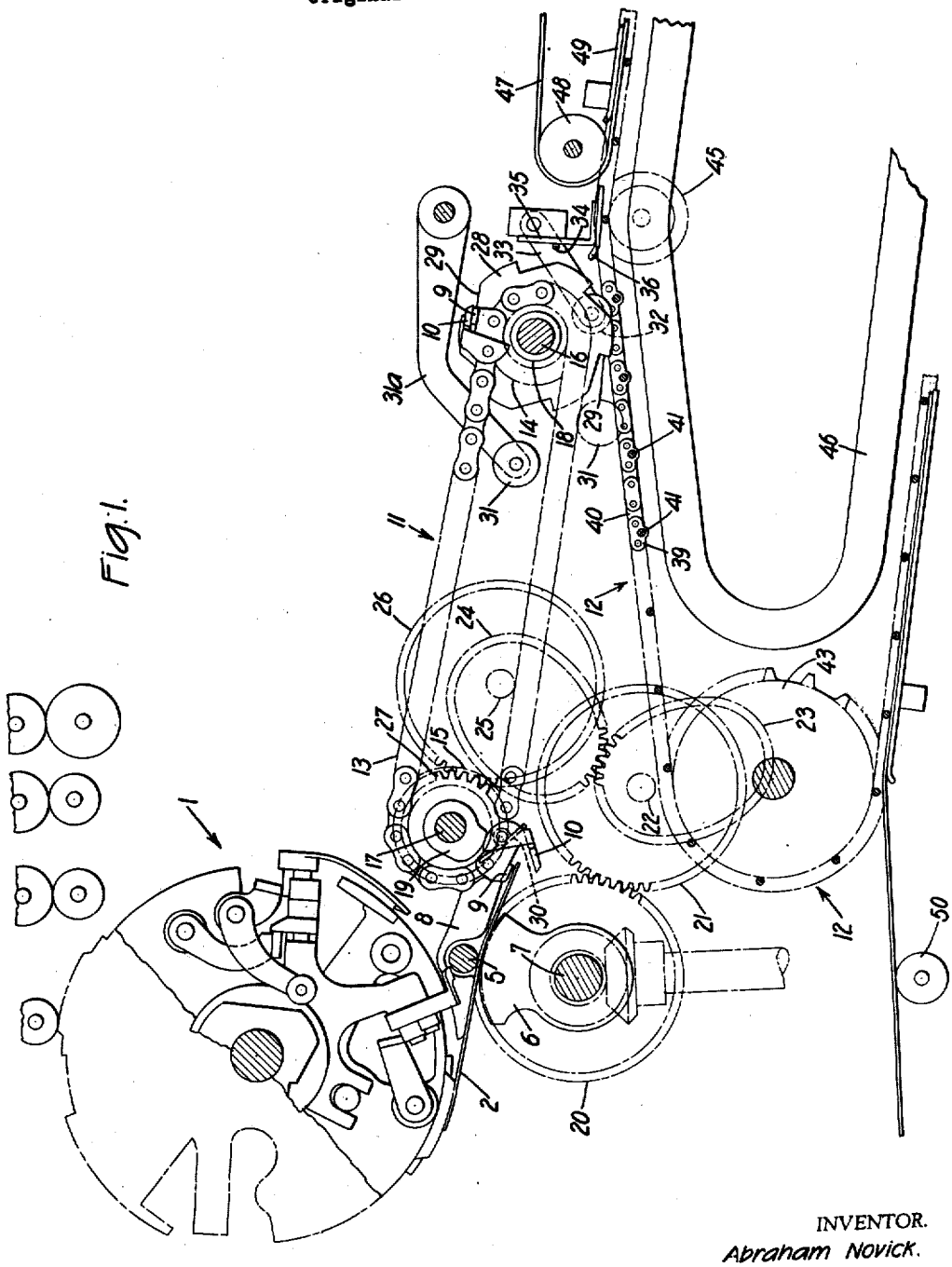
Aug. 23, 1938. A. NOVICK 2,127,568

ENVELOPE MACHINE

Original Filed Nov. 13, 1933 2 Sheets-Sheet 1

Fig. 1.



INVENTOR.
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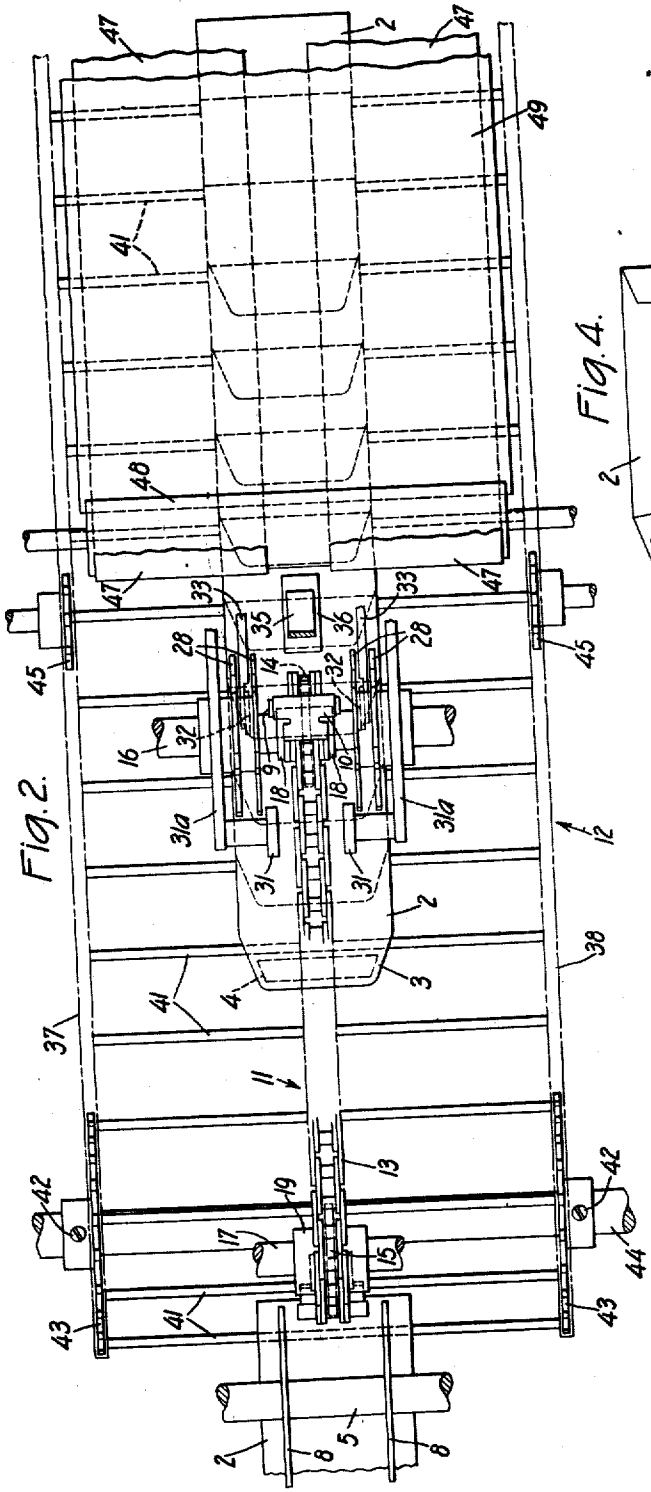


Fig. 2.

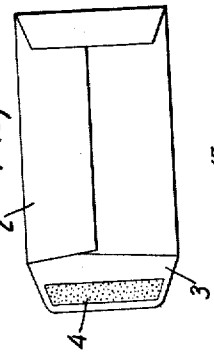


Fig. 4.

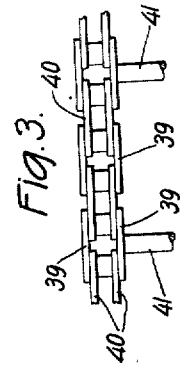


Fig. 3.

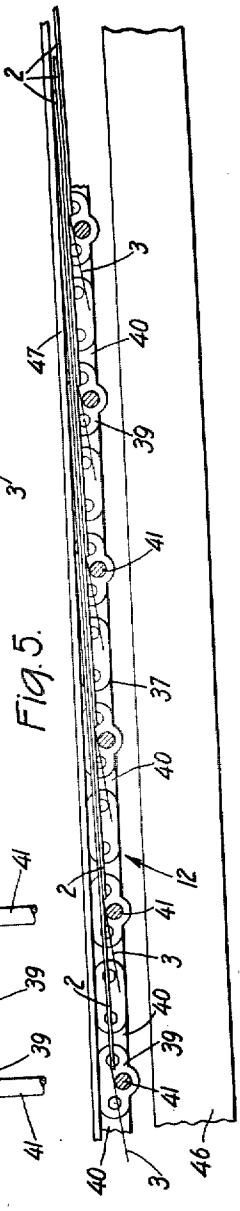


Fig. 5.

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Patented Aug. 23, 1938

2,127,568

UNITED STATES PATENT OFFICE

2,127,568

ENVELOPE MACHINE

Abraham Novick, Flushing, N. Y., assignor to F. L. Smithe Machine Co., Inc., New York, N. Y., a corporation of New York

Original application November 13, 1933, Serial No. 697,768. Divided and this application January 9, 1936, Serial No. 58,335

11 Claims. (Cl. 271—76)

This invention relates to envelope machines. It is an object of the present invention to provide a collating device for taking blanks from a relatively fast feeder and depositing them on a relatively slow feeder in overlapping relationship. It is a feature of the invention that the collating device is arranged to travel at a variable speed. In the preferred embodiment its speed at that point of its cycle, at which it receives the blanks from the fast feeder, is below its average speed and its speed at another portion of its cycle is greater than average, the average speed being approximately equal to that of the said fast feeder. The collating device is preferably so arranged, that when it travels at low speed to receive a blank from the high speed feeder it operates also to deliver a blank to the low speed feeder, so that the advantage of slow speed is obtained at both its receiving and discharging points.

In the specific form of construction illustrated herein the collating device comprises a conveyor having mounted thereon grippers or other elements which are adapted to seize the blanks adjacent their leading edges. These grippers are spaced from each other at least a blank length apart. Adjacent the receiving end, each gripper travels at relatively low speed whereas the blank travels at relatively high speed. The insertion of the blank into the gripper is, therefore, relatively simple because the blank will enter the gripper by reason of its higher speed, this high speed being imparted to the blank by the relatively fast feeder. The gripper after seizing the blank at its leading edge accelerates to a high speed and conveys the blank toward the delivery end. Adjacent the delivery end the gripper speed is gradually reduced to approximately the speed of the relatively low speed feeder. The speed of the blank is thus likewise reduced. The gripper is then opened and the blank is deposited on the slow speed feeder in overlapping relationship to the blanks previously deposited thereon..

Other objects and advantages will hereinafter appear.

This application is a division of my co-pending application Serial No. 697,768 filed November 13, 1933 for Envelope machines.

In the drawings forming part of this specification,

Fig. 1 is a fragmentary, sectional, side elevation, partly diagrammatic, of a machine embodying features of the invention;

Fig. 2 is a fragmentary, plan view, partly broken away, illustrating a portion of the mechanism of Fig. 1;

Fig. 3 is a fragmentary, detail, plan view of a portion of the drying conveyor;

Fig. 4 is a rear plan view of an envelope of the open-end type upon which the mechanism of the present invention is especially well adapted to operate; and

Fig. 5 is a fragmentary, sectional, side elevation of a portion of the drier and the drying conveyor.

The mechanism indicated generally at 1 constitutes means for forming envelope blanks into envelopes 2 of the kind illustrated in Fig. 4. This mechanism may be the same as that illustrated in my pending application Serial No. 671,630 filed May 18, 1933, for Envelope machines. Such mechanism comprises gumming means for the sealing flap 3 to apply a gum patch 4 thereto. The envelopes 2 leave the cylinder with the sealing flap trailing and with the undried gum patch 4 facing downward. Each envelope is fed between a roller 5 and feeding segments 6 fast on a shaft 7. The roller 5 and the segments 6 advance the envelope at the same speed at which the mechanism 1 advances it. The envelope travels along guides 8, the leading end of the envelope being delivered between fixed and movable gripper jaws 9 and 10.

The gripper jaws 9 and 10 constitute elements of a collating device 11 whereby the spaced out envelopes are delivered to a drying conveyor 12. The collating device acts to rearrange the envelopes in fanned-out relation for drying. The collating device comprises a chain conveyor 13 which carries two sets of the gripping jaws 9 and 10. The chain 13 runs upon an idler sprocket 14 and a driven sprocket 15. The idler sprocket 14 is mounted loosely upon a shaft 16 at the discharge end of the collating device while the sprocket 15 is mounted fast upon a driven shaft 17 at the introductory end of the collating device. Collars 18 mounted on the shaft 16 serves to open the grippers at the delivery point, while cams 19 mounted on the shaft 17 but fixed against rotation serve to open the grippers at the receiving station.

The chain 13 is driven at the same average speed as the feeding segment 6 but it is driven variably so that the grippers are traveling relatively slowly at the receiving and delivering stations. This variable drive is effected through the constantly rotating shaft 7 whereby the segment 6 is carried. The shaft 7 has fast upon it a gear 20 which meshes with a gear 21 fast on a

shaft 22. An elliptical gear 23 which is also fast upon the shaft 22 meshes with a cooperating elliptical gear 24 fast on a shaft 25. The shaft 25 has fast upon it a gear 26 which meshes with a pinion 27 fast on the shaft 17. The effect of the variable speed feeding mechanism described is to cause the grippers when open at the receiving station to travel slowly so that the envelope which is under the control of the roller 5 and the segments 6 gains on the grippers and has its bottom or leading edge in position to be securely gripped when the tail of gripper 10 snaps off of the high portion of cam 19. The gripper is then quickly accelerated and sweeps the envelope forward rapidly until the gripper nears the discharge station. The rapid advance of the blank is effective to prevent the gummed sealing flap from dropping down and being dragged along the drying conveyor 12.

In addition to the instrumentalities already described the collating device comprises two sets of ratchet wheels 28 which are fast upon the shaft 16. The shaft 16 is driven at a rate such that the teeth of the ratchet wheels 28 advance at the same linear speed as the drying conveyor 12. The leading end of an envelope blank is carried into engagement with vertical walls 29 of ratchet teeth at a time when the gripper controlling such envelope is slowed down substantially to the speed at which the ratchet wheel uniformly travels. The envelope is accordingly arrested without being subjected to any sudden blow by the ratchet teeth walls 29. The gripper springs 30 apply only a light pressure to the envelope so that the envelope when intercepted by the ratchet wheels may slip relative to the grippers before the grippers have actually been operated to release the envelope. At about the time when an envelope is brought into engagement with the ratchet tooth shoulders hold-down rollers 31 carried by arms 31a are swung down to press the envelope against the preceding envelopes and the drying conveyor 12 so that there can be no slipping of the envelope relative to the drying conveyor. Further rollers 32 carried by pivoted arms 33 bear constantly upon the envelopes on the drying conveyor and assist in feeding them. A stop 34 is provided on each arm 33 for limiting downward swinging of the roller 32 when no envelopes are present. The stops 34 coact with a bracket 35. The bracket 35 also carries a hold-down plate 36.

The drying conveyor 12 comprises two parallel chains 37 and 38. Each chain is composed of alternate wide and narrow links 39 and 40. Cross bars 41 are carried by corresponding links 39 of the two chains. The cross bars 41 are provided at equal intervals, the cross bar spacing being the same as the space provided between the leading edges of successive envelopes as deposited upon the drying conveyor by the collating mechanism which has been described. As illustrated in Figure 2, each envelope is delivered with the sealing flap trailing and the gummed side of the sealing flap faced downward, onto the conveyor 12. It is intended that each envelope shall have an ungummed portion of the sealing flap thereof resting directly upon one of the cross bars 41. Since the collating mechanism arrests and positions the envelopes by engagement with the bottom edges thereof, the desired relation between the sealing flaps and the cross bars will not be automatically secured for different sizes of envelopes. Provision is accordingly made of suitable adjusting means such as set screws 42 whereby sprockets 43 which drive the chains 37 and 38 may be adjusted and fixed relative to their drive shaft 44. The chain conveyors 12 run upon a pair of idler end sprockets similar to the sprockets 43 and upon idlers intermediate sprockets 45 of which only a single pair is illustrated. The conveyor 12 travels in an orbital path and acts to conduct the envelopes in both its outgoing and return stretches in proximity to a drier 46 which may be in the form of a blower chest. It will be observed that the gummed portions of the sealing flaps of the envelopes are invariably fully exposed through the conveyor 12 to the blower. Hold down belts 47 extend around an end roller 48 and beneath an apron or plate 49 adjacent the conveyor 12. The apron 49 conforms in contour to the path of the conveyor 12 throughout the outgoing stretch of the conveyor, around the idler end sprockets, and throughout the return stretch of the conveyor to a point adjacent the sprockets 43. The belts 47 thus act as hold down belts in the upper stretch of the conveyor and as supporting belts along the lower stretch of the conveyor 12. The belts 47 extend beyond the end of the apron 49, being supported upon rollers 50 of which only one is shown. The belts 47 thus serve to conduct the envelopes away from the conveyor 12 to other instrumentalities of the machine. The belts 47 are turned back around an end roller (not shown), the idle stretch being guided outside the active stretch back to the end roller 48.

The chains 37 and 38 are spaced far enough apart to receive envelopes of any usual width between them. The conveyor thus supports the envelopes solely upon the cross bars 41 which do not in any way obstruct or interfere with the drying of the gum. Since the cross bars 41 are adapted to act with equal efficiency upon wide or narrow envelopes, there is no need for any lateral adjustments in connection with the conveyor 12. The belts 47 are also adapted to act upon envelopes of any usual width without adjustment. The only adjustment required, therefore, for adapting the drier to act upon blanks of different sizes is the longitudinal adjustment of the conveyor chains 37 and 38 relative to the collating mechanism.

It will be observed that cross-bars 41 are positioned slightly below the center line of chain 40. As a result of this the plane of the envelopes carried by the chain is substantially in the center of the chain, i. e., in line with pitch line of the chain. This arrangement prevents shifting of the envelopes relative to the chain when the envelopes are carried around the sprockets.

I have described what I believe to be the best embodiment of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. In an envelope machine, the combination with a fast feeder and a relatively slow feeder, of an interposed collating device for taking spaced-out blanks from the fast feeder and depositing them on the slow feeder in fanned-out relation, said collating device comprising a plurality of sets of grippers, a conveyor carrying the grippers through orbital paths, means for opening the grippers at receiving and delivering stations, and means for driving the conveyor at variable speed to cause the grippers to travel slowly at the receiving and delivering stations and at high speed between said stations.

2. In an envelope machine, the combination with a fast feeder and a relatively slow feeder,

of an interposed collating device for taking spaced-out blanks from the fast feeder and depositing them on the slow feeder in fanned-out relation, said collating device comprising a plurality of sets of grippers, a conveyor carrying the grippers through orbital paths, means for opening the grippers at receiving and delivering stations, and means comprising elliptical gears for driving the conveyor at variable speed to cause the grippers to travel slowly at the receiving and delivering stations and at high speed between said stations.

3. In an envelope machine, the combination with a fast feeder arranged to deliver envelopes with the gummed sealing flap margins faced downward and trailing and a relatively slow feeder for carrying the blanks during drying, of an interposed collating device traveling above the slow feeder and in convergent relation therefor taking spaced-out blanks from the fast feeder and depositing them on the slow feeder in fanned-out relation, comprising a set of grippers and means for driving the grippers at substantially the same average speed as the fast feeder but variably so that the grippers travel at a delivery station at substantially the same speed at which the slow feeder travels.

4. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed.

5. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed, the average of said speed being approximately that of the fast feeder.

6. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed, its speed at that point of its cycle at which it receives the blanks from the fast feeder being below its average speed and its speed at another portion of its cycle being greater than average.

7. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed, its speed at that point of its cycle at which it delivers blanks to the relatively slow feeder being below its average speed and the speed at another portion of its cycle being greater than average.

8. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed, its speed at that point of its cycle at which it receives the blank from the fast feeder and at which it delivers blanks to the slow feeder being below its average speed and its speed at another portion of its cycle being greater than average.

9. In combination a relatively fast feeder having means to advance a multiplicity of blanks positively in succession, a transfer device for receiving blanks from said fast feeder, said transfer device comprising a member moving in an orbital path and having grippers mounted thereon and means for controlling said grippers in such manner that they are open to receive the blanks while they are in the control of the relatively fast feeder so that said blanks are fed positively into the open jaws of said grippers by reason of the difference in speed between said fast feeder and said transfer device and means for closing said grippers on said blanks after they have been inserted therein and for releasing the blanks from the high speed feeder.

10. The novel envelope machine comprising a fast feeder and a slow feeder operating at different uniform speeds, and a collating device movable at a cyclically variable speed and acting positively upon the blanks separately to reconcile said speeds in the transfer of blanks from the fast feeder to the slow feeder.

11. The method of collating blanks for the transfer thereof between a fast stage of feeding and a relatively slow stage of feeding, said method including the step of removing the blanks positively from one stage at the speed characteristics thereof, transferring them positively from stage to stage and delivering the blanks positively to another stage at its characteristic speed, varying the collating speed of the blanks intermediate said stages to reconcile the same.

ABRAHAM NOVICK.

CERTIFICATE OF CORRECTION.

Patent No. 2,127,568. August 23, 1938.

ABRAHAM NOVICK.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 19, claim 3, for the syllable "there-" read thereto; and second column, line 46-47, claim 11, for "characteristics" read characteristic; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of September, A. D. 1938.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.

of an interposed collating device for taking spaced-out blanks from the fast feeder and depositing them on the slow feeder in fanned-out relation, said collating device comprising a plurality of sets of grippers, a conveyor carrying the grippers through orbital paths, means for opening the grippers at receiving and delivering stations, and means comprising elliptical gears for driving the conveyor at variable speed to cause the grippers to travel slowly at the receiving and delivering stations and at high speed between said stations.

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5. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed, the average of said speed being approximately that of the fast feeder.

6. In combination, a relatively fast feeder, a relatively slow feeder and a collating device for transferring blanks from the fast feeder and depositing them in overlapping relation on the slow feeder, said collating device being arranged to travel at a variable speed, its speed at that point of its cycle at which it receives the blanks from the fast feeder being below its average speed and its speed at another portion of its cycle being greater than average.

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9. In combination a relatively fast feeder having means to advance a multiplicity of blanks positively in succession, a transfer device for receiving blanks from said fast feeder, said transfer device comprising a member moving in an orbital path and having grippers mounted thereon and means for controlling said grippers in such manner that they are open to receive the blanks while they are in the control of the relatively fast feeder so that said blanks are fed positively into the open jaws of said grippers by reason of the difference in speed between said fast feeder and said transfer device and means for closing said grippers on said blanks after they have been inserted therein and for releasing the blanks from the high speed feeder.

10. The novel envelope machine comprising a fast feeder and a slow feeder operating at different uniform speeds, and a collating device movable at a cyclically variable speed and acting positively upon the blanks separately to reconcile said speeds in the transfer of blanks from the fast feeder to the slow feeder.

11. The method of collating blanks for the transfer thereof between a fast stage of feeding and a relatively slow stage of feeding, said method including the step of removing the blanks positively from one stage at the speed characteristics thereof, transferring them positively from stage to stage and delivering the blanks positively to another stage at its characteristic speed, varying the collating speed of the blanks intermediate said stages to reconcile the same.

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