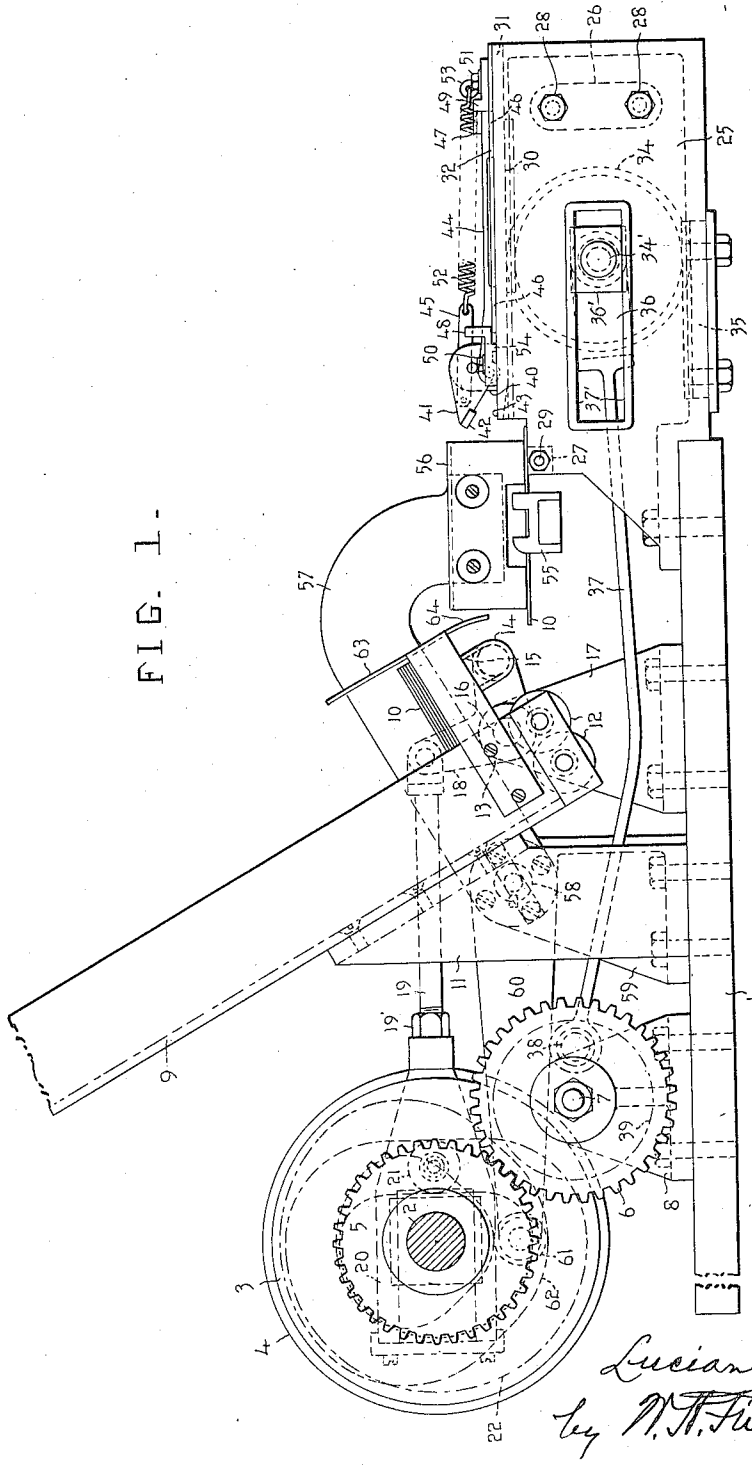
Feb. 18, 1936. L. E. PARKER 2,031,572

COVER FEEDER FOR BOOK MATCH MACHINES

Filed April 15, 1935 3 Sheets-Sheet 1

FIG. 1.



Inventor

Lucian E. Parker

by M. T. Finnell Jr.

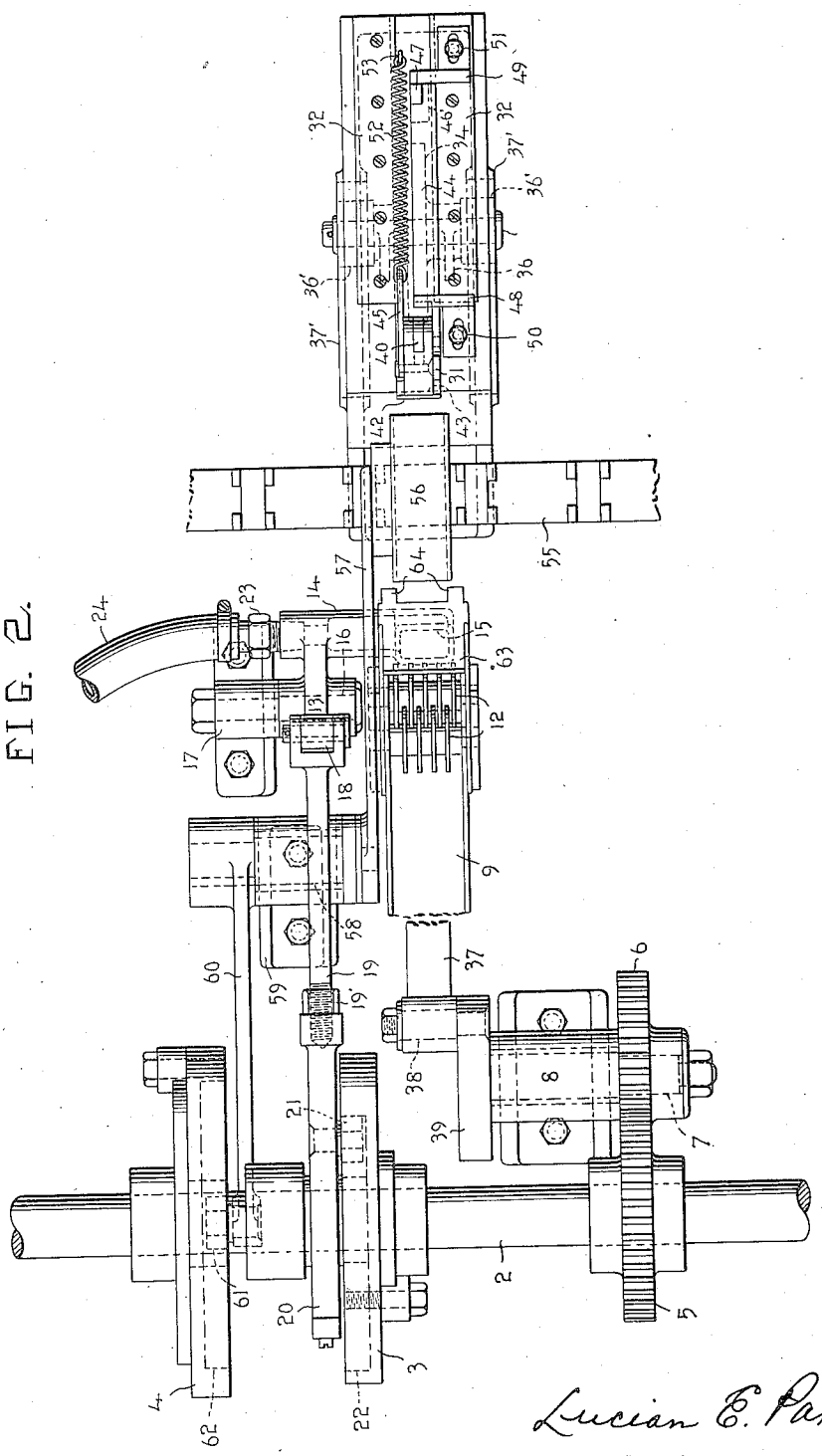
Attorney

Feb. 18, 1936. L. E. PARKER 2,031,572

COVER FEEDER FOR BOOK MATCH MACHINES

Filed April 15, 1935 3 Sheets-Sheet 2

FIG. 2.



Inventor

Lucian E. Parker

By W. H. Finnell Jr.

Attorney

Feb. 18, 1936. L. E. PARKER 2,031,572

COVER FEEDER FOR BOOK MATCH MACHINES

Filed April 15, 1935 3 Sheets-Sheet 3

FIG. 3.

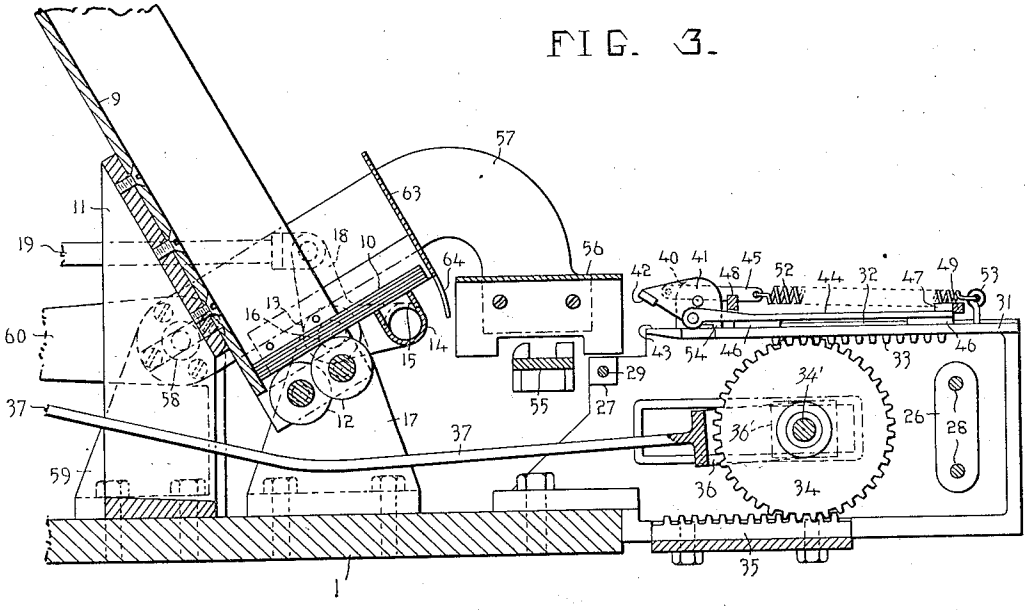
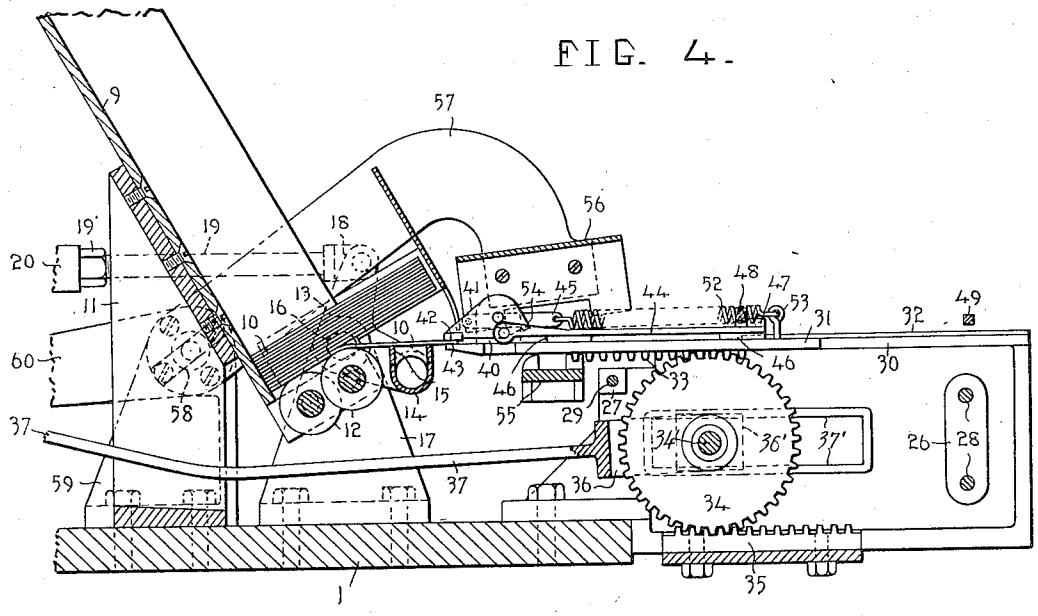


FIG. 4.



Inventor

Lucian E. Parker

By W. W. Finckel Jr.

Attorney

Patented Feb. 18, 1936

2,031,572

UNITED STATES PATENT OFFICE

2,031,572

COVER FEEDER FOR BOOK MATCH MACHINES

Lucian E. Parker, Wadsworth, Ohio, assignor to The Ohio Match Company, Wadsworth, Ohio, a corporation of Ohio

Application April 15, 1935, Serial No. 16,531

3 Claims. (Cl. 271—14)

This invention relates primarily to book match machines, and particularly to mechanism for successively feeding match book cover blanks from a supply of same to a match book assembling machine in which said cover blanks are appropriately folded around and secured to the usual cards of paper matches; and although the invention, broadly considered, is of more general application, it will be described hereinafter in this particular embodiment.

In the feeding of cover blanks as now commonly practiced, a stack of such blanks is arranged in a suitable chute or trough, the blanks thus stacked being supported from beneath the lowermost blank by pins which underlie the end portions of such blank. The blanks thus arranged and supported are individually and successively removed from the stack, from the bottom up, by a suction device which engages each successive blank as it reaches the bottom of the stack and so buckles it downwardly as to free its ends from the supporting pins.

This method of feeding has disadvantages, in that due partly to the friction material forming the usual match striking surface, partly to the printing upon the blanks, and partly to the nature of the material of which the blanks are made, it often happens that two or more blanks, rather than one only, are separated from the stack when the lowermost blank is buckled and withdrawn from the supporting pins, thus interfering with the proper functioning of the apparatus and resulting in loss of time and material.

This disadvantage, in particular, is obviated in cover feeders constructed and operating in accordance with the present invention, in that the cover blanks, arranged preferably in stacked relation, are relatively solidly supported, and, instead of being successively taken from the stack by a downward buckling, are withdrawn successively by sliding movement, the bulk of the covers in the stack being unaffected by such movement, and the withdrawal of more than one blank at a time being rendered impossible, as will be explained more in detail hereinafter.

In addition to the obviation of the particular disadvantage referred to, the apparatus and method hereinafter more fully explained result in a simplified mechanism and mode of operation thereof with attendant advantages.

The invention consists in a machine and method for feeding blanks, especially cover blanks of the kind referred to; the machine comprising means for maintaining a plurality of blanks in predetermined orderly juxtaposed relation, means for displacing one end of each of said blanks successively so that it stands away from the rest, means for grasping and pulling upon the end of each blank thus displaced to withdraw it from the rest of the blanks, and means for successively depositing the thus withdrawn blanks in a transporting mechanism; and the method comprising the various steps of the feeding operation, all as will be explained more specifically hereinafter and finally claimed.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation of a cover feeding mechanism embodying the features of the invention.

Fig. 2 is a plan view thereof with the bed omitted.

Fig. 3 is a fragmentary sectional detail of parts of the mechanism illustrating one step in the feeding operation thereof, and

Fig. 4 is a similar detail illustrating another step in such operation.

In the embodiment of the invention illustrated in the drawings, the cover feeder is shown in a form suitable for application to book match machines of known types, and includes a bed 1 carrying the parts of the cover feed mechanism and forming a suitable support for same in appropriate relation to a power shaft 2 which may be an element of the book match machine.

This power shaft 2 has mounted upon it and preferably keyed to it, two groove cams 3 and 4, and a gear 5 which meshes with and drives a similar gear 6 rotatably mounted upon a stud shaft 7 supported in a bearing bracket 8 secured to the bed 1.

The trough or chute 9 in which the cover blanks 10 are arranged in juxtaposed or stacked relation is supported in tilted position upon a bracket 11, as shown, and is provided adjacent to its lower end with a pair of complemental, freely rotatable, rollers 12 of spaced disk formation which provide a substantially frictionless bottom for the chute 9 and support the stack or plurality of cover blanks arranged therein in such manner that they normally gravitate toward the bed of the chute, and hence stack evenly therein without tendency to slide out.

Carried by and preferably forming a part of one arm of a bell-crank lever 13, is a suction member 14 having an elongated suction slot 15 (see Fig. 2) and which is moved into and retracted from a position to exert the function of

its suction slot upon the lowermost cover blank of the stack of same in the chute. This movement is accomplished by oscillation of the lever 13 upon its pivot 16 in the bearing bracket 17 by means of connection of the other arm 18 of the lever, with a link 19 adjustably secured as at 19' to a yoke 20 carrying a roller 21 which follows the groove 22 of the cam 3.

The suction member 14 is connected to a suitable source of suction by means of a nipple 23 and flexible pipe or tube 24 (see Fig. 2).

Suitably attached to the portion of the bed remote from the shaft 2 is a pair of similar stands 25 held in suitable spaced relation by bosses or the like 26 and 27 and securely and rigidly bolted together as shown at 28 and 29. These stands 25 are rabbeted at their upper edges, as shown, to provide ways 30 (Fig. 4) for guiding and supporting a sliding, reciprocating plate 31 which is held in operative position in these ways 30 by gibs 32 secured to the stands 25.

The under face of the plate 31 carries a rack 33 meshing with a gear 34 which rolls upon a complemental rack 35 fixed between the stands 25. Reciprocating, and hence rotative, movement is imparted to this gear 34 by means of a yoke 36 linked at 37 to the crank pin 38 of a crank disk 39 carried by and turning with the shaft 7 of the gear 6. The trunnion 34' of the gear 34 is carried by cross-heads 36' sliding in cross-head guides 37' provided in the stands 25.

By virtue of this rack and gear mechanism whereby reciprocating motion is imparted to the sliding plate 31, it will be seen that the speed of reciprocation of the plate 31 is twice that of the gear 34, and hence during each oscillation of the suction member 14 the plate 31 makes a complete reciprocation forward and back.

The plate 31 carries an upstanding bearing bracket 40 upon which is pivotally mounted a bifurcated jaw carrier 41 the jaw member 42 of which overlies and is oscillated toward and away from a complemental part or jaw member 43 on the end of the upper face of the plate 31.

Eccentrically pivoted to the jaw carrier 41 are a tongue 44 and a link 45.

The tongue 44 is provided upon its under surface with blocks or feet 46 which furnish it with bearing members contacting with the upper surface of the plate 31; and it is provided upon its upper surface at its free end with a lug 47 adapted to engage opposed faces of stop members 48 and 49 adjustably secured to one of the stands 25 as indicated at 50 and 51, respectively (see Fig. 2) adjacent to the limits of movement of the plate 31. These stop members are adapted not only to cooperate with the lug 47 but serve also to overlie the tongue 44 and maintain it in appropriate sliding engagement with the plate 31.

The link 45 is connected by a spring 52 with a part 53 rigidly attached to the plate 31.

By this arrangement of parts, it will be seen that as the plate 31 moves to the left the gripper mechanism formed by the jaws 42 and 43 will advance in the position shown in Figs. 1 and 3, but, owing to the fact that the linear reciprocatory movement of the plate 31 is greater than the distance between the stops 48 and 49, the lug 47 will engage the stop 48 before the plate 31 has reached the limit of its travel to the left, and hence relative movement between plate 31 and tongue 44 will cause jaw carrier 41 to turn upon its pivot, thus extending spring 52 and causing jaw member 42 to snap downward toward jaw member 43 under the influence of the spring as the longitudinal axis of the spring and its connecting lever 45 passes the pivotal axis of the jaw carrier 41 (see Fig. 4). Similarly, on the return stroke of plate 31, the engagement of lug 47 with stop 49 will cause jaw carrier 41 to snap back to its original position, its pivotal movement in this reverse direction being arrested and limited by the stop finger 54 of the jaw carrier 41.

Appropriate adjustment of the stops 48 and 49 will, obviously, result in desired timing of the pivotal action of the jaw carrier 41.

The usual cover blank transporting member, such as a linked conveyor chain 55 passes with a step by step movement transversely of the machine in timed relation to the actuation of the parts of the feeder, and at each dwell in the progress of the chain a carrier link is in position to receive a cover blank. Above the conveyor chain is arranged a cover positioning member 56, preferably of inverted U shape in transverse section and of such lateral and vertical dimensions as to permit the gripper mechanism to pass freely through it. This positioning member 56 is rigidly carried by an arm 57 connected with a shaft 58 pivoted in a bearing member 59. To this shaft 58 is also connected a lever 60 carrying at its free end a roller 61 which follows the groove 62 of the cam 4 to thus oscillate the arm 57 and move the member 56 toward and away from the conveyor chain. Obviously, due to its dimensions, as described, the positioning member 56 will not interfere with movement of the gripper mechanism, regardless of whether the positioning member is raised or lowered, and thus the gripper mechanism may be projected through it to engage a subsequently depressed blank immediately after it has released the blank previously grasped. This tends to speed up operation of the device as a whole.

In order to maintain the proper stacked relation of the cover blanks in the chute 9 and to prevent withdrawal therefrom of more than one blank at a time a guard 63 is provided, this guard having an arcuate portion providing two fingers 64 between which the gripper mechanism is projected, as shown in Fig. 4.

The operation of the cover feeder is substantially as follows:—

With the chute 9 furnished with a proper supply of cover blanks 10, stacked therein in juxtaposed relation and resting upon the disks of the rollers 12 forming the bottom of the chute, and assuming that the mechanism customarily provided therefor is imparting a step by step or intermittent movement to the conveyor 55, and that the shaft 2 is rotating in timed relation to the movement of the conveyor, and that the tube 24 is connected with a suitable source of suction, it will be seen that as the cams 3 and 4 and gears 5 and 6 rotate in response to rotation of the shaft 2, the bell-crank lever carrying suction device 14 will be oscillated, and the suction device, through the medium of its suction slot 15, will attach itself to one end of the lowermost blank of the plurality of blanks in the chute, as shown in Figs. 1 and 3 and, during its oscillation, will displace or depress the end of such blank to the position shown in Fig. 4, where its end is free of the guard 63 and fingers 64.

Meanwhile, the positioning member 56 has been raised, as illustrated in Fig. 4, and the gripper mechanism has been projected to the left through and beneath the positioning member to grip the depressed or displaced end of the cover blank, as shown.

As explained, the reciprocating movement of the gripper mechanism is rapid as compared with the movement of the other moving parts of the feeder and, therefore, the blank thus grasped will immediately be withdrawn from beneath the stack of blanks by an endwise sliding movement imparted to it by the gripper mechanism upon its return stroke, that is to say its stroke to the right, the free rotation of the rollers **12** providing for a substantially frictionless movement of the cover blank.

The cover blank is withdrawn to the right to a position substantially as illustrated in Fig. 1 and, meanwhile, the positioning member **56** is swung downward under the influence of its lever connection with the cam **4** to depress the cover blank into proper position in the appropriately disposed underlying link of the conveyor **55**. The conveyor then makes another step of movement, as the positioning member is swung upward, to present another link in position to receive the next cover fed.

Repetition of this feeding action will be repeated as long as the feeder is operated and there are cover blanks arranged in the chute **9**.

Obviously, the separating of the end of the lowermost blank by the displacing or downward bending thereof imparted by the suction device **14**, will result in only one blank (the lowermost blank of the stack) being fed at a time, the other blanks in the stack being maintained in proper stacked relation by the chute **9** and its guard **63** supplemented by the weight of the blanks in the stack.

As hereinbefore stated, the stops **48** and **49** may be adjusted with respect to each other, and with relation to the limits of reciprocation or travel of the plate **31**. This makes possible an adjustment such that the gripper jaws **42**, **43** may be engaged with the depressed end of a cover blank, and released therefrom, at such times as to properly grasp the depressed end of a blank in timed relation to the oscillatory movement of the suction member **14**, and to release the end of the blank at the instant when it is withdrawn to a position in proper predetermined relation to the conveyor **55**, respectively.

The means **19'** for adjustment of the link **19** make possible oscillatory operation of the suction member **14** within such limits as to carry the end of the cover blank to which the suction member attaches itself into proper position for engagement with it of the gripper jaws **42**, **43**.

Various changes are contemplated as within the spirit of the invention and the scope of the following claims.

What I claim is:—

1. In a cover feeder for book match machines, means for positioning a plurality of cover blanks in juxtaposed relation, means for transporting said blanks successively to a match book assembling mechanism, means for displacing one end of each of said blanks successively from said plurality, means for successively withdrawing the thus displaced blanks, and oscillatable positioning means for successively positioning each of the blanks thus withdrawn in said transporting means, said positioning means lying in the path of movement of said withdrawing means and spanning same and acting to depress the withdrawn blanks into underlying parts of said transporting means.

2. In a cover feeder for book match machines, a chute for supporting a plurality of cover blanks in superposed stacked relation, means for successively transporting said blanks to a match book assembling machine, and means for successively feeding said blanks to said transporting means, including oscillatable suction means for depressing one end of the lowermost of said blanks, means including a pair of automatically actuated gripper jaws for grasping said depressed end and withdrawing said lowermost blank from the stack of same, means for preventing displacement of the other blanks of said stack during the withdrawing operation, and means including an oscillatable depresser member for positioning the withdrawn blanks successively in said transporting means, said depresser member including a part in alignment with said gripper jaws and adapted to span same for engagement with the blanks withdrawn thereby.

3. In a cover feeder for book match machines, a chute for supporting a plurality of cover blanks in superposed stacked relation, means for successively transporting said blanks to a match book assembling machine, and means for successively feeding said blanks to said transporting means, including oscillatable means for depressing one end of the lowermost of said blanks, means including a reciprocating gripper mechanism for grasping said depressed end and withdrawing said lowermost blank from the stack of same, means for preventing displacement of the other blanks of said stack during the withdrawing operation, oscillatable means for positioning the withdrawn blanks successively in said transporting means, said positioning means including a depresser member adapted to span said gripper mechanism and through which the latter may pass freely, and a driving mechanism for said feeding means operated in timed relation to the successive movement of said transporting means, said mechanism including means for imparting a complete advance and retraction of said gripper mechanism during one successive movement of said depressing means, positioning means and transporting means, the form and arrangement of said positioning means permitting passage of said gripper mechanism during its reciprocation regardless of the position of the positioning means during its oscillation.

LUCIAN E. PARKER.