooperating bevel gears 86, 88, comprises the cam shaft upon which are mounted the various cams for operating the mechanisms above referred to and it will be observed that the cam shaft 84 is driven with continuous uniform motion while the conveyer chain 36 carrying the holders 18 for operatively supporting the envelopes is driven with a step by step intermittent motion and the various cams on the shaft 84 are so designed as to cause the operations referred to to be performed while the envelope and the conveyer pockets 16 are at rest.

The mechanism for forming the envelope from a blank sheet may comprise any usual or preferred mechanism, not shown, adapted to receive the blank sheets from a stack 90 thereof supported in a magazine 92, and to feed the blank sheets through adhesive applying mechanism operative to apply adhesive along the marginal edges 13 of the sheet whereupon the latter is folded to present the adhesive coated surfaces together so that a flat envelope with an extended flap is produced. The envelopes thus produced are then guided into a magazine, not shown, where a sufficient quantity of the envelopes are stacked to permit the adhesive to set before being withdrawn from the magazine by the stripper mechanism 14. The stacked envelopes are arranged to be withdrawn individually and successively from the forward end of the magazine and deposited into successive pockets 16. As herein illustrated, the stripping mechanism 14 comprises a blade 272 secured to an arm 276 carried by a vertically reciprocated slide bar 280 mounted in a bracket 282. In operation, the blade 272 is inserted into the foremost envelope and then given an outward and descending motion to withdraw the envelope from the stack. The arm 276 may be pivotally mounted on the vertically reciprocated slide bar 280 and is arranged to be rocked outwardly to provide the withdrawing movement by a stationary cam piece 310 cooperating with a cam roll 312, as illustrated in Fig. 3.

Referring now to Fig. 3 it will be observed that the stripping station 14 operates to deposit successive envelopes into successive pockets 16, and, as herein shown, each pocket 16 comprises a pair of fingers 316, 318, which are provided with V grooves to hold the envelopes. The fingers 316, 318 are pivotally mounted in a base section 320 and are normally urged toward each other by a spring 322. The fingers are provided with arms 324, 326, one of which 326 is provided with a cam roll 323, the other arm 324 resting against the arm 326 in cooperating relationship. It will be noted that the fingers are normally held in an angular position in order to bulge out or open the mouth of the envelope to facilitate the reception of the tea bag or other article, the fingers being limited in their inward movement by a pin 330 extending from the conveyer chain and which engages the arm 326 of the pocket. However, in order to insert the envelope into the pocket at the stripping station 14, the fingers 316, 318 are arranged to be spread to a vertical or perpendicular position by a cam piece 332 which is pivoted at 334 and which is arranged to be rocked into engagement with the cam roll 323 on the arm 326. The cam piece 332 may be rocked by a link 346 which may be connected to a cam, not shown, arranged to effect opening and closing of the fingers in timed relation to the stripping mechanism 14. Through the connections as described the cam piece 332 is rocked to spread the

fingers at the time the stripper blade 272 is about to descend to insert an envelope and after the stripper blade 272 has been withdrawn the cam piece is again rocked to permit the fingers to open the mouth of the envelope. In order to insure the mouth of the envelope being wide open to receive the article to be inserted a plunger 348 is provided at the next station 20 which is operated by the stripper blade slide bar 280 being secured to the latter by a connecting member 350 and operating simultaneously therewith. As herein shown the plunger 348 enters the envelope as the stripper descends and is withdrawn on the return stroke.

The pocket and the envelope are now advanced to station 22 where the envelope is to receive the article which is to be enclosed. Referring now to Figs. 2 and 3, the article, herein shown as a commercial type of tea bag, is delivered to the envelope from a cup 352 being guided into the envelope by a funnel 354. The cup 352 comprises one of a series of such cups operatively supported upon a chain 356 and provision is made for intermittently moving the chain to deposit the tea bags into successive envelopes. The chain 356 is arranged to run over sprockets 358, 360, and the sprocket 358 is fastened to a shaft 362 running idle in its bearings 364 in the frame member 366. The sprocket 360 is fast to a shaft 368 and is arranged to be driven from the intermittently driven shaft 54 through bevel gears 370, 372, fast on the shafts 54, 369, respectively. A sprocket 374 fast on the other end of the shaft 369 is connected to a sprocket 376 on the shaft 368 by a chain 378. In operation, the tea bags are delivered to the cups 352 from a tea bagging machine or they may be dropped into the cups manually and during the intermittent movement of the chain 356 the cups 352 are inverted to drop their contents into the envelopes. During the movement of the cups 352 around the sprocket 360 the articles are retained in the cups by a curved retaining member (not shown) until the cup reaches the guide funnel 354. It will be noted that the fingers 316, 318 are arranged to be spread slightly after leaving the article inserting station 14 in order to permit the top of the envelope to be operated upon to fold and seal the flap in a substantially parallel or contacting position. As herein shown this movement of the fingers is effected by the cam roll 328 which rides up on a stationary cam piece 382 attached to the chain guide 40.

The envelope with its tea bag, loosely dropped into it is now presented to station 24, see Fig. 3, where the article is thrust deeper into the envelope by a cam operated pusher member 384.

The envelope is now advanced to station 26 where provision is made for folding down the flap 17 of the envelope and as best shown in Figs. 4 and 5 the envelope is gripped at its upper end, below the line where the fold is to be made, by a slide member 400 on one side and an angular creasing member 402 on the other side. The flap is arranged to be folded over the creasing member 402 by a yieldingly mounted roll 404 which during the operation of the machine, is guided in back of the flap by a concave section 406 of the slide member 400 until it reaches the flap and upon continued movement of the roll 404 the flap is yieldingly creased over the member 402. The slide member 400 is arranged to be reciprocated in a bracket 408 by connections from a cam 410, fixed to the cam shaft 84, including a cam roll 412, mounted in a lever 414

which is fixed to a rocker shaft 416, a second lever 418 also fixed to the shaft 416 and a link 420. A spring 422 holds the cam roll 412 in contact with its cam 410, and through the connections described the slide member is pushed forward to grip the envelope and withdrawn to permit a succeeding envelope to enter. The creasing member 432 which is pivotally mounted on a shaft 424 is arranged to be rocked in timed relation and in cooperation with the slide member 400 by a cam 426 fast on the cam shaft 84. The connecting linkage includes a cam roll 428, levers 430, 432, link 434 and an arm 436 attached to the creasing member 432. A spring 438 holds the cam roll 428 against its cam 426.

The folding roll 404 is one of a set of two which are similarly mounted on the ends of a two armed lever 440. The two armed lever 440 is arranged to rotate on its axis so that each roll 404 operates on alternate envelopes. As herein illustrated the rolls are mounted on one arm 442 of a three armed lever which is pivotally mounted to the two armed lever 440 above referred to. A second arm 444 is provided with a spring 446 which normally urges a third arm 448, provided with a roller 450, against a stop plate 452 attached to a hub 454 on the shaft 456, and arranged to rotate therewith. With this construction it will be seen that the folding roll 404 is yieldingly mounted so that when the unit is rotated the roll will follow the path 406 and fold the flap 17 against the creasing member 402.

Provision is made for rotating the folding roll unit and as best shown in Fig. 2, a gear 458 fast on the cam shaft 84 meshes with a gear 460 which is formed integrally with a sprocket 462 connected to a sprocket 464 on the shaft 456 by a chain 466.

The envelope is now presented to station 23, see Figs. 2 and 6, where provision is made for applying adhesive to the flap. The envelope arrives at this station with the flap extending outwardly at approximately right angles to the envelope having flexed back to this position after leaving station 25. As herein shown, the envelope is operatively supported by a slide member 468 which is provided with an extension 470 against which the flap rests when the adhesive is being applied by an applying roll 472. The adhesive applying roll 472 mounted on an arm 474 is arranged to rock on a shaft 476 from a supply roll 478 to the flap and to thereafter be returned to the supply roll. The arm 474 is rocked by a cam 480 fast on the cam shaft 84 through connections including a cooperating cam roll 482 mounted on a lever 484, a second lever 488 also fast on the rocker shaft 486, a link 490 which connects the lever 488 to an operating lever 492 fixed to the rocker shaft 476 on which the arm 474 is mounted. As will be seen from an inspection of Fig. 1, the adhesive is applied to the flap in a relatively narrow strip 19 this being all the glue necessary to seal the flap.

The supply roll 478 is constantly driven through a drive from the main driving shaft 70 which is provided with a sprocket 494, connected to a sprocket 496 on an intermediate shaft 498 by a chain 500. A gear 502 fixed to the intermediate shaft 498 meshes with a gear 504 on a transversely extended shaft 506 which is provided with a bevel gear 508, meshing with a bevel gear 510 on a shaft 512. A sprocket on the shaft 512 is connected to a sprocket 514 on an idler stud 516 by a chain 518 and the glue

roll is driven by the cooperating gears 520, 522, on the shafts 516, 526, respectively.

The sliding member 468 is mounted to reciprocate in a slide bracket 528 through connections from the rocker shaft 486 by a lever 530 fixed to the rocker shaft 486 and a link 532 connecting the lever 530 to the slide member 468. A spring 534 yieldingly urges the cam roll 482 against the cam 480.

After leaving the adhesive applying station 28 the envelope is guided between rails 536, 538 to a presser station 30 and as best shown in Fig. 7 a sliding block 540 is arranged to support the back of the envelope while a rocking member 542 lays the flap down against the envelope whereupon additional pressure is applied by the slide block 540 to firmly seal the flap. The rocking member 542 is mounted upon one arm 544 of a bell crank rockingly mounted on a shaft 546, and the other arm 548 is provided with a cam roll 550 which cooperates with a cam 552 fixed to the cam shaft 84. A cam 554 fast on the cam shaft 84 is arranged to operate the slide block 540 through a lever 556 provided with a cam roll 558 and fixed to a rocker shaft 560, and a link 564 connected to the slide block 540 which is arranged to slide in a bracket 566. A spring 568 holds the cam roll 550 against its cam 552 and a spring 569 holds the cam roller 558 against its cam 554.

After the described operations have been performed, the closed and sealed envelope is moved to the ejecting station generally indicated at 32 which may comprise any known or usual form of ejecting mechanism herein shown as a sliding bar 570 mounted in a slide bracket 572 and provided with fingers 574 which grip the envelope and withdraw it from the pocket 16. The envelope is released when it reaches a position above the conveyer 34 on which it is carried away from the machine.

While the preferred embodiments of the invention have been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

This application is a division of my copending application, Serial No. 114,422, filed December 5, 1936, which has matured into Patent No. 2,213,729.

Having thus described the invention, what is claimed is:

1. In a machine of the character described, means for closing the flap of a filled envelope comprising a pair of clamping members positioned to grasp the envelope along the line to be creased, and means cooperating with said clamping members for folding and creasing said flap including a rotatable arm, a second arm pivotally and yieldingly mounted in said rotatable arm and a roller carried by said second arm arranged to engage said clamping members to perform the folding and creasing operation.

2. In a machine of the character described, means for closing the flap of a filled envelope, comprising a reciprocal backing member adapted to engage one side of the envelope and having a curved guide extending in back of said flap, a rockingly mounted forming member adapted to engage the other side of the envelope, and means cooperating with said backing and forming members for folding and creasing said flap including a rotatable arm, a second arm pivotally and yieldingly mounted in said rotatable arm, and a roller carried by said second arm, said roller be-

ing arranged to revolve into yielding engagement with said curved guide and said forming member to perform the folding and creasing operation.

3. In a machine of the character described, envelope holding and moving means, means for closing the flap of a filled envelope, while supported in said holding means, comprising a reciprocal backing member adapted to engage one side of the envelope and having a curved guide extending in back of said flap, a rockingly mounted forming member adapted to engage the other side of the envelope, and means cooperating with said backing and forming members for folding and creasing said flap including a rotatable arm, a second arm pivotally and yieldingly mounted in said rotatable arm, and a roller carried by said second arm, said roller being arranged to revolve into yielding engagement with said curved guide and said forming member to perform the folding and creasing operation, a third arm pivotally and yieldingly mounted in said rotatable arm, and a second roller carried by said third arm, and means including driving mechanism for revolving said rollers to permit the latter to alternately engage successive envelopes being carried by said holding means.

4. In a machine of the character described, means for closing the flap of a filled envelope comprising a pair of clamping members positioned to grasp the envelope along the line to be creased, a roller, a yielding mounting for said roller pivoted about an axis spaced from said roller, said mounting and said roller being sup-

ported for rotation about a second axis spaced from said first mentioned axis and means for rotating said mounting and roller about said second axis to effect movement of said roller into cooperating engagement with said clamping members to fold and crease said flap.

5. In a machine of the character described, means for closing the flap of a filled envelope comprising a pair of clamping members positioned to grasp the envelope along the line to be creased, a roller, a movable member, means for movably supporting said movable member, a yielding mounting for said roller pivoted on said member about an axis spaced from said roller and means for moving said movable member to effect movement of said roller into engagement with said clamping members to fold and crease said flap.

6. In a machine of the character described, means for closing the flap of a filled envelope, comprising a reciprocating backing member adapted to engage one side of the envelope and having a curved guide extending in back of said flap, a forming member adapted to engage the other side of the envelope, a movable member, means for movably supporting said movable member, a roller, a yielding mounting for said roller pivoted on said member about an axis spaced from said roller and means for moving said movable member to effect movement of said roller into cooperating engagement with said curved guide and said forming member to perform the folding and creasing operation.

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