O. R. HINCHER & A. J. MORRISON.

PAPER BOX MACHINE.

APPLICATION FILED JUNE 2, 1909.

964,645. Patented July 19, 1910.

2 SHEETS—SHEET 1.

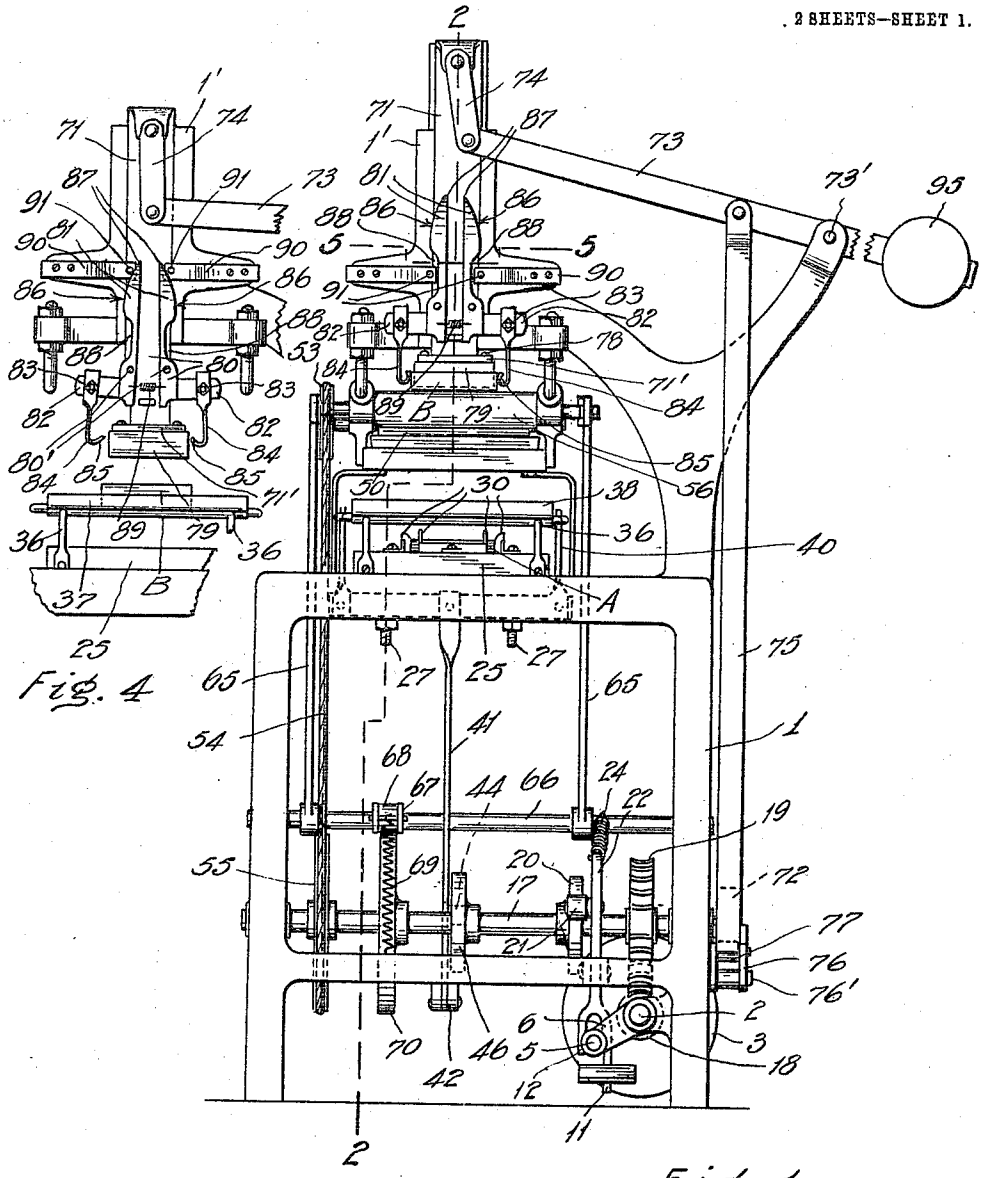

Fig. 4

Fig. 1

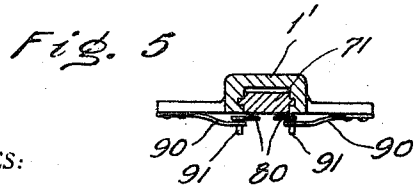

Fig. 5

WITNESSES:

H. Barnes.

M. M. Smith.

INVENTORS:

Otis R. Hincher

and Alfred J. Morrison

BY

Pierre Barnes

ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

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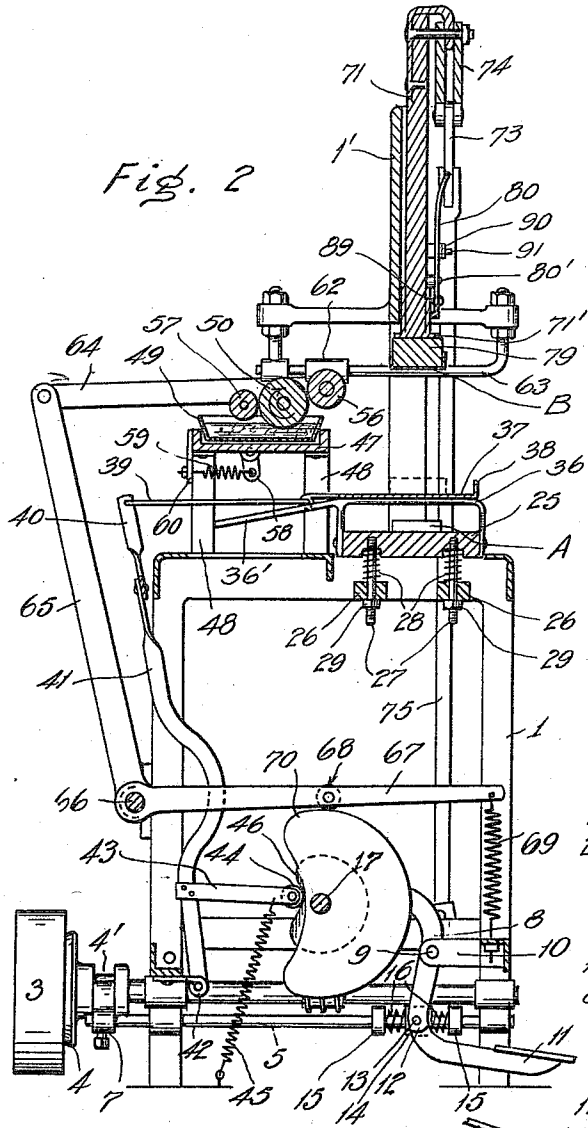
2 SHEETS—SHEET 2.

Fig. 2



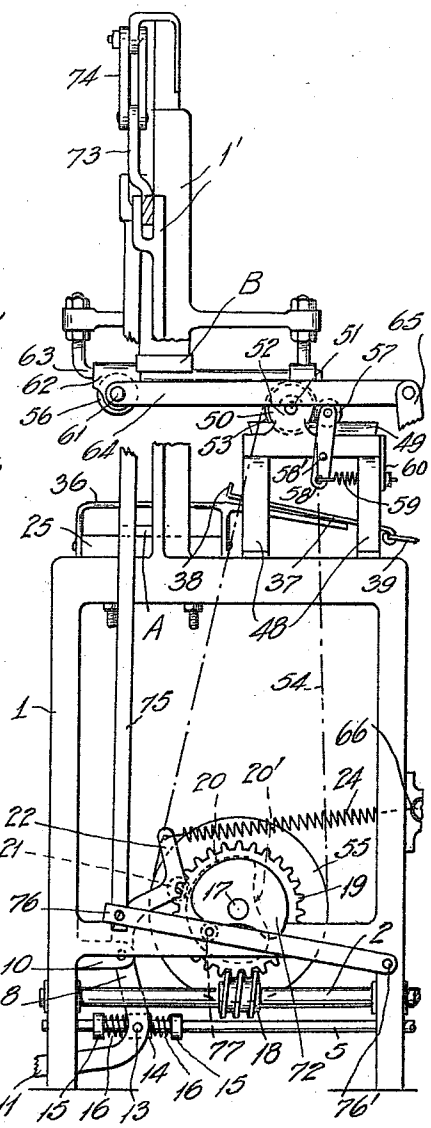


Fig. 3

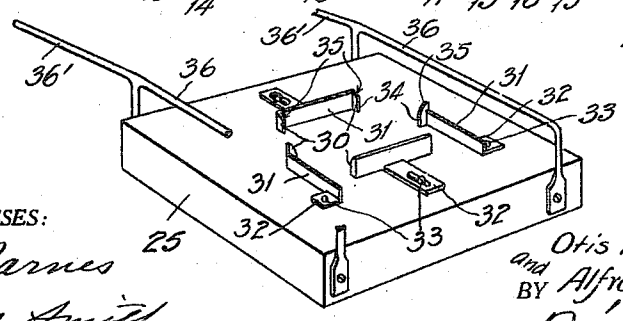


Fig. 6

WITNESSES:

H. Barnes

M. M. Smith.

INVENTORS:

Otis R. Hincher

and Alfred J. Morrison

BY Pierre Barnes

ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OTIS R. HINCHER, OF SEATTLE, WASHINGTON, AND ALFRED J. MORRISON, OF MINNEAPOLIS, MINNESOTA.

PAPER-BOX MACHINE.

964,645. Specification of Letters Patent. Patented July 19, 1910.

Application filed June 2, 1909. Serial No. 499,713.

To all whom it may concern:

Be it known that we, OTIS R. HINCHER and ALFRED J. MORRISON, citizens of the United States, residing at Seattle, in the county of King and State of Washington, and Minneapolis, county of Hennepin, and State of Minnesota, respectively, have invented certain new and useful Improvements in Paper-Box Machines, of which the following is a specification.

This invention relates to paper-box making machines; and its object is the provision of improved means for attaching bottoms or tops to box-bodies or the covers thereof.

The invention consists in the novel construction and combination of devices, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a front elevational view of a machine embodying our invention. Fig. 2 is a vertical section through 2—2 of Fig. 1. Fig. 3 is an end elevation, viewed from the right hand side of Fig. 1. Fig. 4 is a fragmentary front elevation of the machine with parts thereof represented in different positions from where they are illustrated in Fig. 1. Fig. 5 is a cross sectional view through 5—5 of Fig. 1. Fig. 6 is a perspective view of the machine platen, with attachments thereof.

The reference numeral 1 designates the machine frame provided with bearings for a driving shaft 2 which, as shown, is arranged longitudinally with respect to the frame. Mounted upon said shaft is a power-driven pulley 3. This pulley is loose upon the shaft and may be coupled therewith through the medium of a suitable clutch, desirably of the frictional type and whereof 4 designates one of the elements. For actuating the clutch there is provided a rod 5 disposed to be parallel with the shaft 2 which is supported in frame brackets 6 and carries at one end a shifter 7 which engages in a peripheral groove 4′ of the boss of said clutch-element. A treadle-lever 8 is fulcrumed by a pin 9 to ears 10 provided for the frame and above the rod 5. Upon said lever is an offset lug 12 which with the main portion of the lever are apertured to receive the trunnions 13 of a sleeve 14 wherethrough the rod 5 extends.

15 are set collars upon the shifter-rod which are spaced from the said sleeve to accommodate intermediately disposed helical cushioning springs 16. Arranged transversely to the frame is a cam shaft 17 receiving rotary motion from said driving shaft while the latter is operative. For such power transmission we desirably employ worm and tooth gears 18 and 19 upon the respective shafts 2 and 17. A cam, 20, see Figs. 1 and 3, which will hereinafter be termed the controller-cam, is provided on the cam-shaft and coacts with a roll 21 which is carried by an arm 22 of the lever 8. Said controller-cam has a portion of its periphery concentric to its axis of rotation and also has a reëntrant portion 20′. A spring 24 connected with the lever-arm 22 and a rigid support to the rear of the machine frame serves to tilt the lever 8 such that the roll 21 thereof will bear against the periphery of the controlling-cam. Thus when the roll is tracking the concentric portion of the cam, the lever is maintained in condition to cause the shifting of rod 5 to effect the operative engagement of the driving pulley 3 with the shaft 2 and whence motion is derived to rotate the cam-shaft. When the roll enters the depression 20′ of the controlling-cam said coupling is disengaged with a consequent interruption to the operative parts of the entire machine. This cessation of motion occurs once in each cycle of operation unless, through the instrumentality of the treadle arm 11 of the lever 8 the operator prevents the roll entering said cam-depression.

Included in the machine frame is a support for a platen 25 and may consist of rigid bridge-members 26 which are provided with apertures to receive posts 27 which are fixedly connected to and depend from the platen, as shown in Fig. 2. About each post and between said platen and said support is a coil spring 28 whose function is to yieldingly sustain the platen in its uppermost position as determined by the adjustment of nuts 29 at the screw threaded lower ends of the posts.

In operation a stack of covering papers A are placed upon said platen and are kept in vertical alinement and in proper horizontal location by means of guide-elements 30 which are carried bv the platen, see Figs. 1 and 6. These guide-elements are severally connected to or formed integral with spring-plates 31 which have apertured lugs 32 to

receive screws 33 for adjustably attaching the same to the platen. Such guide-elements are each formed to present a straight edge 34 at the bottom which is arranged perpendicular to the top face of the platen and above they flare outwardly, as at 35.

In proximity to the ends of the platen and secured thereto is a pair of superposed track-rails 36 which are desirably made horizontal, or nearly so, above the platen and to the rear thereof are sloped downwardly, as at 36′. Supported by said track rails is a carrier comprised of a plate 37 having an upturned front edge 38, while at the back it is rolled to afford a hinge-joint with the rectangularly bent ends of rods 39 which make connection with the branch members 40 of a vibratory lever 41. This lever is fulcrumed from its lower end to a pin support 42 secured to the rear of the frame, see Fig. 2. Extending forwardly from the lever 41 is an arm 43 carrying a roll 44 which, through the agency of a spring 45, is kept in peripheral contact with the carrier-actuating cam 46 mounted upon the cam-shaft 17. Disposed at a sufficient distance above said track-rails to afford a free passage for the carrier is a platform 47 which is rigidly supported by legs 48, or otherwise, from the frame. Said platform is arranged to hold a removable paste-pan 49.

50 is a roller having its axle 51 journaled in bearings 52 provided for the platform 47 and upon one of the axle ends is a pulley 53 which is driven by a belt 54, Figs. 1 and 3, from a driven pulley 55 upon the cam shaft. The roller 50 is partially submerged in paste contained in the pan 49 and when the roller is rotated in the direction indicated by the dart in Fig. 2, it conveys upon its circumference a supply of paste to a paste-applying roller 56. In order, however, that superfluous paste may not thereby be delivered to the paste-applying roller and that the paste may be properly distributed over the surface of the conveying roller 50 prior to its delivery to said applying roller, we utilize a pressure roller 57 to attain such results.

As shown in Fig. 3, the roller 57 has its axle journaled in the upper arms of vibratory levers 58 which, intermediately of their lengths are fulcrumed by pins 58′ rigidly connected with the platform. The lower arms of levers 58 are each connected by a spring 59 with an attachment 60 of the platform. The paste-applying roller 56 is arranged for reciprocatory movements to and from the front of the machine; to which ends the axle 61 of the roller has its ends journaled in slipper-blocks 62 which travel upon guide-rods 63 supported from the frame. The ends of the axle 61 protrude outside the respective slipper-blocks and serve for making connection by links 64 with arms 65 which extend upwardly from a rock-shaft 66 journaled in bearings provided at the rear of the frame. Projecting forwardly from said rock-shaft, see Fig. 2, is an arm 67 carrying a roll 68 which is caused by a spring 69, acting through the arm 67, to bear against the periphery of a cam 70 and whereby the reciprocatory movements of the paste-applying roller 56 are obtained.

In a part 1′ of the frame which overhangs the platen is a guideway for a vertically movable head 71 made operative from said cam shaft through the medium of a cam 72 thereupon, and connecting mechanism. Such mechanism may comprise an oscillatory beam 73 fulcrumed by a pin 73′ with the frame and connected by a link 74 with said head. From between said head 71 and said fulcrum pin, the beam 73 is operatively connected by a rod 75 with a vibratile arm 76 which is fulcrumed by a pin 76′, Fig. 3, with the frame. Intermediately of its length the arm 76 carries a roll 77 which engages the cam 72 from the underside. A weight 95 is advantageously provided for the outer end of the beam 73 to more than counterbalance the opposing weights depending from the beam. A spring, not shown, in the drawings, may be substituted for or provided to coöperate with the weight 95. The beforementioned head is adapted, as by the provision of a flanged lower end 71′, for having detachably fastened therewith, as by screws 78, a form 79 of suitable size to fit within a cover or body-part B of a box. For convenience the term box-body hereinafter employed is to be understood to mean either part of a box. The head is likewise equipped with gripping-devices capable of exercising a two-fold duty, namely, to retain a box-body upon said form as it approaches the platen, and to eject the box-body therefrom upon the upward movements of the head. As shown in Figs. 1, 2 and 4, the gripping devices consist of companion members 80 each formed of a bell-crank shape and respectively connected with the head by pivotal pins 80′. These members are arranged such that there will be an arm 81 of each directed upwardly and their other arms 82 directed laterally.

Adjustably secured by nutted screws 83, or an equivalent, to the respective arms 82 are downwardly extending hooks 84 whose office is to grip or clasp the box-body when they are brought into contact therewith in the performance of their duty and whereupon the respective hook-bills 85 are resistently pressed back to occupy the shapes in which represented in Fig. 1. But when the hooks are withdrawn, through the appropriate tilting of the members 80, the resilient power of the hooks in resuming their normal shapes, Fig. 4, will effect the strip-

ping of said form. The arms 81 of said companion members are constructed to have their outer edges provided with cheeks which slope outwardly from the upper extremities, or points 87 with depressions 88 therebelow. The members 80 are also characterized by having the upper ends of the arms 81 inclined forwardly, as shown in Fig. 2.

89 is a contractile spring representing the members 80 below their pivotal connections 80′ and acting to retain the members in their normal positions, (Fig. 1). Secured near their outer ends to the frame part 1′ is a pair of spring metal plates 90 whose inner ends, Fig. 5, are offset to allow the members 80 to pass downwardly therebehind in a corresponding movement of the head, but by reason of the upper ends of the members 80 being inclined forward, as previously stated, their points 87 will direct the members to have their cheeks 86 pass to the front of the plates 90 when ascending. The cheeks 86 will thus encounter studs 91 which protrude forwardly from the plates 90 and thereby cause the members 79 to be swerved outwardly, as will be understood from an inspection of Fig. 4. During the ascending movement of the head, the members are affected, as explained, to withdraw the hooks from the box-body. When the elevation of the head is such as to present the depressions 88 to the plates 90, the latter will spring forward through the cavities and thus allow the members 80 to be in position to pass again to the rear of the plates in the following downward movement of the head.

In operation, the box-body B is placed by the operator upon the form 79 and engaged therewith by the hook-members 84. By applying foot-pressure to the treadle bar 11 the shifter rod 5 is influenced to cause the clutch element 4 engaging the driving shaft 2 with the power-driven pulley 3 resulting in the cam-shaft 17 being rotated through the medium of the geared connections 18 and 19. The paste-applying roller 56 is supplied with a coating of paste from the paste-pan 49 by means of the rotating roller 50. The cam 70 in turning with its shaft allows the dipping of the arm 67 and likewise allows the spring 69 to exercise its power to cause the rock-shaft 66 tilting the arms 65 to thrust the roller 56 forwardly and apply a layer of paste to the underside of the box-body B. The return of the roller 56 into juxtaposed position with the roller 50 is then accomplished by the spring 69. The cam 72 now asserts itself to draw the head 71 downwardly and press the box-body to which the paste has been applied against the paper at the top of the stack A and with a force capable of overcoming the power of the springs 28 which yieldingly uphold the platen 25. This relative power of the springs coöperates with the positive opposing force exerted through the head and affords ample pressure to cause the adherence of a paper to the box-body.

By the continued rotation of the cam 72 the weight 95 is allowed to operate to elevate the head. In the course of such head movement the members 80 are, as previously explained, influenced to release the box-body and cause it to be cast down upon the carrier 37 which, priorly, has been moved through the operation of the cam 44 into the position in which it is illustrated in Fig. 2. The continuance of the action of this cam permits the carrier being withdrawn by the spring 45 from below the head and into the position whereat it is shown in Fig. 3 to remove the work. This completes a cycle of operation and while the treadle arm 11 is held in its depressed position by the operator's foot, to thereby maintain the clutch devices in couple, the machine will continue operative. It may be said that the guide-elements 30 are spread asunder by the descending head engaging the sloping faces 35 thereof to allow the box body coming into contact with the stack of papers.

Having described our invention, what we claim, is—

1. In a paper-box machine, the combination with a reciprocating head, a form provided for the head, a platen, devices for retaining a stack of papers upon the platen, means for engaging a box-body with said form, devices operative during the upward movement of the head for causing said means to effect the stripping of said box-body from the form, and retractile means to apply paste to the under side of the box-body prior to its downward movement with the head.

2. In a paper-box machine, a frame, a platen, springs carried by the frame for yieldingly supporting said platen, a reciprocating head, means for detachably securing a box-body to the head, means for applying paste to the underside of the box-body, and distensible means yieldable to said head for retaining a stack of papers in adjusted position upon said platen.

3. In a paper-box machine, the combination with a reciprocating head, a form detachably secured to the head, a yieldingly supported platen, yielding devices for retaining a stack of papers upon the platen, means for engaging a box-body with said form during the operative movement of the latter and then acting during the upward movement of the head for stripping said box-body from the form, means to apply paste to the underside of a box-body prior to its downward movement with the head, and means for removing a box-body from the machine subsequent to the pasting of one of said papers thereto.

4. In a paper-box machine, the combina-

tion of a frame, a driving shaft, a power pulley mounted loosely on said shaft, a clutch for engaging said pulley with the shaft, manually operable means for causing said clutch to be operative, a cam-shaft, operative connections between said shafts, a cam upon said cam-shaft, a head mounted for vertical reciprocating movements in said frame, a second cam on said cam shaft. operative connections between said last named cam and the head for effecting the operations of the head, means for detachably securing a box-body to the head, a platen supported by said frame, a paste-containing pan, and means operable from said cam-shaft for conveying paste from said pan and applying such paste to said box-body.

5. In a paper-box machine, the combination of a frame, a driving shaft, a power pulley mounted loosely on said shaft, a clutch for engaging said pulley with the shaft, manually operable means for causing said clutch to be operative, a cam-shaft, operative connections between said shafts, a cam upon said cam-shaft, operative connections between said cam and the clutch whereby the latter is rendered inoperative in each cycle of the operations of the machine, a head mounted for vertical reciprocative movements in said frame, a second cam on said cam shaft, operative connections between the last named cam and the head for effecting the operations of the head, means for detachably securing a box-body to the ing said platen, springs yieldingly supporting said platen, a paste-containing pan, and means operable from said cam-shaft for conveying paste from said pan and applying such paste to said box-body.

6. In a paper-box machine, the combination of a frame, a driving shaft, a power pulley mounted loosely on said shaft, a clutch for engaging said pulley with the shaft, manually operable means for causing said clutch to be operative, a cam-shaft, operative connections between said shafts, a cam upon said cam-shaft, a head mounted for vertical reciprocating movements in said frame, a second cam on said cam-shaft, operative connections between said last named cam and the head for effecting the operations of the head, means for detachably securing a box-body to the head, a platen supported by said frame, a pan, a roller for applying paste to the underside of said box-body, means operable from said cam-shaft for effecting the reciprocating movement of said roller for applying the paste to the box-body, a roller partially submerged in paste contained in said pan, and means operable from said cam-shaft for rotating the last named roller for applying paste to the first named roller.

7. In a paper-box machine, the combination of a frame, a driving shaft, a power pulley mounted loosely on said shaft, a clutch for engaging said pulley with the shaft, manually operable means for causing said clutch to be operative, a cam-shaft, operative connections between said shafts, a cam upon said cam-shafts, a head mounted for vertical reciprocating movements in said frame, a second cam on said cam-shaft, operative connections between said last named cam and the head for effecting the operations of the head, means for detachably securing a box-body to the head, a platen supported by said frame, a paste containing pan, means operable from said cam-shaft for conveying paste from said pan and applying such paste to said box-body, a carrier, and means operable from said cam-shaft for reciprocating the carrier whereby the box-bodies are discharged from the machine subsequent to the pasting of the papers thereupon.

OTIS R. HINCHER.
ALFRED J. MORRISON.

Witnesses for O. R. Hincher:
HORACE BARNES,
WM. T. HOBSON.
Witnesses for A. J. Morrison:
M. P. SATTERLEE,
GEO. A. FISHER.