W. S. IRELAND.

TYPE WRITING MACHINE.

APPLICATION FILED NOV. 18, 1916.

1,278,472.

Patented Sept. 10, 1918.

2 SHEETS—SHEET 1.

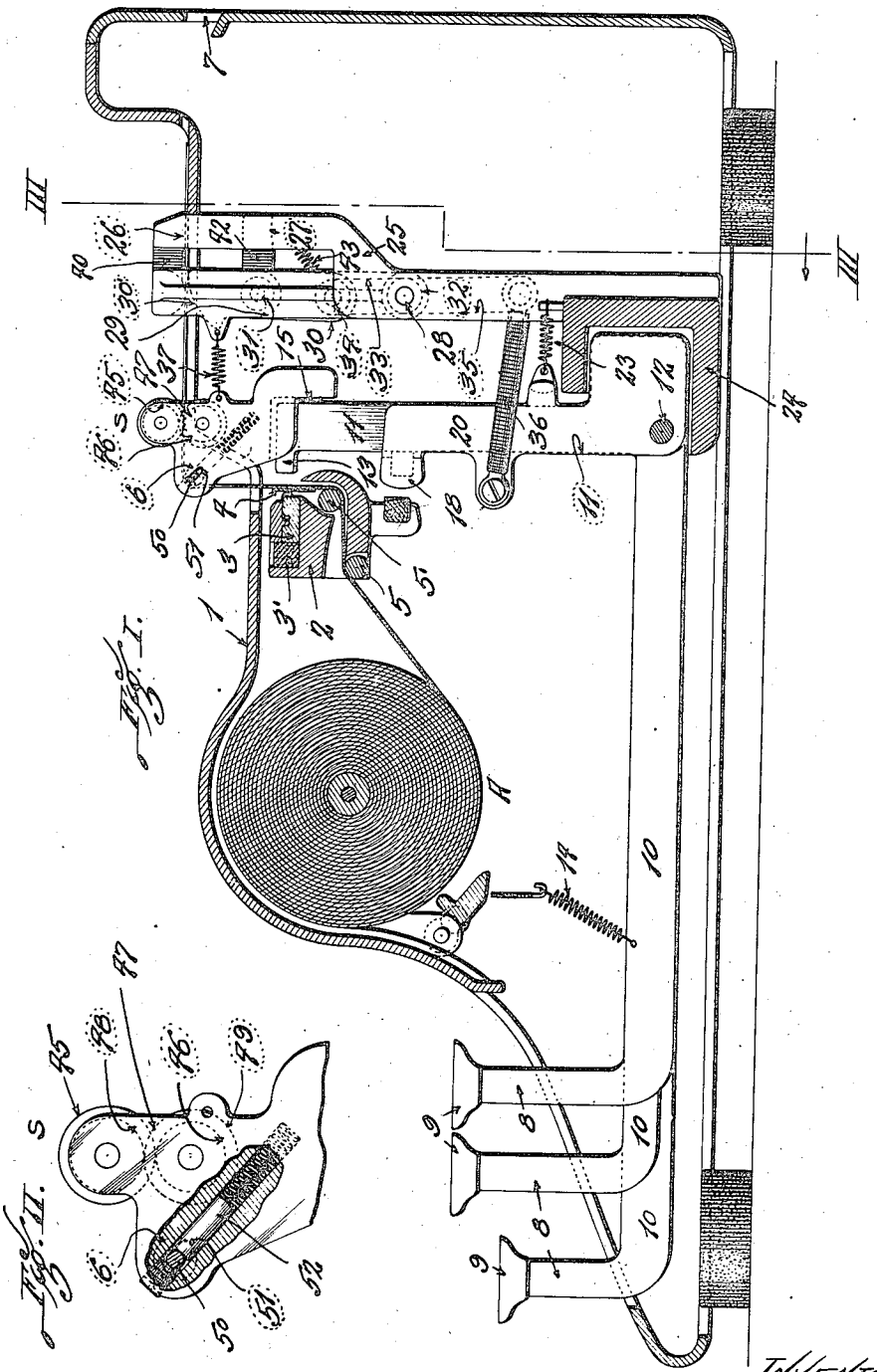


Fig. I.

Fig. II.

INVENTOR.

W. S. IRELAND,

BY Knight & Cook ATTYS.

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2 SHEETS—SHEET 2.

Fig. III.

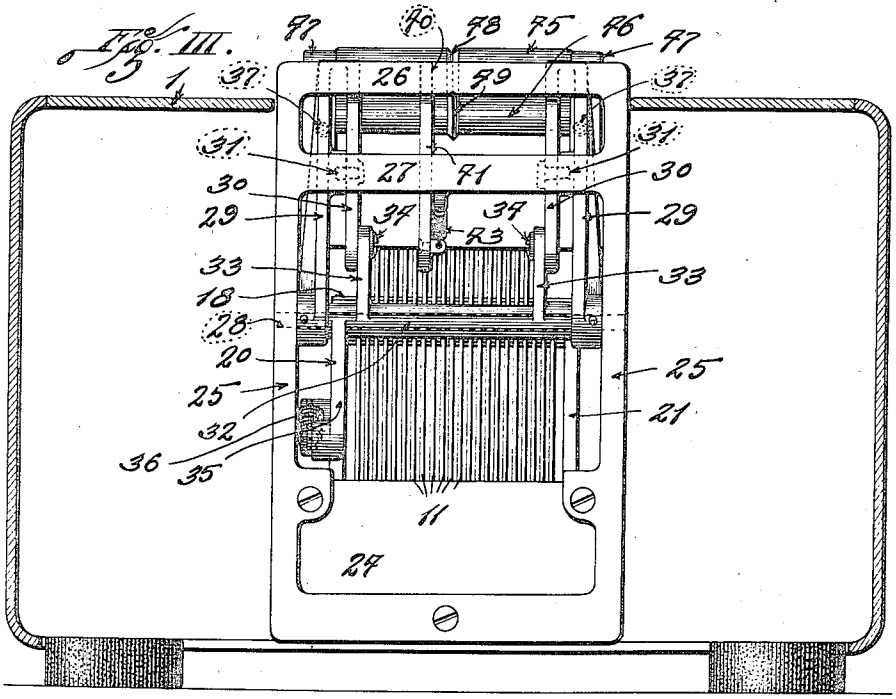


Fig. IV.

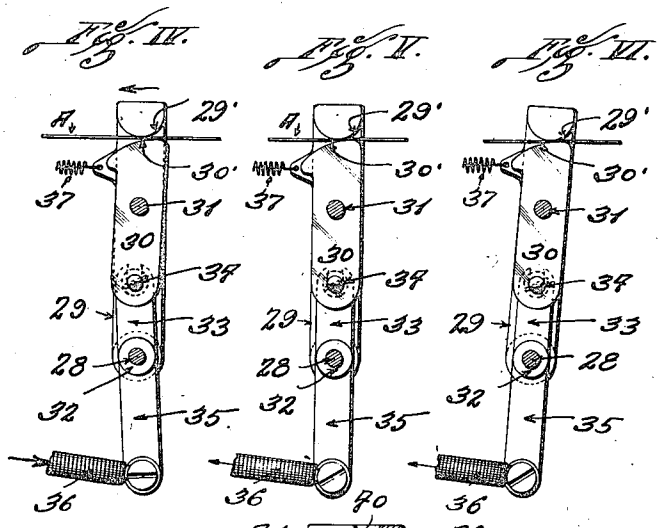
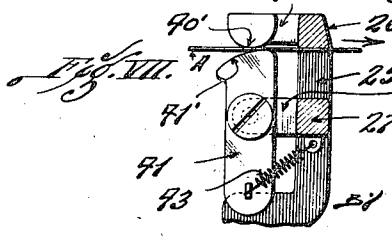


Fig. V.

Fig. VI.

Fig. VII.



INVENTOR.

W. S. IRELAND,

Knight Cook & Attys.

UNITED STATES PATENT OFFICE.

WARD S. IRELAND, OF ST. LOUIS, MISSOURI, ASSIGNOR TO NATIONAL SHORTHAND MACHINE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,278,472. Specification of Letters Patent. Patented Sept. 10, 1918.

Application filed November 18, 1916. Serial No. 132,063.

To all whom it may concern:

Be it known that I, WARD S. IRELAND, 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 Type-Writing Machines, 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 improvements in typewriting machines, and more particularly to paper feeding mechanism adapted for use in shorthand machines. One of the objects of the invention is to produce a strong, simple and accurate paper feeding device adapted to coöperate with the finger keys of a shorthand machine, and adapted to advance the paper a fixed distance during each key operation. To insure the desired accuracy, the paper feeding device preferably includes gripping elements which positively grip the paper and hold it very firmly throughout the paper feeding operation. The paper feeding device moves a fixed distance during each operation, and since the paper is prevented from slipping by the positive gripping devices, it also travels a fixed distance during each operation. An accurate paper feeding device of this kind is particularly adapted for use in a shorthand machine wherein the paper is to be fed step by step (line by line) in response to the key operations.

Figure I is a longitudinal section of a shorthand machine embodying the features of my invention.

Fig. II is an enlarged detail view showing the paper straightening device and the yieldable paper guide located adjacent thereto.

Fig. III is a transverse section taken approximately on line III—III, Fig. I, looking toward the front of the machine.

Fig. IV is a vertical section of the paper feeding device, showing the parts as they appear during their backward, or idle movement.

Fig. V is a view similar to Fig. IV showing the positions of the paper feeding elements at the beginning of a paper feeding operation.

Fig. VI is a view of the paper feeding elements as they appear at the end of the paper feeding operation.

Fig. VII is a detail view of the means for preventing retrograde movement of the paper.

To illustrate the invention, I have shown a shorthand machine provided with a housing 1, a type holder 2 arranged in said housing (Fig. I) a type bar 3 loosely secured in said type holder, a yieldable abutment 3′ arranged in the type holder and fitted to the type bar 3, and an inking ribbon 4 adjacent to the line of type on the type bar 3. The paper passes from a supply roll A, over a roller 5, under and partially around a roller 5′, in front of and over a roller 6, to a paper straightening device S, and then to a paper feeding device whereby it is unwound from the roll and fed through an opening 7 at the rear of the machine.

The key actuated devices preferably include a series of angular levers each having an upwardly extending arm 8 at its front end (Fig. I) and a character key 9 at the upper end of said arm. Any suitable shorthand code may be used, and, if desired, the keys may be provided with characters corresponding to the line of type characters on the type bar 3. Each key lever includes an arm 10 extending rearwardly from its arm 8, and an arm 11 extending upwardly from the rear portion of said arm 10. The series of key levers is pivotally supported by a pivot member 12 located at the junctions of the lever arms 10 and 11. The upper end of each lever arm 11 is provided with a forwardly extending hammer 13 which lies adjacent to the type 3. Restoring springs 14 (Fig. I) connected to the lever arms 10, tend to retain the upper ends of lever arms 11 in engagement with an abutment 15.

When one of the finger keys 9 is depressed, the key lever associated therewith turns about the axis of pivot member 12 and a printing hammer 13 moves toward the type 3, thereby forcing the paper and inking ribbon toward the type and printing one of the type characters on the paper. The key levers may be operated independently of each other, or any desired number of key levers may be operated simultaneously.

The universal bar associated with the key levers includes a transverse abutment 18 (Figs. I and III) arranged in front of the series of lever arms 11 and engaging all of said lever arms. The universal bar also includes a pair of arms 20 and 21 pivotally supported by the pivot member 12, arranged

on opposite sides of the lever arms 11, and secured near their upper ends to the transverse abutment 18. 23 designates a restoring spring (Fig. I) connected to the universal bar and tending to retain it in the position shown in the drawings. The transverse abutment 18, forming part of the universal bar structure, is so arranged that the universal bar will move in response to movements of any one of the key levers.

24 designates a key lever guide, arranged near the junctions of the key lever arms 10 and 11, and adapted to receive the wings which extend rearwardly from the key levers and universal bar as shown in Fig. I.

The paper feeding device preferably comprises a stationary supporting frame having a pair of side members 25 secured at their lower ends to the key lever guide 24, and cross bars 26 and 27 connecting the upper portions of said side members. A pivot rod 28, extending across the stationary frame, is journaled in the side frame members 25. The gripping elements include a pair of oscillatory gripping arms 29 secured at their lower ends, to the pivot rod 28, the upper end of each of said arms being provided with a lateral extension having a cam-shaped gripping face 29′. Gripping levers 30, arranged below the gripping faces 29′, are pivotally connected at 31, to the oscillatory gripping arms 29. These gripping levers 30 have cam-shaped gripping faces 30′ adapted to coöperate with the gripping faces 29′ in holding the paper during the paper feeding operations. It may be noted at this point that the gripping levers 30 are movable about the axis of their pivots 31, to secure the margins of the paper between the gripping faces 29′ and 30′. The gripping levers 30 are also adapted to move in unison with the oscillatory gripping arms 29, to which said levers are pivotally connected.

The means for driving the gripping elements includes a sleeve 32 loosely supported on the pivot rod 28, and provided with a pair of upwardly extending lever arms 33 to which the lower ends of gripping levers 30 are pivoted. The upper end of each lever arm 33 is preferably slotted, as shown by dotted lines in Fig. IV, to receive the pivot pin 34 at the lower end of a gripping lever 30. A lever arm 35, depending from the sleeve 32, is preferably connected to the universal bar by means of a yieldable link 36. Restoring springs 37, connected to the oscillatory gripping arms 29, tend to retain said arms in their normal or starting positions.

The universal bar oscillates about the axis of pivot member 12 in response to movements of the key levers, and motion is transmitted from the universal bar to the paper feeding device, through the medium of the link 36. At the beginning of each key operation the upper portion of the universal bar moves forwardly, thus actuating the paper feeding device to advance the paper as will be presently described, and at the end of the paper feeding operation the printing hammers force the paper and inking ribbon toward the type. During the return movement of the universal bar the paper feeding elements are restored to their normal or starting position. When the parts occupy the last mentioned position, the restoring springs 37 connected to the oscillatory gripping arms 29, tend to pull the upper ends of said arms toward the front of the machine; and this action causes the gripping elements to grip the paper so as to avoid slippage, or lost motion, at the beginning of the paper feeding operation. To clearly understand this, it should be noted that both of the long gripping arms 29 are supported by the pivot rod 28; the driving device, including sleeve 32 and lever arms 33 and 35, is loosely fitted to said pivot rod and connected to the universal bar, and the gripping levers 30 are pivoted to the long gripping arms 29. Obviously, the lever arms 33 are under the control of the universal bar, and when the latter is stopped in its normal position, the arms 33 are held in a fixed position. However, the long gripping arms 29 are free to move, to a certain extent, independently of the universal bar and lever arms 33. When the long gripping arms 29 are pulled to their starting position, by springs 37, the pivots 31 move with said arms but the lower ends of gripping levers 30 are retarded by lever arms 33 when the latter reach their normal position. Hence, as the long gripping arms 29 continue in motion, under the influence of springs 37, the gripping levers 30 are held at their lower ends by the stationary arms 33; the result being that said gripping levers 30 turn about the axis of the pivots 31 to force their gripping faces toward the gripping faces 29′, thus gripping the paper when the parts are at rest in their starting positions.

When the universal bar begins its movement, it pulls the link 36 in the direction indicated by the arrow in Fig. V, thus pulling the lower end of lever arm 35 forwardly and moving the upper ends of lever arms 33 rearwardly. This action, tending to turn the gripping levers 30 about the axis of the pivots 31, forces the gripping faces into engagement with the paper. While the parts are in this condition, and the link 36 is moving in the direction indicated in Fig. V, the gripping levers 30 can not turn on the pivots 31; and energy is then transmitted from lever arms 35 and 33, through gripping levers 30, to the long gripping arms 29. Therefore, all of the gripping elements move together during the paper feed-

ing action, and this movement is in an arcuate path, about the center of pivot rod 28. Fig. VI shows the parts as they appear at the end of the feeding operation. When the universal bar begins its return movement, the link 36 is thrown, very quickly, in the direction indicated in Fig. IV, thereby reversing the movement of the driving arms 35 and 33, so as to shift the gripping faces of levers 30 away from the gripping faces 29′. This releases the gripping elements and permits springs 37 to restore the long gripping arms 29. During the return movement of the parts, the gripping faces occupy, approximately, the relative positions shown in Fig. IV, and after the universal bar has completed its return movement, the springs 37 move the long gripping arms 29, independently of the lever arms 33 so as to force the gripping elements into engagement with the paper.

In feeding the paper, the gripping members 29 and 30 move in unison, however, the parts are so arranged that the driving device forces the gripping faces 30′ backwardly with respect to the movement of the paper. Of course, these gripping faces 30′ do not travel backwardly during the feeding operation, but in transmitting energy from the universal bar to the long gripping arms 29, the upper ends of gripping levers 30 tend to move backwardly, such movement being limited, or prevented, by the paper which lies between the gripping faces. The paper is firmly gripped throughout the feeding operation, and if for any reason an unusually severe pulling action is required to feed the paper, the cam-shaped gripping elements will automatically grip the paper more firmly, this being due to the manner in which the gripping elements are arranged, and also to the shape of the cam-like gripping faces.

The means for preventing retrograde movement of the paper comprises a stationary gripping arm 40, extending from the stationary cross-bar 26 at a point near the center of the path of the paper, and provided with a cam-shaped gripping face 40′ (Fig. VII) adapted to engage the paper. A yieldable gripping lever 41, pivotally connected to a stationary arm 42, is provided with a cam-shaped gripping face 41′ adapted to coöperate with the gripping face 40′. 43 designates a light spring, connected to the gripping lever 41, and tending to force the gripping face 41′ toward the gripping face 40′. The gripping lever 41 will yield freely to permit the paper to travel in the direction indicated by the arrow in Fig. VII, but on account of the shape and arrangement of the gripping elements 40 and 41, they will prevent retrograde movement of the paper.

The paper straightening device comprises a pair of rotatable creasing rolls 45 and 46, located in the path of the paper at a point between the printing device and paper feeding device, said creasing rolls being journaled in bearing members 47. The upper roll 45 has an annular groove 48 for the reception of an annular rib 49 which projects from the lower roll 46. The paper feeding device pulls the paper between the creasing rolls 45 and 46, so as to rotate said rolls. The annular rib 49 forces a portion of the paper into the annular groove 48, thereby creasing the paper to form a longitudinal reinforcing rib therein, which prevents the paper from re-curling after it passes from the machine.

The type bar 3 (Fig. I) engaging the yieldable abutment 3′, is free to yield in response to the pressure of the printing hammers 13. If these printing hammers continue to move forwardly after the paper has been clamped between the printing elements, the positive paper feeding device will continue to pull the paper, and in this event the guide roller 6 (Figs. I and II) will yield to prevent the feeding device from tearing the paper. This yieldable guide roller 6 has journals 50 which lie in slots 51 in the bearing members 47, and each journal 50 engages a spring pressed pin 52 as shown most clearly in Fig. II.

The paper straightening device herein shown is claimed in an application for patent filed by me on Nov. 18, 1916, Serial Number 132,070. The printing elements are claimed in an application filed by me on Nov. 18, 1916, Serial Number 132,076. The universal bar is claimed in an application filed by myself and W. E. Lippert on Nov. 18, 1916, Serial Number 132,078.

I claim:

1. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping elements, a pair of pivotally supported levers adapted to coöperate with said oscillatory gripping elements, said levers being movable about their axes to force the paper into engagement with said oscillatory gripping elements, and means for oscillating said levers and oscillatory gripping elements in unison to feed the paper.

2. In a typewriting machine, a paper feeding mechanism comprising an oscillatory device having a pair of gripping faces, a pair of pivotally supported levers each having a gripping face adapted to coöperate with one of the first mentioned faces, and means for moving said levers about their pivots to grip the paper between said levers and oscillatory device, said levers and oscillatory device being movable in unison to feed the paper.

3. In a typewriting machine, a paper feeding device comprising an oscillatory gripping device, a gripping lever pivoted to said

oscillatory gripping device, said gripping lever being movable about the axis of its pivot to grip the paper between said oscillatory gripping device and gripping lever, and means for moving all of said parts in unison to feed the paper, said means including a universal bar and means for transmitting movement from said universal bar to said gripping lever.

4. In a typewriting machine, a paper feeding device comprising a pair of oscillatory members each having a gripping face, a pair of gripping levers pivoted to said oscillatory members, said gripping levers being provided with gripping faces adapted to coöperate with the gripping faces of said oscillatory members, the gripping levers being movable with respect to said oscillatory members so as to grip the paper, and means for moving all of said parts in unison to feed the paper, said means including a universal bar connected to said gripping levers.

5. In a typewriting machine, a paper feeding device comprising a pivot member, an oscillatory gripping device pivotally supported by said pivot member, a gripping lever pivoted to said oscillatory gripping device, the axes of said gripping lever and oscillatory gripping device being in different planes, said oscillatory gripping device being provided with a gripping face adapted to coöperate with said gripping lever and said lever being movable toward and away from the gripping face of said oscillatory gripping device, and means for moving all of said parts about the axis of said oscillatory gripping device so as to feed the paper.

6. In a typewriting machine, a paper feeding device comprising a pivot member, an oscillatory gripping device pivotally supported by said pivot member, a gripping lever pivoted to said oscillatory gripping device, said gripping lever and oscillatory gripping device being provided with gripping faces adapted to coöperate with each other to grip the paper, and means for moving all of said parts about the axis of said oscillatory gripping device so as to feed the paper, said means including an operating device connected to said gripping lever.

7. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping elements, a pair of gripping levers pivoted to said oscillatory gripping elements, said gripping levers being movable with respect to said oscillatory gripping elements so as to grip the paper, and an operating device pivoted to said gripping levers, said operating device being adapted to move said oscillatory gripping elements and the gripping levers about the axis of the said oscillatory gripping elements.

8. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping elements, a pair of gripping levers pivoted to said oscillatory gripping elements, said gripping levers being movable toward the gripping faces of said oscillatory gripping elements so as to grip the paper, and a driving device including lever arms pivoted to said gripping levers.

9. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping elements, a pair of gripping levers pivoted to said oscillatory gripping elements, said gripping levers being movable toward the gripping faces of said oscillatory gripping elements so as to grip the paper, and a driving device including lever arms pivoted to said gripping levers, said lever arms being movable about the axis of said oscillatory gripping elements to force the gripping faces into engagement with the paper, at the same time feeding the paper.

10. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping elements, a pair of gripping levers pivoted to said oscillatory gripping elements, a driving device pivotally supported at the axis of said oscillatory gripping elements and pivoted to said gripping levers, said driving device being movable independently of said oscillatory gripping elements so as to force the gripping faces of said gripping levers into engagement with the paper, and the said driving device being operable to move all of said parts about the axis of said oscillatory gripping elements in feeding the paper.

11. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping arms each having an extension provided with a gripping face, a pivot member supporting said arms, a driving device comprising a pair of lever arms pivotally supported by said pivot member, a pair of gripping levers pivoted to said lever arms and pivotally supported by said oscillatory gripping arms, said gripping levers being provided with gripping faces adapted to coöperate with the gripping faces of said oscillatory gripping arms, all of said parts being movable about the axis of said oscillatory gripping arms.

12. In a typewriting machine, a paper feeding device comprising an oscillatory device having a pair of gripping faces, a pair of gripping levers pivoted to said oscillatory device, said gripping levers being provided with gripping faces adapted to coöperate with the gripping faces of said oscillatory device, the gripping levers being movable with respect to said oscillatory device so as to grip the paper, and operating mechanism including a universal bar connected to said gripping levers.

13. In a typewriting machine, a paper feeding device comprising an oscillatory device having a pair of gripping faces, a pair

of gripping levers pivoted to said oscillatory device, said gripping levers being provided with gripping faces adapted to coöperate with the gripping faces of said oscillatory device, the gripping levers being movable with respect to said oscillatory device so as to grip the paper, and operating mechanism including a universal bar connected to said gripping levers, and a spring for restoring said oscillatory device.

14. In a typewriting machine, a paper feeding device comprising a pair of gripping elements one of which is pivotally supported by the other, and means tending to force the gripping face of said pivotally supported gripping element backwardly with respect to the movement of the paper so as to grip and at the same time feed the paper.

15. In a typewriting machine, a paper feeding device comprising an oscillatory gripping device, a gripping lever pivoted to said oscillatory gripping device, and means tending to force the gripping face of said lever backwardly with respect to the movement of the paper so as to grip and at the same time feed the paper, said means including a universal bar connected to said lever.

16. In a typewriting machine, a paper feeding device comprising an oscillatory gripping device, a gripping lever pivoted to said oscillatory gripping device, and means tending to force the gripping face of said lever backwardly with respect to the movement of the paper so as to grip and at the same time feed the paper, said means including a drive member secured to said gripping lever.

17. In a typewriting machine, a paper feeding device comprising a pair of oscillatory gripping arms, each having a gripping face, a pair of gripping levers pivoted to said oscillatory gripping arms, each gripping lever being provided with a gripping face adapted to coöperate with one of said gripping arms, and an operating device fitted to said gripping levers, said operating device tending to force the gripping faces of said levers backwardly with respect to the movement of the paper so as to grip and at the same time feed the paper.

18. In a typewriting machine, a paper feeding device comprising an oscillatory gripping device, gripping levers pivoted to said oscillatory gripping device, said gripping levers having cam shaped gripping faces adapted to coöperate with said oscillatory gripping device, a driving device fitted to said gripping levers, and means for actuating said driving device to force the cam shaped gripping faces into engagement with the paper, at the same time moving all of said parts to feed the paper.

WARD S. IRELAND.