C. F. PFLANZE.

MEANS FOR FEEDING SHEET MATERIAL.

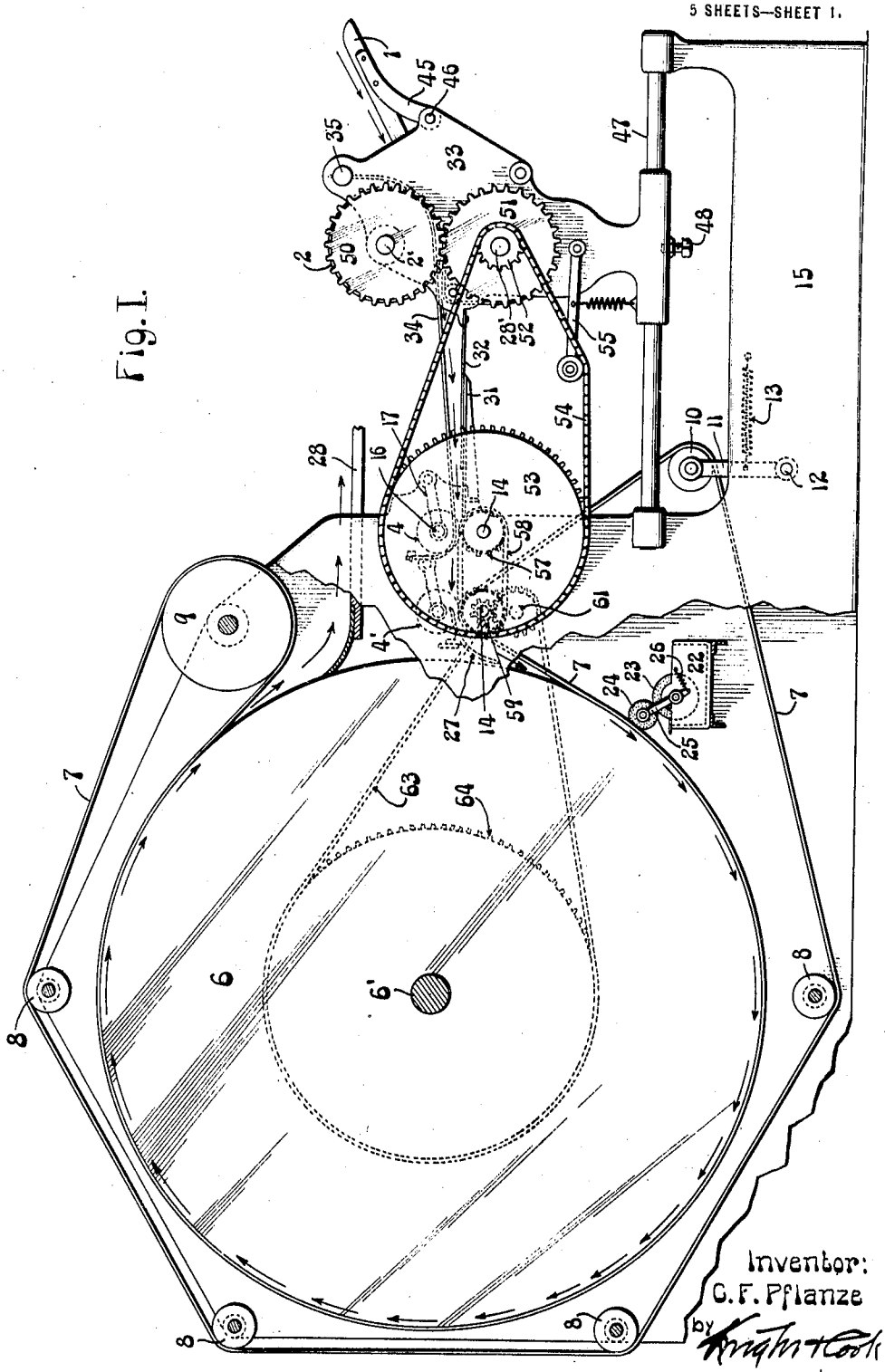
APPLICATION FILED NOV. 23, 1917.

1,385,468.

Patented July 26, 1921.

5 SHEETS—SHEET 1.

Fig. 1.



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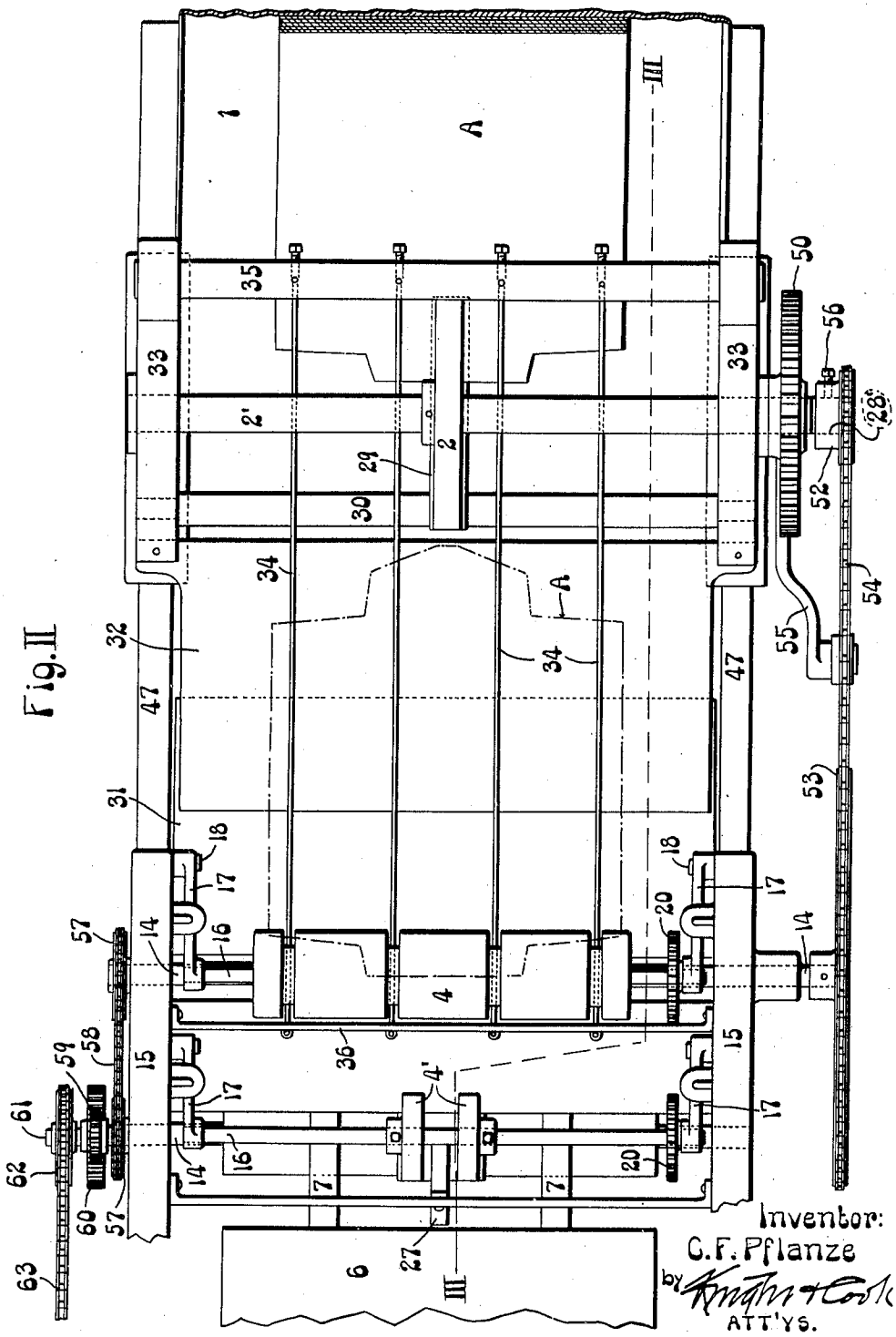
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5 SHEETS—SHEET 2.

Fig. II



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5 SHEETS—SHEET 3.

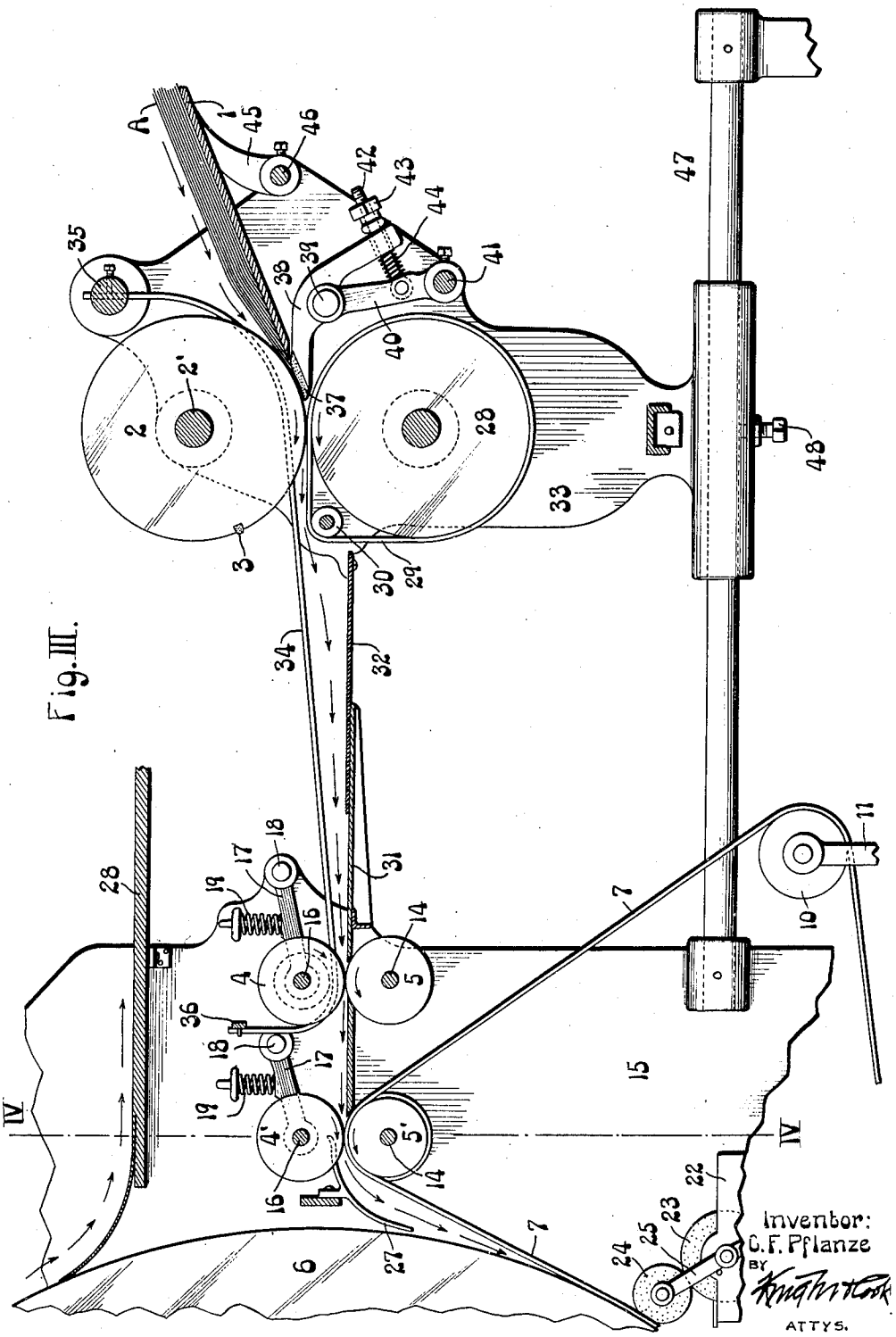


Fig. III.

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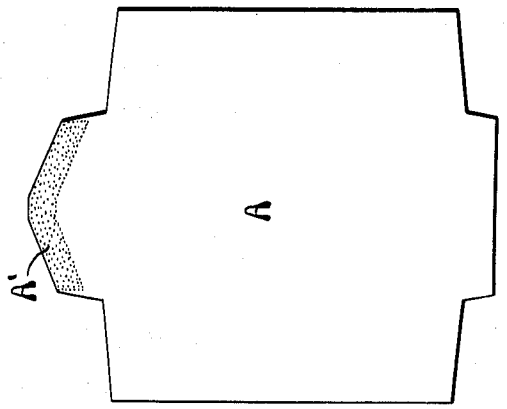
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5 SHEETS—SHEET 4.

Fig. V.



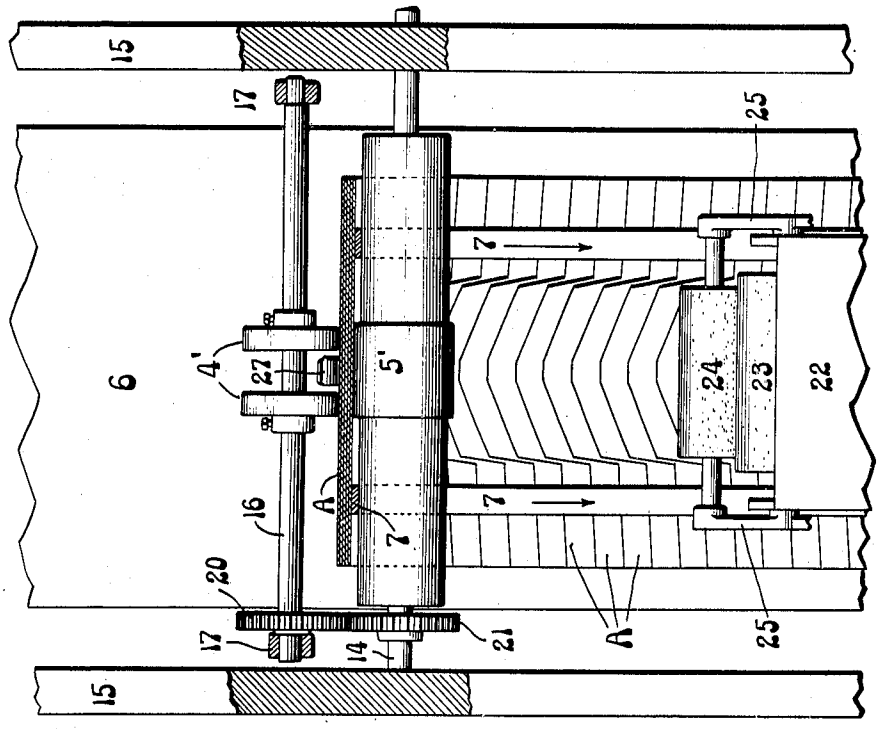


Fig. IV.

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5 SHEETS—SHEET 5.

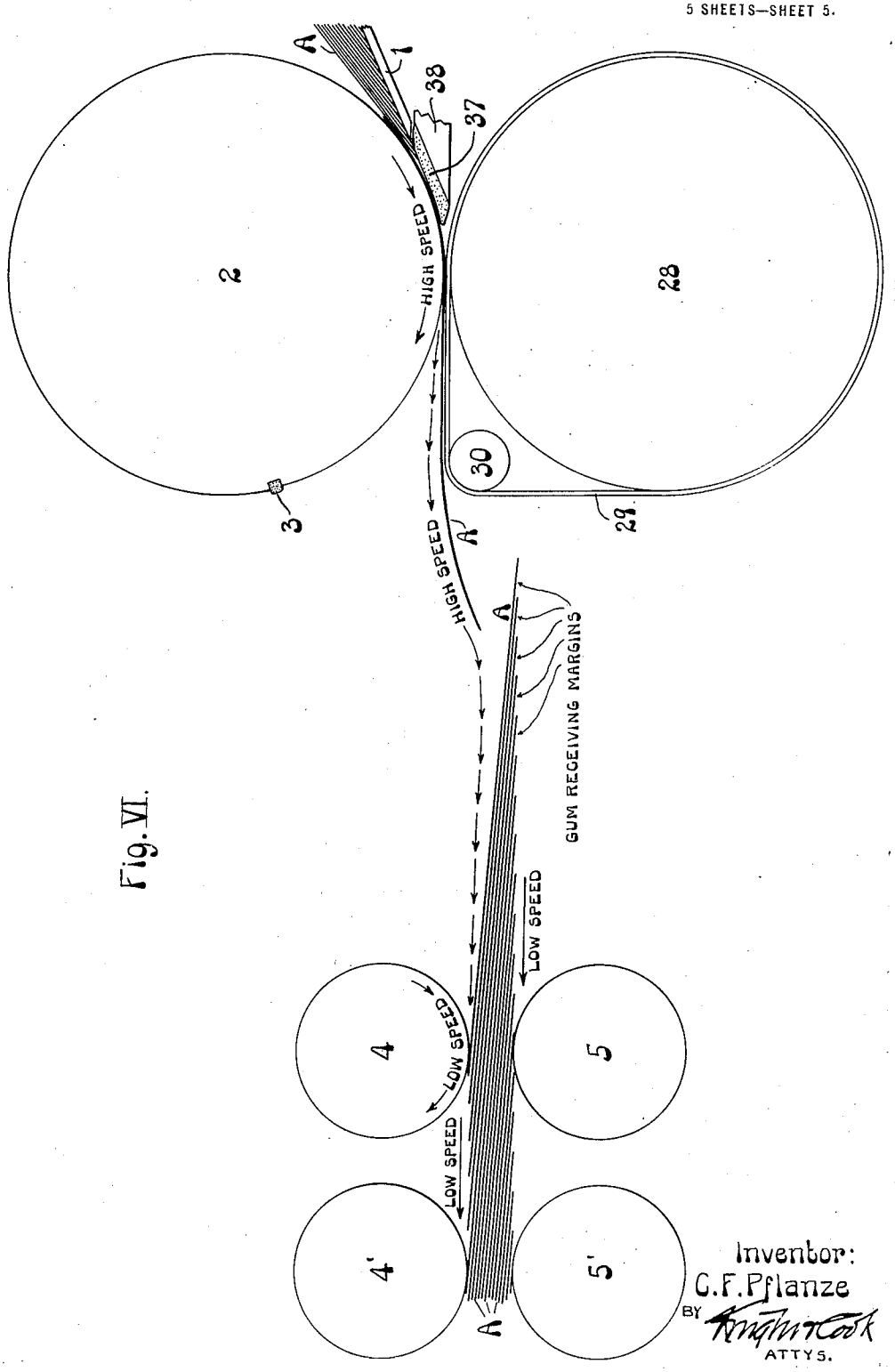


Fig. VI.

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UNITED STATES PATENT OFFICE.

CHARLES F. PFLANZE, OF ST. LOUIS, MISSOURI.

MEANS FOR FEEDING SHEET MATERIAL.

1,385,468. Specification of Letters Patent. Patented July 26, 1921.

Application filed November 23, 1917. Serial No. 203,523.

To all whom it may concern:

Be it known that I, CHARLES F. PFLANZE, a citizen of the United States of America, a resident of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Means for Feeding Sheet Material, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to methods of and means for feeding and gumming sheet material such, for example, as envelop blanks. The main features of the invention consist in a method of and means for arranging the sheets of material in a long continuous pile, so as to expose marginal portions of the sheets. It has heretofore been both difficult and expensive to accurately arrange envelop blanks, and the like, in this manner, and the earlier mechanical devices and methods have been otherwise unsatisfactory. The machine herein disclosed will take envelop blanks, one at a time, from a source of supply and arrange the blanks in a long continuous traveling pile, leaving marginal portions of the sheets exposed in a continuous line at one surface of the pile. The margins can be easily gummed by merely applying the gum to the continuous exposed surface.

More specifically stated, the preferred form of the invention comprises a high speed transmission device whereby sheets of material, such as envelop blanks, are taken one at a time from a pile and quickly transmitted to an accumulator, including a low speed feeding device whereby the sheets are advanced at a relatively low speed. The individual sheets, passing quickly from the source of supply, are retarded and permitted to accumulate in a long pile with their front and rear margins exposed at the top and bottom of the pile. The relatively high speed is so great that an entire individual sheet will be delivered to the traveling pile while the latter advances a distance equal to the width of one of the exposed margins.

The sealing flaps of envelop blanks are usually gummed by the means for gumming the other flaps which are closed and sealed by the envelop folding mechanism immediately after the gumming operations. If the flaps are gummed and sealed in this manner, complex mechanism must be employed and care must be exercised to prevent the fresh gum on the sealing flaps from contacting with the other elements, for the creasing and folding operations are performed while the gum is in an adhesive condition. However, if the sealing flaps are gummed and permitted to dry before the blanks are delivered to the mechanism for gumming and folding the other flaps, they can be creased, folded, closed and carried away from the machine by a comparatively simple mechanism. Therefore, one of my objects is to provide an efficient means for gumming the sealing flaps of envelop blanks before they are introduced into the means for gumming and folding the other flaps.

Another object is to produce a machine of the character described adapted to be easily adjusted to act upon envelop blanks of different dimensions, and also adjustable to arrange the blanks in such a manner that gum-receiving margins of any desired width can be exposed to the gumming device.

Figure I is a side elevation, partly in section, illustrating a feeding and gumming machine embodying the features of the present invention.

Fig. II is an enlarged plan view of a portion of the machine.

Fig. III is a section taken approximately on the line III—III, Fig. II.

Fig. IV is a section taken approximately on the line IV—IV, Fig. III, showing the long continuous pile of envelop blanks.

Fig. V is a detail view showing one of the envelop blanks.

Fig. VI is a diagrammatical view of the means for taking the blanks, one at a time, from an inclined pile, and arranging them in a long continuous pile so as to expose the gum-receiving margins.

Before pointing out the minor details of construction, I will briefly describe the general features of the new method and apparatus.

Fig. V shows a sheet of material in the form of an envelop blank A having its sealing flap gummed as shown at A′. Fig. VI diagrammatically illustrates an inclined pile of the blanks A resting upon an inclined support 1 near a high speed feeding or transferring device. These elements are also shown in Fig. III. The high speed feeder preferably includes a constantly rotating member 2 having a friction member 3, such as a small block of rubber, projecting from its periphery and adapted to en-

gage the top sheet of the adjacent pile, so as to deliver said top sheet to the high speed feeding device. The sheets are thus taken, one at a time, from the inclined pile and rapidly transmitted as indicated by arrows (Fig. VI) to a low speed feeding device including the rotating members 4, 4′, 5 and 5′. The sheets are retarded by the low speed feeding device and permitted to accumulate in a long continuous traveling pile. The high speed transferring device delivers one entire sheet to the low speed feeder while the latter advances the long pile of sheets a distance equal to the width of one of the gum-receiving margins.

In other words, if each gum-receiving margin is one inch wide, the high speed transferring device will deliver one entire sheet to the traveling pile while the latter advances a distance of one inch. As a result, the sheets accumulate with their gum-receiving margins exposed in a continuous line, as shown by Figs. IV and VI.

In addition to the rotating members 4, 4′, 5 and 5′, the low speed feeding device includes a large rotating drum 6 to which the long pile of sheets is delivered, as indicated by arrows in Figs. I and III, and endless bands 7 for retaining the sheets in engagement with the periphery of the drum. Each endless band 7 is fitted to idle wheels 8 and 9, and also to a tightener (Fig. I) consisting of a wheel 10 mounted at the upper end of an arm 11, the latter being pivoted at 12 and provided with a spring 13 tending to retain the band 7 in a taut condition. The rotary feeding members 5 and 5′ are in the form of long rolls secured to shafts 14 mounted in the main side frames 15. Shafts 16, secured to the rotary feeding members 4 and 4′, are mounted in arms 17 at opposite sides of the machine (Figs. II, III and IV), each of said arms being pivoted at 18 and provided with a spring 19 (Fig. III) tending to force the arm downwardly about the axis of its pivot 18. The rotary feeding members 4 and 4′ are thus yieldingly mounted above the feed rolls 5 and 5′, and the springs 19 tend to force the upper rotary members toward the lower rolls. The upper feeding members 4′ may consist of a pair of disks (Figs. II and IV) secured to shaft 16, and the end portions of the adjacent lower roll 5′ are preferably reduced in diameter (Figs. III and IV) to receive the pair of endless bands 7. Each of the yieldingly mounted upper shafts 16 is provided with a gear wheel 20 (Figs. II and IV) meshing with a gear wheel 21 on the adjacent lower shaft 14, so if the lower shafts 14 are driven, power will be transmitted, through the gear wheels 21 and 20, to the upper shafts 16. The teeth of these gear wheels are long enough to permit the upper feeding members 4 and 4′ to rise and fall without disengaging the gear wheels.

22 designates a gum receptacle (Figs. I, III and IV) provided with a roll 23 for transmitting gum to a gumming roll 24. The roll 24 is rotatably mounted in the upper ends of arms 25, the latter being pivotally mounted on the shaft of the roll 23. A spring 26 (Fig. I) is connected to the lower end of each arm 25 for the purpose of forcing the gumming roll 24 toward the large drum 6.

When the machine is in operation, the long pile of blanks accumulating with their gum receiving margins exposed as shown in Fig. VI, will travel in the direction indicated by arrows in Figs. I and III. More specifically stated, the long traveling pile of blanks passing from the rotary feeding members 4′ and 5′, will be deflected downwardly by a stationary deflector 27 (Figs. I and III) so as to travel between the endless bands 7 and the periphery of the large drum 6. The gum-receiving margins will be exposed, one after the other, in a continuous line, as shown by Figs. IV and VI, and the gumming roll 24 will apply a continuous film of gum to these margins. Thereafter, the gummed blanks will continue in motion at the relatively low speed. After traveling slowly with the large drum 6 and endless bands 7, for a considerable period of time, the gummed blanks will be discharged onto a table 28, as indicated by arrows in Figs. I and III. At this time, the gum is dry and the blanks can be easily handled and delivered to a suitable means for performing the other envelop making operations.

In passing from the rolls 4′ and 5′ to the drum 6, the blanks are bent downwardly, and during this bending operation, the margins of the blanks tend to buckle, or bend upwardly, at points between the rotary feeding members 4 and 4′. However, this does not in any way interfere with the delivery of the individual sheets to the feeding member 4. It is, therefore, an advantage to use two pairs of the rotary feeding members, with one pair in advance of the other, so as to avoid the undesirable results which would occur if the thin sheets of paper were permitted to buckle at points in the path of the rapidly moving sheet passing from the high speed transmission device.

In addition to the rotary feeding or projecting member 2, the high speed transmission device includes a roll 28 arranged directly below the rotary feeding member 2, and a belt 29 surrounding said roll 28 and fitted to a small idle roll 30 (Figs. II, III and VI) the belt 29 and the rotary member 2 are driven at the same peripheral speed by mechanism to be hereinafter described. Immediately after the sheets are projected by the high speed transmission device, they

are supported partly by the rotary members 4 and 4', and partly by a table arranged immediately in advance of the high speed transmission device. This table is adjustable, and it may consist of a section 31 (Figs. II and III) secured to the main side frames and a section 32 secured to a pair of side frame members 33. The adjustable table lies in a horizontal plane lower than the top surface of the belt 29, so that the sheets can be readily projected, one over the other. Wires 34 extend from a stationary rod 35 to a stationary bar 36, as shown in Figs. II and III for the purpose of limiting the upward movements of the rapidly moving sheets passing from the high speed transmission device. The rotary feed roll 4 is preferably grooved as shown in Fig. III, to receive the wires 34.

A friction member 37, preferably a block of rubber, is located adjacent to the rotary feeding member 2 (Figs. III and VI) so as to be engaged by the lower edges of the uppermost sheets on the inclined table 1. This friction member 37 is located so close to the rotating member 2 that the inclined sheets will not pass from the table 1 until they are engaged by the friction member 3 projecting from the periphery of the rotary member 2. When the friction member 3 traveling at a high rate of speed, engages the uppermost sheet on the inclined table 1, said sheet will be forced through the small gap at the member 37 and delivered to the belt 29. The sheet will then be advanced at a high rate of speed and delivered to the low speed feeding device. The next succeeding sheet on the inclined table 1 will be retarded by the stationary friction member 37, and prevented from following the rapidly moving sheet. By referring to Figs. III and VI it will be observed that the lower edges of the inclined pile of sheets engage the inclined table 1 or the friction member 37, and that these sheets are free to drop by gravity so as to pass successively to the high speed feeding device. In actual practice, I have found it necessary, or desirable, to accurately adjust the friction member 37 relative to the periphery of the rotary member 2. The friction member 37 is, therefore, secured to a lever 38 pivotally connected at 39, to the upper end of an arm 40. This arm 40 is adjustably mounted on a rod 41. A bolt 42, pivoted to the arm 40, passes through the lever and a nut 43 may be adjusted for the purpose of moving said lever 38 on the axis of its pivot 39. A compression spring 44 surrounding the bolt 42, maintains the lever 38 in engagement with the nut 43.

The inclined table 1 is provided with depending arms 45 (Figs. I and III) adjustably mounted on a rod 46.

All of the elements of the high speed transmission device, including the shafts 2' and 28' secured to the members 2 and 28, are supported by the side frame members 33, and said members 33 are adjustably mounted on horizontal guide rods 47. Set screws 48 (Figs. I and III) may be used to secure the side frame members 33 to the guide rods 47. The high speed transmission device is thus mounted in such a manner that it can be adjusted toward and away from the low speed feeder to provide for the transferring and accumulation of sheets of different dimensions. For the same reason, the table section 32, in advance of the high speed transmission device, is attached to the adjustable side frame members 33.

The distance between the high speed transmission device and the low speed feeder is preferably a little greater than the length of one of the individual sheets, the object being to positively disengage each individual sheet from the high speed transmission device before the sheet reaches the low speed feeder. The sheets are therefore projected from the high speed feeder and thrown for a slight distance, under the influence of momentum, to the low speed feeding elements 4 and 5.

Obviously, it is desirable to handle sheets of different dimensions, and this can be done by merely adjusting the high speed transmission device toward or away from the low speed feeder. It will not be necessary to make any other adjustment unless the width of the gum-receiving margin is to be changed. The high speed transmission device will act upon sheets of various lengths, the circumference of the rotary feeding member 2 being large enough to feed a sheet of the maximum length, and if smaller sheets are introduced into the machine, the rotary feeder 2 will turn idly for a brief interval of time immediately after it delivers one of the sheets to the low speed feeding device. Only one sheet will be delivered during each revolution of the rotary member 2, for this member has only one projecting friction element 3, and the sheets will not pass from the inclined pile until engaged by said friction member 3.

For the foregoing reasons, the high speed transmission device can be very easily and quickly adjusted to coöperate with the low speed feeder in handling sheets of material of various different lengths. However, if the width of the gum-receiving margin is to be changed, a different kind of adjustment must be made.

To understand this point it is important to observe that the high speed transmission device delivers one complete sheet of material during the time required for the low speed feeder to advance the sheets a distance equal to the width of one gum-receiving margin. As previously stated, if the gum-

receiving margin is to be one inch wide, the low speed feeder will advance the sheets a distance of one inch during the time required for the high speed device to deliver a complete sheet to the traveling pile. Therefore, the width of the gum-receiving margin depends upon the difference between the high speed and the low speed, and not upon the length of the sheet. The means for changing the relative speeds will be presently described.

Any suitable power transmission devices may be utilized to actuate the different elements of the machine, and it is to be understood that the invention is not limited to the mechanism, herein shown. This driving mechanism is shown most clearly in Figs. I and II. 50 designates a gear wheel secured to the shaft 2′ and meshing with a gear wheel 51 on the shaft 28′. Assuming that power is transmitted to the shaft 28′, motion will be transmitted through the gear wheels 50 and 51 for the purpose of driving the rotary member 2 in synchronism with the belt 29 on the rotary member 28. The shaft 28′ is therefore revolved at a relatively high speed, so as to properly actuate the high speed transmission device. The low speed feeding device is driven through the medium of a small sprocket wheel 52 fixed to the power shaft 28′, a large sprocket wheel 53 fixed to one of the shafts 14, and a sprocket chain 54 fitted to said wheels 52 and 53. A spring actuated tightener 55 may be fitted to the chain 54, as shown in Fig. I, to compensate for adjustments of the high speed transmission device. The sprocket wheel 52 is detachably secured to the power shaft 28′ by means of a set screw 56, (Fig. II) and the relative speeds of the two cooperating feeding devices may be changed by removing the sprocket wheel 52 and substituting therefor a larger or smaller sprocket wheel.

The power transmission devices also include sprocket wheels 57 (Figs. I and II) secured to the shafts 14, and a sprocket chain 58 fitted to said sprocket wheels. The large drum 6 may be driven through the medium of a pinion 59 fixed to one of the shafts 14 and meshing with a larger gear wheel 60, the latter being fixed to a shaft 61 provided with a sprocket wheel 62. 63 designates a sprocket chain for transmitting movement from the sprocket wheel 62 to a much larger sprocket wheel 64 (Fig. I) on the shaft 6′ to which the drum 6 is secured.

All of the power mechanism may be driven continuously, with the result of rapidly transferring the sheets, one at a time, from the inclined pile, at the same time causing the sheets to accumulate, one over the other, in a long slow-moving pile with their gum-receiving margins exposed in a continuous line, as previously pointed out.

I claim:

1. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed rotary transmission device whereby individual sheets are discharged one over the other, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, said accumulator including a low speed feeding device comprising a pair of rotary feed rolls arranged in advance of said rotary transmission device to receive the sheets discharged therefrom.

2. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed rotary transmission device whereby individual sheets are discharged one over the other, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, said accumulator including a support arranged in advance of said high speed rotary transmission device to receive the sheets discharged therefrom, and a low speed feeding device comprising a pair of rotary feed rolls arranged in advance of said support to feed the sheets therefrom.

3. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed feeding device whereby the sheets of material are transmitted at a relatively high speed, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, said accumulator including a low speed feeding device arranged to receive the sheets discharged from said high speed feeding device, one of said feeding devices being adjustable toward and away from the other to provide for the transferring and accumulation of sheets of different dimensions.

4. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed feeding device whereby the sheets of material are transmitted at a relatively high speed, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, said accumulator including a low speed feeding device arranged to receive the sheets discharged from said high speed feeding device, a support for one of said feeding devices, a guide on which said support is adjustably mounted, and means for securing said support in different positions to provide for the transferring and accumulation of sheets of different dimensions.

5. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed feeding device whereby the sheets of material are transmitted at a relatively high speed, and an accumulator whereby the sheets are re-

tarded and caused to accumulate in a long continuous pile, said accumulator including a support arranged in advance of said high speed feeding device to receive the sheets discharged therefrom, and a low speed feeding device arranged in advance of said support to feed the sheets therefrom, one of said feeding devices and a portion of said support being adjustable toward and away from the other feeding device to provide for the transferring and accumulation of sheets of different dimensions.

6. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed transmission device whereby the sheets are transmitted at a relatively high speed, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, said accumulator including a pair of feed rolls arranged to receive the sheets discharged from said high speed transmission device, a second pair of feed rolls to which the sheets are fed by the first mentioned rolls, and a rotary drum arranged to receive the sheets passing from said second pair of feed rolls.

7. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed transmission device whereby the sheets are transmitted at a relatively high speed, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, said accumulator including a pair of feed rolls arranged to receive the sheets discharged from said high speed transmission device, a second pair of feed rolls to which the sheets are fed by the first mentioned rolls, a rotary drum arranged to receive the sheets passing from said second pair of feed rolls, and a deflector arranged to deflect the sheets from said second pair of feed rolls to the periphery of said rotary drum.

8. In a machine for feeding and arranging sheets of material to expose marginal portions thereof, a high speed transmission device whereby the sheets are transmitted at a relatively high speed, and an accumulator whereby the sheets are retarded and caused to accumulate in a long continuous pile, an actuating mechanism including means whereby the speed of one of said devices may be changed independently of the other so as to provide for the exposure of margins of different widths.

In testimony that I claim the foregoing I hereunto affix my signature.

CHARLES F. PFLANZE.