N. A. ANDERSON.

BUCKLING DEVICE.

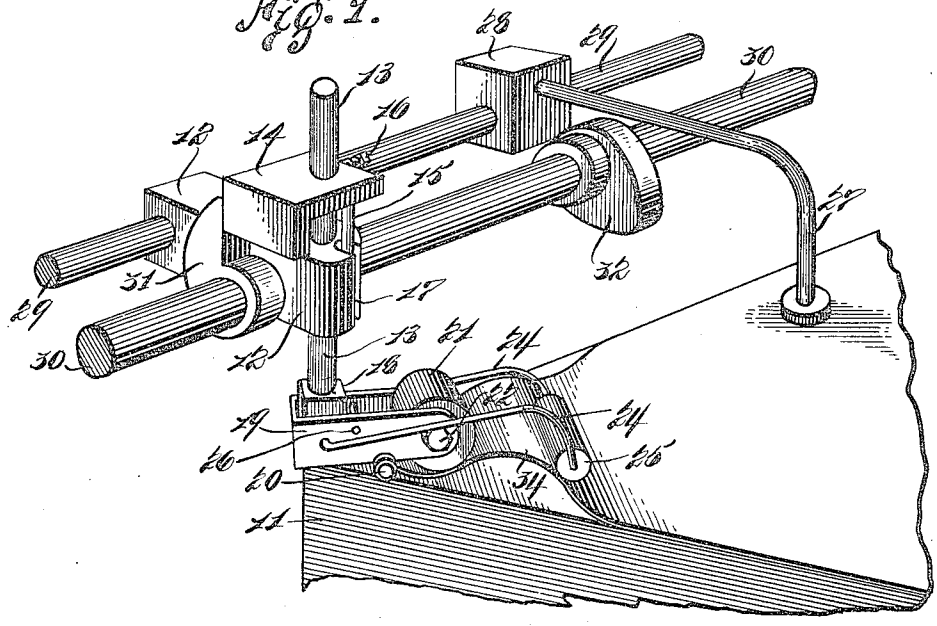
APPLICATION FILED DEC. 11, 1915.

1,225,740.

Patented May 15, 1917.

3 SHEETS—SHEET 1.

Fig. 1.



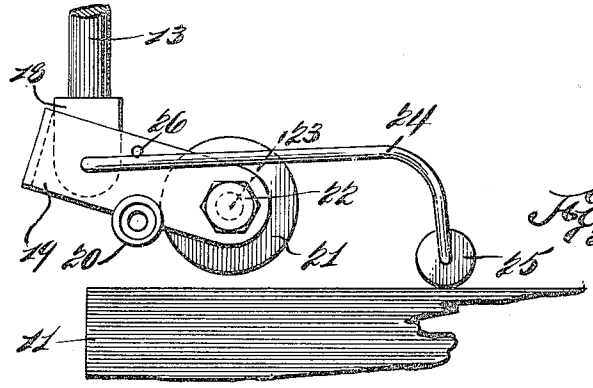


Fig. 2.

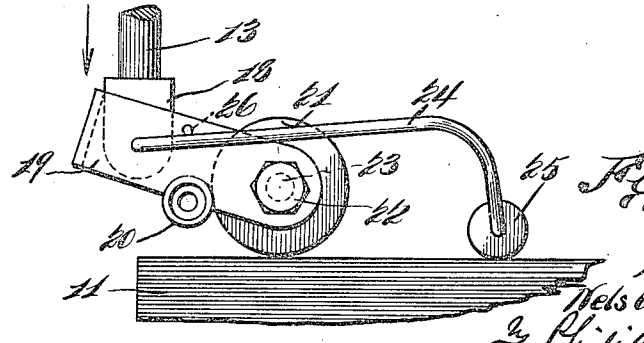


Fig. 3.

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3 SHEETS—SHEET 2.

Fig. 4.

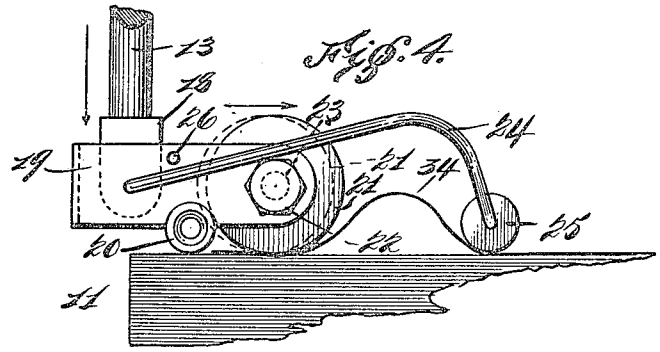


Fig. 5.

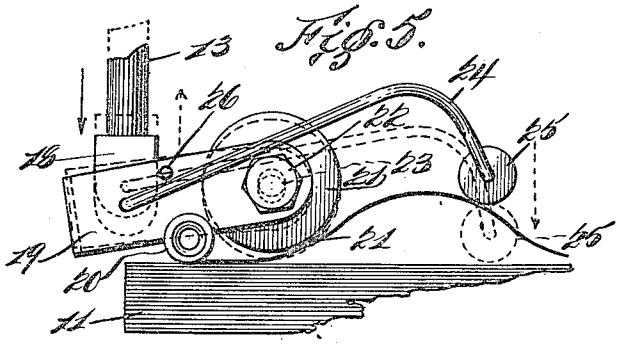


Fig. 6.

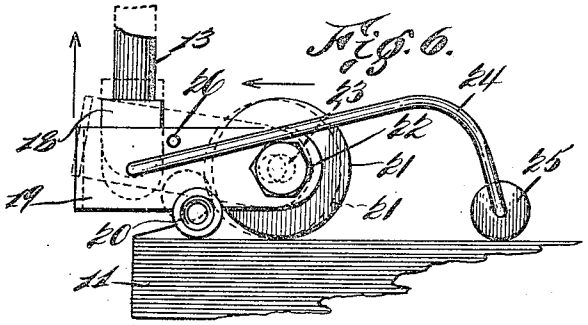
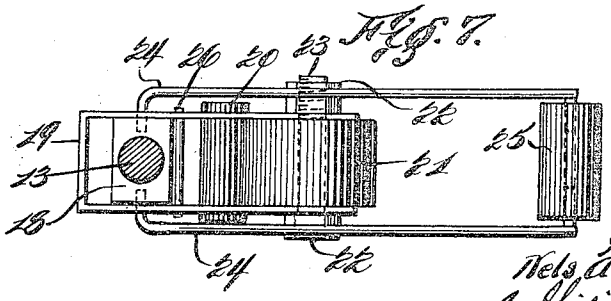


Fig. 7.



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3 SHEETS—SHEET 3.

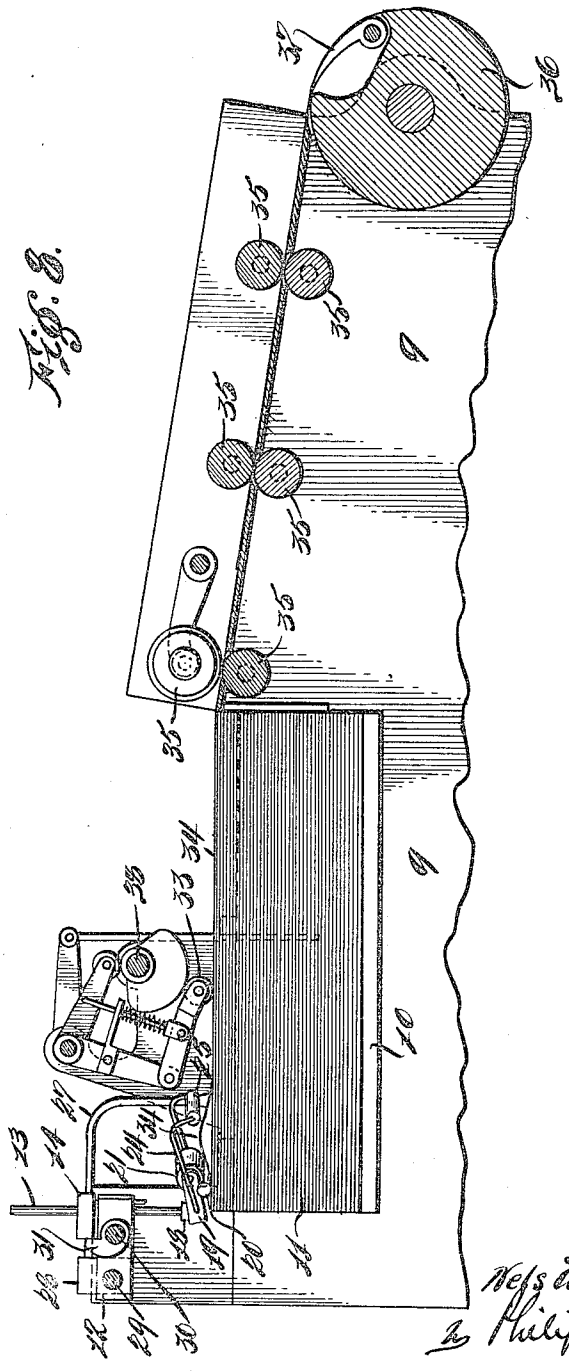


Fig. 8.

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UNITED STATES PATENT OFFICE.

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BUCKLING DEVICE.

1,225,740. Specification of Letters Patent. Patented May 15, 1917.

Application filed December 11, 1915. Serial No. 66,271.

To all whom it may concern:

Be it known that I, NELS A. ANDERSON, a citizen of the United States, and a resident of Warren, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Buckling Devices, of which the following is a specification.

My invention relates to buckling-devices for paper feeding machines which feed separate sheets of paper successively from a pile to a printing-press or other machines in which sheet paper is operated upon.

The objects of my invention are, among other things, to improve the buckling mechanism by which the top sheet is loosened and separated from the pile, before it is carried forward by the feeding devices and feed rolls, to be delivered to the printing-press or other machine; also to produce a simple device of this character which is certain and reliable in its operation, and which can be readily adjusted to feed paper of different sizes, all as will be hereinafter set forth and claimed.

In the accompanying drawings. Figure 1 is a perspective view of my buckling-device and its operating mechanism;

Fig. 2 is a side view enlarged of the device in its normal position;

Fig. 3 is a side view showing my buckling-device lowered to the top sheet of the pile, being the first step in the buckling operation;

Fig. 4 is a side view similar to Fig. 3, showing the buckler frame lowered, thereby buckling the top sheet, this being the second step in the buckling operation;

Fig. 5 is a side view similar to Fig. 3, the frame being still further lowered to raise the pressure roller carried by the frame, this being the third step in the buckling operation;

Fig. 6 is a side view similar to Fig. 3, showing the first step in raising the buckling-device from the pile;

Fig. 7 is a top plan view of the buckling-device; and

Fig. 8 is a diagrammatic view of my buckling-device applied to the ordinary type of paper feeding machines.

Similar numerals refer to similar parts throughout the several figures.

Referring to the drawings, 9 designates the framework of the paper-feeding machine which carries the vertically-movable feed-table 10, upon which the pile of paper 11 is placed. The mechanism for raising the feed-table 10 from time to time, as required, is not shown and need not be described, since it is old and well known, and the form thereof constitutes no part of my present invention.

12 designates a block secured to the frame 9, having the movable shaft or rod 13 mounted therein, free to move vertically in block 12, and carrying a square block or stop 14, which is secured to the rod 13. The block 14 carries a vertically projecting pin 15 secured in the block by the set-screw 16; the pin 15 slides in the vertical slot 17 formed in the block 12, and acts as a guide to prevent any rotary movement of the rod 13, when the set-screw 16 is tightened.

The lower end of the rod 13 carries on its cubical end 18 the pivoted frame 19 having a projecting lug 20 on its lower surface acting as a "pile-retaining" member. The frame 19 also carries a fixed wheel 21, preferably made of rubber, which is non-rotatable, in the frame when in use, but by loosening the nut 22 on the axle bolt 23, the wheel 21 may be rotated to present a fresh surface on the pile. This wheel 21 acts in my device as the "buckling" member. Projecting from the sides of the frame 19 and pivoted thereto, is the bent rod 24, its arms being mutually parallel, as shown in Fig. 7, carrying at its outer end the steel pressure roller 25, as shown in the figures. The nut 22 and bolt 23 project, so as to form a spindle, on each side of the frame 19 sufficiently to engage the under surface of the rod 24, as shown in Figs. 4, 5, 6 and 7. The pin 26, passing through the sides of the frame 19, as shown in Fig. 7, acts as a stop against the vertical rod 13, thereby preventing the rubber wheel 21 from lifting beyond a predetermined angle to the rod 13. The relative positions of the nut 22 and bolt 23 and the rod 24, are such that in certain positions of the frame 19, the roller 25 will be raised from the pile, while in other positions, as shown in Figs. 2 and 3, the roller 25 will be free to rest on the pile by its own weight. A similar relationship also exists between the lug 20 and the rubber wheel 21, so that the wheel is at times held free from contact with the pile, as in Fig. 5, while at other times the wheel rests on the pile

through gravity, as shown in Fig. 3. The roller 25 acts as the "holding" member in my buckling-device.

Referring to Fig. 1, the curved rod 27 serves as a governor controlling the operation of the mechanism for intermittently raising the feed-table 10, the rod 27 being secured to the block 28 mounted on the oscillating shaft 29 connected with a suitable ratchet and pawl mechanism (not shown), this form of construction being common in the art.

Secured to the constantly rotating shaft 30 is the cam 31 adapted to engage the block 14, thereby giving a vertical movement to the rod 13; the cam 32, likewise mounted on the shaft 30, secures a reciprocating movement to the governor rod 27 resting on the pile.

Referring to Fig. 8, 33 represents any suitable form of feeding-off device to pass the top sheet 34, which has already been buckled, forwardly from the pile 11 to the feed-rolls 35, and thence to the impression-cylinder 36, there to be grasped by its grippers 37. The feeding-off device 33 is operable from the rotating shaft 38, through suitable cams and connecting levers and arms, which need not be described in detail, as they constitute no part of my present invention.

The manner of operating my buckling device, throughout a cycle of movement, is substantially as follows: The cam 31, acting on the block 14, raises the rod 13 to its full height, lifting the lug 20 and wheel 21 clear of the pile, but in such inclined position that the roller 25 is free to rest on the pile, as shown in Fig. 2. As the cam 31 passes from beneath the block 14, the rod 13 drops, as indicated by the arrow in Fig. 3, carrying with it the rubber wheel 21, which contacts with the corner of the top sheet of the pile at such an angle as to exert a combined pressing and rubbing action on the top sheet, buckling same toward the roller 25, which holds the sheet to the pile, all as is clearly shown in Fig. 4. The result of this movement on the top of the pile is to buckle and loosen the corner of the topmost sheet 34, as shown in Fig. 4. The continued dropping of the rod 13 brings the lug 20 into contact with the remainder of the pile immediately to the rear of the wheel 21, which, by the rocking of the frame 19 upon the lug 20 as a fulcrum, then raises both the wheel 21 and the roller 25 free from the pile, as shown in Fig. 5, thereby permitting the top sheet to be easily withdrawn from the pile by any suitable feeding device, as for example, the feeding-off devices 33, as shown in Fig. 8.

The next movement in the cycle begins by the raising of the rod 13, which, through the operation of the lug 20, acting as a fulcrum, first lowers the roller 25 onto the pile, followed by the lowering of the rubber wheel 21, as shown in Fig. 6. The wheel 21 contacts with the pile with a rearward, wiping action that tends to smooth out the underlying sheets. The continued upward movement of the rod 13 then raises the lug 20 from the pile, followed by the raising of the rubber wheel 21, leaving only the roller 25 still resting on the pile, as shown in Fig. 2, until the next cycle of operation is inaugurated through the descent of the rod 13.

In practice it is customary to employ two of my improved buckling-devices acting in unison, one at each rear corner of the pile of sheets, and in conjunction therewith, suitable feeding-off devices, as I have shown diagrammatically in Fig. 8, for engaging the topmost sheet and withdrawing it from the pile, after the rear corners of the sheet have been loosened and partially separated by my buckling-devices, as hereinbefore described.

From the foregoing it will be understood that a buckling-device has been provided which combines in itself all of the essential elements for performing the loosening and buckling of separate sheets stacked in a vertical pile, which are operable in a unitary structure, through the reciprocating movement of the rod 13, so that each of these buckling elements successively and effectively performs its particular function in separating the corners of the sheets.

I claim as my invention:

1. A buckling device for sheets comprising a movable structure carrying a holding member, a buckling member and a pile-retaining member, and means for actuating said members in proper succession.

2. A buckling device for sheets comprising a movable unitary structure carrying a holding member, a buckling member and a pile-retaining member, and means for actuating said members in proper succession.

3. A buckling device for sheets comprising a movable structure carrying a holding member, a buckling member and a pile-retaining member, and a single mechanism for actuating said members in proper succession.

4. A buckling device for sheets comprising a movable unitary structure carrying a holding member, a buckling member and a pile-retaining member, and a single mechanism for actuating said members in proper succession.

5. A buckling device for sheets comprising a vertically movable frame having incorporated therewith holding, buckling and pile-retaining members, and means to actuate said frame whereby the said incorporated members operate in proper succession.

6. A buckling device for sheets comprising a vertically movable frame having incorporated therewith holding, buckling and pile-retaining members, and a single mechanism to actuate said frame whereby the said

incorporated members operate in proper succession.

7. A buckling device for sheets comprising a movable frame having incorporated therewith holding, buckling and pile-retaining members, a rod pivotally supporting said frame, and means to reciprocate the rod whereby said incorporated members operate in proper succession.

8. A buckling device for sheets comprising a movable frame having incorporated therewith holding, buckling and pile-retaining members, a rod pivotally supporting said frame, and a single mechanism to reciprocate the rod whereby said incorporated members operate in proper succession.

9. A buckling device for sheets comprising a frame carrying a holding roller, a buckling wheel and a pile-retaining lug, means pivotally supporting said frame, and means to actuate said frame-supporting means whereby said frame-carried members operate on the sheets in proper succession.

10. A buckling device for sheets comprising a frame carrying a holding-roller, a buckling wheel and a pile-retaining lug, a rod pivotally supporting said frame, and means to reciprocate the rod whereby said frame-carried members operate on the sheets in proper succession.

11. In a buckling device for sheets formed in a pile, the combination of means for controlling the height of the pile, a unitary structure carrying a holding member, a buckling member and a pile-retaining member, and means for actuating said members and said controlling means in proper succession.

12. In a buckling device for sheets formed in a pile, the combination of means for controlling the height of the pile, a movable unitary structure carrying a holding member, a buckling member and a pile-retaining member, and means for actuating said members and said controlling means in proper succession.

13. In a buckling device for sheets formed in a pile, the combination of means for controlling the height of the pile, a unitary structure carrying a holding member, a buckling member and a pile-retaining member, and a single mechanism for actuating said members and said controlling means in proper succession.

14. In a buckling device for sheets formed in a pile, the combination of means for controlling the height of the pile, a movable unitary structure carrying a holding member, a buckling member and a pile-retaining member, and a single mechanism for actuating said members and said controlling means in proper succession.

15. In a buckling device for sheets formed in a pile the combination of means for holding the top sheet near its corner, means for buckling the sheet toward said holding means, means for retaining the remainder of the pile after the top sheet has been buckled, and means for lifting said holding means and buckling means while the top sheet is removed.

16. In a buckling device for sheets formed in a pile, the combination of means for holding the top sheet near its corner, means for buckling the sheet toward said holding means, means for retaining the remainder of the pile after the top sheet has been buckled, means for lifting said holding means and buckling means while the top sheet is removed, and a single mechanism for operating the aforesaid means in proper succession.

17. In a buckling device for sheets formed in a pile, the combination of means for holding the top sheet near its corner, means for buckling the sheet toward said holding means and for subsequently smoothing the remainder of the pile, means for retaining the remainder of the pile after the top sheet has been buckled, and means for lifting said holding means and buckling means while the top sheet is removed.

18. In a buckling device for sheets formed in a pile, the combination of means for holding the top sheet near its corner, means for buckling the sheet toward said holding means and for subsequently smoothing the remainder of the pile, means for retaining the remainder of the pile after the top sheet has been buckled, means for lifting said holding means and buckling means while the top sheet is removed, and a single mechanism for operating the aforesaid means in proper succession.

19. In a buckling device for sheets formed in a pile, the combination of means for holding the top sheet near its corner, means for buckling the sheet toward said holding means, means for retaining the remainder of the pile after the top sheet has been buckled, means for lifting said holding means and buckling means while the top sheet is removed, and means for returning said holding means and buckling means to the pile and for subsequently lifting said pile-retaining means to permit the sheets, other than the removed top sheet, to resume their horizontal position in the pile.

20. In a buckling device for sheets formed in a pile, the combination of means for holding the top sheet near its corner, means for buckling the sheet toward said holding means, means for retaining the remainder of the pile after the top sheet has been buckled, means for lifting said holding means and buckling means while the top sheet is removed, means for returning said holding means and buckling means to the pile and for subsequently lifting said pile-retaining means to permit the sheets, other

than the removed top sheet, to resume their horizontal position in the pile, and a single mechanism for operating the aforesaid means in proper succession.

21. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug affixed to the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, and means for actuating said members in proper succession.

22. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug and a single mechanism for actuating said members in proper succession.

23. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, a movable rod pivotally supporting said frame, and means to reciprocate the rod whereby said frame-carried members operate on the sheets in proper succession.

24. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, a movable rod pivotally supporting said frame, and a single mechanism to reciprocate the rod whereby said frame-carried members operate on the sheets in proper succession.

25. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, and means oscillating said frame whereby said members engage the sheets in proper succession.

26. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, and a single mechanism oscillating said frame whereby said members engage the sheets in proper succession.

27. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, a movable rod pivotally supporting said frame, and means to vertically reciprocate the rod to oscillate the frame whereby said members engage the sheets in proper succession.

28. A buckling device for sheets comprising a movable frame carrying thereon a vertically swinging holding member, a pile-retaining lug mounted on the under side of the frame, and a non-rotatable buckling wheel intermediate said holding member and said lug, a movable rod pivotally supporting said frame, and a single mechanism to vertically reciprocate the rod to oscillate the frame whereby said members engage the sheets in proper succession.

29. A buckling device for sheets comprising a movable structure carrying a holding member, a member for buckling the sheets and thereafter smoothing the remainder of the pile, and a pile-retaining member, and means for actuating said members in proper succession.

30. A buckling device for sheets comprising a movable structure carrying a holding member, a member for buckling the sheets and thereafter smoothing the remainder of the pile, and a pile-retaining member, and a single mechanism for actuating said members in proper succession.

31. A buckling device for sheets comprising a movable frame having incorporated therewith a holding member, a member for buckling the sheets and thereafter smoothing the remainder of the pile and a pile-retaining member, means pivotally supporting said frame, and means to actuate said frame-supporting means whereby said incorporated members operate in proper succession.

32. A buckling device for sheets comprising a movable frame having incorporated therewith a holding member, a member for buckling the sheets and thereafter smoothing the remainder of the pile, and a pile-retaining member, means pivotally supporting said frame, and a single mechanism to actuate said frame-supporting means whereby said incorporated members operate in proper succession.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."