

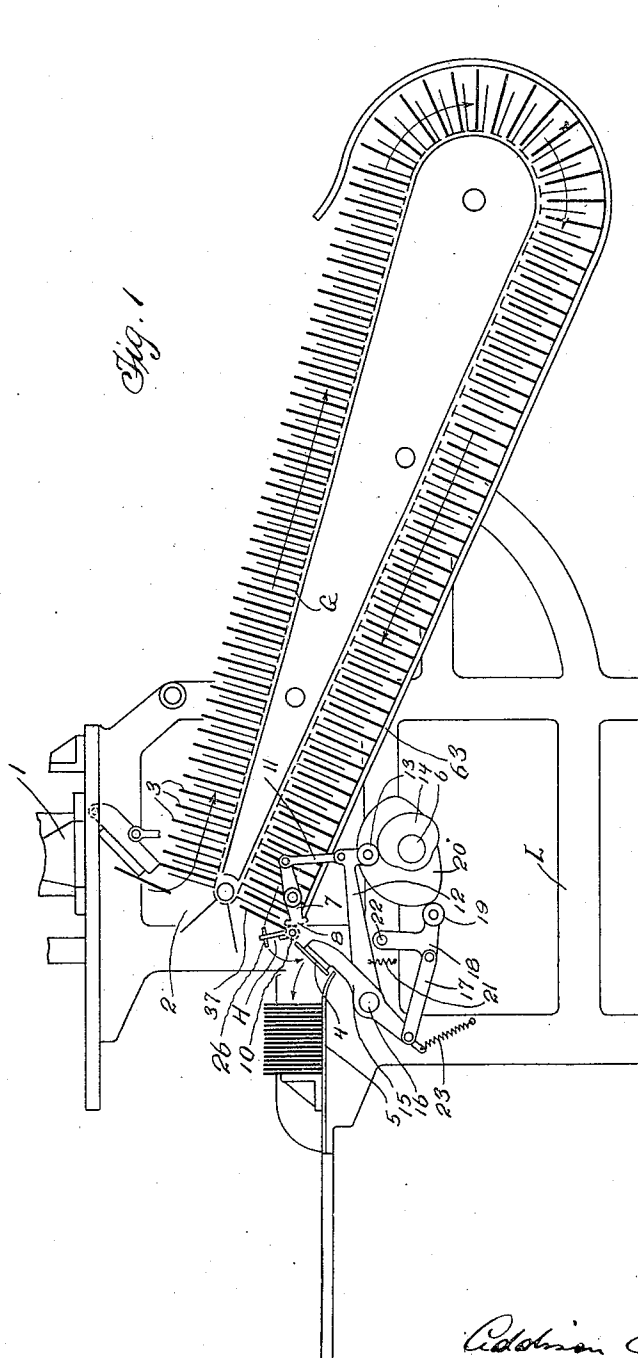
A. E. AUGUSTINE;
GRIPPER MECHANISM FOR ENVELOPE MAKING MACHINES.

APPLICATION FILED JULY 12, 1920.

1,421,889.

Patented July 4, 1922.

3 SHEETS—SHEET 1.



Inventor
Adolphe E. Augustine
By *his* Attorney
Samuel H. Anderson

GRIPPER MECHANISM FOR ENVELOPE MAKING MACHINES.

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3 SHEETS—SHEET 2.

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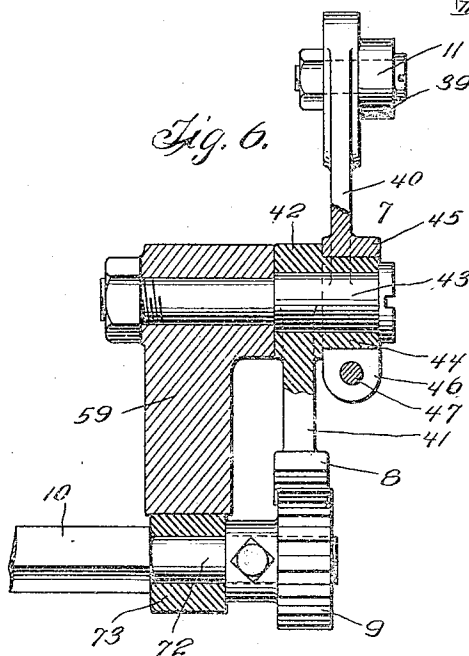
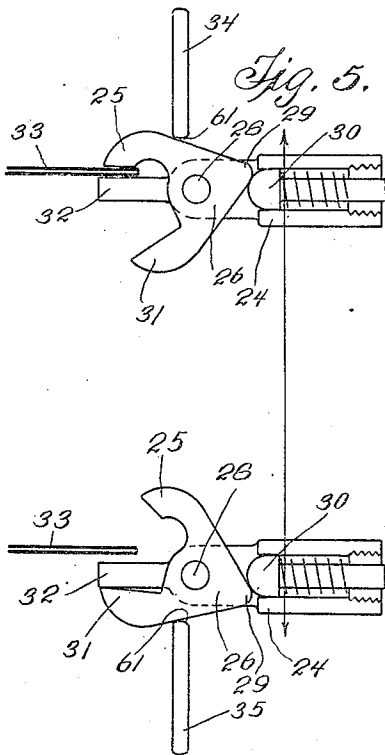
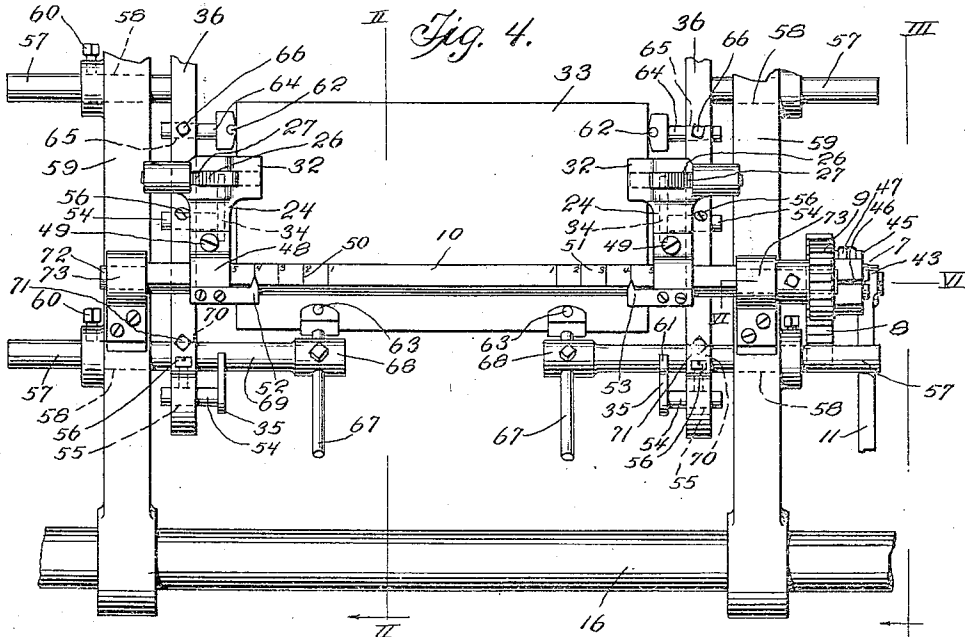
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3 SHEETS—SHEET 3.



Inventor
A. E. Augustine
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UNITED STATES PATENT OFFICE.

ADDISON E. AUGUSTINE, OF HACKENSACK, NEW JERSEY, ASSIGNOR TO CHESTER MACHINE CO. INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

GRIPPER MECHANISM FOR ENVELOPE-MAKING MACHINES.

1,421,889.

Specification of Letters Patent.

Patented July 4, 1922.

Application filed July 12, 1920. Serial No. 395,666.

To all whom it may concern:

Be it known that I, ADDISON E. AUGUSTINE, residing at Hackensack, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Gripper Mechanism for Envelope-Making Machines, of which the following is a specification.

This invention relates to an envelope-making machine and particularly to an improved gripper device and associated mechanism therefor.

In machines of this general character, after the envelopes have become dry, they are picked out of the drying mechanism by what is known in the art as a gripper device, and by this gripper device are transferred to the delivery mechanism.

A particular object of the present invention is to provide improved means whereby to regulate and control the operation of the gripper device.

A further object is to provide improved means whereby the gripper device is rendered adjustable for successfully operating upon envelopes of various sizes.

A further and more detailed object is to provide improved, simplified and efficient means whereby the various movements and operations of the gripper device are readily adjustable in numerous respects so that the gripper device may be easily made to function in a correct manner at all times and notwithstanding the various imperfections which inevitably occur in the manufacture and assembling of mechanism of this character.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of elements, combinations, arrangements of parts and applications of principles, constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification,

and in which I have shown merely a preferred form of embodiment of the invention:—

Figure 1 is a diagrammatic view illustrating in side elevation an envelope-making machine having associated therewith a gripper device operating in accordance with this invention.

Figure 2 is an enlarged vertical sectional view through a portion of the machine containing the gripper device, the section being taken substantially upon the plane of line II of Fig. 4.

Figure 3 is an elevational view of substantially the same parts as seen in Fig. 2, the view in this instance, however, being taken from a plane indicated III of Fig. 4.

Figure 4 is a front elevational view of the structure seen in Figs. 2 and 3.

Figure 5 is a diagrammatic view presented for graphically illustrating two different positions of the gripper fingers, and

Figure 6 is an enlarged horizontal sectional view taken substantially upon the plane of line VI of Fig. 4.

By referring to the drawings herewith presented by way of illustrating the exemplary embodiment of this invention, the reference character L indicates the main frame of the envelope-making machine. The envelopes feed downwardly from a folding mechanism 1 into the spaces, as 2, occurring between the leaves, or fins, 3 of the drying chain G.

The chain G moves step by step in the direction indicated by the arrows, and the envelopes, having been newly gummed just prior to entering the chain, have ample time to dry during their transit with the chain.

As the envelopes reach the upper end of the lower lead of the chain, they are lifted out of the chain by the gripper device, indicated generally by the reference character H in Fig. 1, and are placed upon the surface of a delivery plunger 4 by which they are delivered on to a delivery table 5, being piled one against the other by the plunger 4, substantially as indicated.

Both the gripper device and the plunger are arranged to be operated from a common drive shaft 6 extending across the machine. The gripper device comprises in part a pivotally mounted lever 7 having a segment 8 at one end engaging the teeth of a small gear 9 by which oscillatory movement of the lever is transmitted in kind to the shaft 10 carrying said gear.

The lever 7 is connected by a link 11 with a second lever 12 carrying an anti-friction roller 13 bearing against a cam 14 carried on the shaft 6.

The plunger 4 is formed at the free end of a lever 15 pivotally mounted upon a shaft 16 and connected by a link 17 with a second lever 18 carrying an anti-friction roller 19 bearing upon a cam 20 also carried by the shaft 6.

The lever 12 is conveniently mounted upon the shaft 16 and a spring 21 normally urges the lever downwardly so that the roller 13 is held at all times against the cam 14.

The lever 18 is pivotally mounted, as at 22, upon a stationary part of the frame L and a spring 23 operates to hold this lever so that the roller 19 is at all times pressed into engagement with the cam 20.

The shaft 10 of the gripper device is preferably squared and carries a pair of gripper arms 24 so that said arms swing therewith.

At the outer end of the arms 24 are the gripper fingers 25 arranged so that they will grip the envelopes one after the other as the envelopes are brought up by the chain G and will deposit the envelopes on to the face of the plunger 4.

The mechanism thus briefly described is so timed that during the rotation of the shaft 6 the gripper fingers will be swung upwardly to grip an envelope from the chain at substantially the same time that the plunger 4 moves backwardly to receive the envelope. By the time the envelope has been swung around on to the surface of the plunger, the plunger is already moving, or is about to begin movement, toward its delivery position. The envelope is thus lifted away from the gripper fingers and is carried on to the delivery table while the gripper fingers swing again upwardly to receive a further envelope. This operation is repeated rapidly once at each revolution of the shaft 6.

Each of the gripper arms 24 carries one gripper finger and the two are identical in construction and operation except that they are reversed with respect to each other so that they will correctly operate at opposite ends of the envelope. The gripper fingers, as 25, are each formed as a part of a plate 26 pivotally mounted at the free ends of the arms 24, being received in horizontal slots 27 in said arms and being pivotally mounted within said slots by means of pivot pins 28. Each plate has a heel portion 29 arranged

to receive pressure from a spring pressed plunger 30 and has also an extension stop 31 opposed to the finger 25 but spaced therefrom at the opposite side of a relatively stationary portion 32 of the arm 24. In operation the plunger 30, standing at one side of the heel 29, will press the gripping finger 25 against the portion 32 of the arm 24, or against an interposed portion of an envelope 33 to hold the envelope for movement with the arm. Or, the plunger 30, standing at the opposite side of the heel 29, will press the stop 31 against the portion 32 of the arm and thus hold the finger 25 so spaced away from the portion 32 as to facilitate either the introduction, or the removal of an envelope, all as clearly seen in Fig. 5.

Upper and lower adjustable stops 34 and 35 are provided for controlling the movements of the gripping fingers from gripping to releasing position, there being a pair of these stops for each of the gripper arms. The stops 34 are carried each by a separate supporting member 36 and said stops are positioned so that they will be engaged by the gripping fingers as the arms swing upwardly.

By the time the arms have reached a position in which the parts 32 of said arms lie adjacent to an envelope, as 37, which is to be picked out of the chain G, the gripping fingers 25 come into engagement with the stops 34 and are moved so that the heels 29 pass the plungers 30 and cause the gripping fingers to snap into engagement with the envelope, the plungers continuing to exert pressure for holding the envelopes against accidental displacement, (see upper part of Figure 5).

The arms now swing downwardly carrying the envelope. By the time the arms reach a position in which the envelope engages the face of the plunger 4, the extensions 31 strike against the stops 35 and cause the gripping fingers to be swung free of engagement with the envelope so that the envelope can be carried away from the arms by the plunger. The plungers 30 now engage the opposite side of the heels 29 and hold the gripping fingers in non-gripping position, (see lower part of Fig. 5) until the arms swing again upwardly to carry said gripping fingers into engagement with the stops 34 for gripping a further envelope.

It will be recognized that in this operation the relation of the stops 34 and 35 to the gripper arms must be adjusted with considerable accuracy, and also that the movements of the gripper arms must be adjusted with much accuracy with respect to the stops 34 and 35 and to the position occupied by the envelopes within the chain, as well as with respect to the position and timing of the plunger.

In the first place, the degree of swing im-

parted to the arms by the mechanism, including the cam 14, the lever 7 and the cam 9, must be adjustable so that the amount of movement of the envelope will be correct.

5 For this purpose the lever 7 has a slot provided therein within which the pivot pin 39 for the link 11 engages, said pivot pin being adjustable along the length of the slot so that a given movement of the link may be made to impart any desired extent of arcuate movement to the lever.

Second: The precise point of beginning and ending of swing of the arms must be adjusted so as to bring the part 32, when in its upper position, in proper register with the envelope to be gripped, and when in its lower position, to bring the envelope into proper timed relation with the plunger. For this purpose the lever 7 is made up of two separately formed parts 40 and 41, as best seen in Fig. 6, the part 40 being connected with the link 11, and the part 41 carrying the segment 8. The part 41 has a hub portion 42 which is mounted upon the pivot pin 43 and which is formed with a concentric bearing extension 44 upon which a hub portion 45 of the part 40 is mounted. The hub portion 45 of the part 40 is split, as at 46, and provided with a clamp screw 47 by means of which it may be rigidly connected with the extension 44 in any position of rotary adjustment to which it may have previously been moved upon said extension.

After the clamp screw has been screwed tight, the parts 40 and 41 of the arm 7 maintain fixed relation to each other throughout the subsequent operation of the machine but are at the same time capable of being readily adjusted whenever desired. By this feature of adjustment the point of beginning and stopping of the movement of the gripper arms may be definitely set.

Third: The precise position of the two gripper arms 24 with respect to the portion of the envelope to be gripped by the fingers 25 must be adjusted in accordance with the length of the particular envelope at the time being made; that is, so that the part 32 of the gripper arms will stand to overlap just the proper proportion of the length of the envelope. For this purpose the arms 24 are connected with the squared shaft 10, each by means of a clamp portion 48 which slidably engages the shaft and which is adapted to be tightened upon the shaft at will by means of a set screw or the like 49. To facilitate and simplify the operation of adjusting the arms to different positions, the shaft may be provided with two scales 50 and 51 thereon, one for each of the arms, and the arms be provided with pointers 52 and 53 for movement along the scales. In this instance the scales are marked off in accordance with the different standard sizes of envelopes which the machine is adapted to make. Movement

of the arms along the shaft to bring the pointers 52 and 53 in register with a corresponding number on each of the scales, will place the arms in proper position for operating upon envelopes of the particular size 70 indicated by that number on the scale. Any other appropriate means for indicating the desired position for the arms may be employed, if desired, or the pointers 52 and 53 may be of a different shape or arrangement. 75 Or they may be omitted altogether, the edge of the arms being relied upon as an indicating pointer upon the scale in this case.

The shaft 10 being rectangular in cross section, and the clamp portions 48 of the 80 arms being correspondingly shaped, the arms are at all times held in parallelism regardless of the positions of the arms longitudinally of the shaft.

Fourth: The precise position of the stops 85 34 and 35 for operating the gripper fingers must be adjusted in a direction longitudinally of the shaft 10 to correspond with the adjustment of the arms 24 along said shaft for operating upon different sized envelopes. 90 In this respect the stops 34 and 35 must at all times stand in just the proper relation to the pivots 28, upon which the gripper fingers are mounted, so that the gripper finger plates 26, in swinging against said stops, 95 will engage the stops with the pivots 28 upon the proper side of the stops to produce a swinging movement of the plates about the pivots.

For this purpose the stops 34 and 35 are 100 mounted upon carrying pins 54 which are longitudinally slidable within openings 55 formed through the supporting brackets 36, set screws or the like, as 56, being provided for retaining the stops in any position to 105 which they are moved.

Furthermore, the supporting brackets 36 are themselves adjustable so that if desired the stops 34 and 35, carried by each supporting bracket, may be moved together by 110 adjusting said supporting brackets. For this purpose the supporting brackets 36 each have connected therewith a pair of studs 57 which extend through apertures 58 formed in the stationary frame members 59 and 115 which are held in any position of longitudinal adjustment within said openings by means of set screws, or the like, 60.

Fifth: The precise position of these stops 34 and 35 must be adjusted so that the outer 120 surfaces 61 of said stops, against which the gripper finger plates 26 impinge, will stand in exactly the correct position so that the given adjusted amount of movement of the gripper arms in bringing the gripper finger 125 plates against these surfaces, will result in a full and complete movement of the plates from one position to another relative to the spring plungers 30. This is of extreme importance since after adjustments of the grip- 130

per arms, as heretofore mentioned, have been made, said arms will, in operation, always swing between two given precise points which are determined largely by the position of the envelopes being dealt with. The surfaces 61 then must be brought into positions to bear correct relation with the stopping points of the arms.

For this purpose the carrying pins 54, upon which the stops are carried, are mounted to be adjustably rotatable within the bearing openings 55, and the surfaces 61 of the stops are shaped so as to extend in a plane which is tangential or eccentric to the center of rotation of the carrying pins.

The set screws 56 will hold the stops in any position to which they may be rotated. Portions of the surfaces 61, which portions lie closer to, or further from, the center of rotation of the carrying pins, may thus be brought into position as desired for engaging the gripper finger plates. A slight rotation in one direction or the other of the stops will produce operation of the gripper finger earlier or later according to the direction of movement of the stops. When the correct position is determined the stops thereafter are held immovable by the set screws 56.

Guide rods 62 and 63 are provided extending along the length of the chain G for guiding the envelopes to the point where they are picked out of the chain by the grippers. These guide rods may be supported in any appropriate manner but preferably are supported by the supporting brackets 36 so that they may be adjusted with said supporting brackets whenever said brackets are moved to change the position of the stops 34 and 35. The guide rods 62 and 63 are also adjustably connected with said supporting brackets. The guide rods 62 are connected with the supporting brackets by means of carrying pins 64 which extend slidably through openings 65 formed in the supporting brackets and which are held in any adjusted position relative to the supporting brackets by means of set screws, or the like, as 66. These guide rods 62 stand at opposite sides of the envelope and obviously must bear a correct relation as to position with respect to the stops 34 and 35, as well as to the gripper arms. The manner of mounting these guide rods upon the supporting brackets 36 enables them to be moved either with the stops when ever the stops are moved, or to be moved into a desired adjusted position relative to said stops.

The guide rods 63 are positioned beneath the envelopes so that the edge of the envelopes rest thereon. They are carried upon supporting pins 67 which are adjustably held in supporting heads 68. The supporting heads 68 are carried upon extension parts 69 of the lower studs 57 so that the guide

rods 63 are made adjustable toward and away from each other with the supporting brackets 36.

If desired, however, the supporting brackets 36 may be adjusted toward or away from each other without moving the guide rods 63. Note in this connection that the supporting brackets 36 have apertures 70 there-through to slidably receive the extensions 69 and that the set screws 71 are provided for holding the supporting brackets in any position of adjustment longitudinally of said extensions.

The shaft 10, carrying the gripper arms, has its opposite end portions 72 made cylindrical and rotatably mounted within bearing members 73 carried upon the frame pieces 59.

As many changes could be made in this construction without departing from the scope of the following claims, it is intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, and each of said stop members being pivotally mounted and having its striking surface portion lying in a plane eccentric to the pivotal axis of the stop for the purpose set forth.

2. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, each of said stop members comprising a plate having a pivotal extension part, bearings within which said extension parts are rotatably mounted, and said plates having edge surface portions disposed eccentric to the pivotal axis of said extension parts for the purpose set forth.

3. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, and

means for moving said gripping fingers comprising a carrying shaft, arms at the outer end of which said fingers are mounted; said carrying shaft being of rectangular cross section, said arms having rectangular openings to receive said shaft so that said arms are slidable longitudinally along said shaft while at the same time being non-rotatable upon said shaft, and means to hold the arms in any adjusted position longitudinally of said shaft.

4. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, arms at the outer end of which said fingers are mounted, said carrying shaft being of rectangular cross section, said arms having rectangular openings to receive said shafts so that said arms are slidable longitudinally along said shaft while at the same time being non-rotatable upon said shaft, means to hold the arms in any adjusted position longitudinally of said shaft, and said shaft having duplicate indications thereon adjacent each of said arms whereby to indicate the required movement for said arms, for the purpose set forth.

5. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, arms at the outer end of which said fingers are mounted, said carrying shaft being of rectangular cross section, said arms having rectangular openings to receive said shaft so that said arms are slidable longitudinally along said shaft while at the same time being non-rotatable upon said shaft, means to hold the arms in any adjusted position longitudinally of said shaft, said shaft having duplicate scales thereon adjacent each of said arms, and pointers carried one by each of said arms to register with said scales, for the purpose described.

6. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement,

stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, arms at the outer end of which said fingers are mounted, said carrying shaft being of rectangular cross section, said arms having rectangular openings to receive said shaft so that said arms are slidable longitudinally along said shaft while at the same time being non-rotatable upon said shaft, and the portions of said arms engaging said shaft comprising clamps by which to hold the arms fixed in any position of adjustment longitudinally of the shaft.

7. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, a gear connected with said shaft, a pivotally mounted lever having a toothed segment at one end engaging said gear, and operating means engaging the opposite end of said lever beyond the pivot of the lever of a character to swing the lever about its pivot for oscillating said shaft.

8. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, a gear connected with said shaft, a pivotally mounted lever having a toothed segment at one end engaging said gear, and operating means engaging the opposite end of said lever beyond the pivot of the lever of a character to swing the lever about its pivot for oscillating said shaft, together with means adjustable to vary the extent of rotation imparted by a given extent of movement imparted to the lever by said operating means.

9. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fin-

gers comprising a carrying shaft, a gear connected with said shaft, a pivotally mounted lever having a toothed segment at one end engaging said gear, and operating means engaging the opposite end of said lever beyond the pivot of the lever of a character to swing the lever about its pivot for oscillating said shaft, together with means adjustable to vary the radial position of the arc of movement imparted to said shaft by a given movement of said operating means.

10. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, a gear connected with said shaft, a pivotally mounted lever having a toothed segment at one end engaging said gear, and operating means engaging the opposite end of said lever beyond the pivot of the lever of a character to swing the lever about its pivot for oscillating said shaft, together with means adjustable to vary both the extent and the radial position of arcuate movement imparted to said shaft by a given movement of said operating means.

11. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, a gear connected with said shaft, a pivotally mounted lever having a toothed

segment at one end engaging said gear, and operating means engaging the opposite end of said lever beyond the pivot of the lever of a character to swing the lever about its pivot for oscillating said shaft, said lever being made up of separate members one carrying said segment and the other having connection with the operating means, together with means whereby said members are adjustable with respect to each other for the purpose set forth.

12. A gripper device for envelope-making machines comprising gripping fingers mounted to move from one position to another and to be operated into gripping and non-gripping positions by striking obstructions at opposite ends of its path of movement, stop members constituting obstructions arranged at opposite ends of said path of movement to be engaged by said gripping fingers, means for moving said gripping fingers comprising a carrying shaft, a gear connected with said shaft, a pivotally mounted lever having a toothed segment at one end engaging said gear, and operating means engaging the opposite end of said lever beyond the pivot of the lever of a character to swing the lever about its pivot for oscillating said shaft, said lever being made up of separate members one carrying said segment and the other having connection with the operating means, one of said members having a portion constituting the pivotal mounting of the lever and having an extension bearing provided thereon concentric with the pivotal support of the lever, and the other member having a portion rotatably adjustably engaging said extension for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

ADDISON E. AUGUSTINE.

Witnesses:

L. GESSFORD HANDY,
MAY SCHULZ.