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E. B. ALLEN.

NAIL ASSORTING MACHINE.

No. 384,735. Patented June 19, 1888.

Fig. 1.

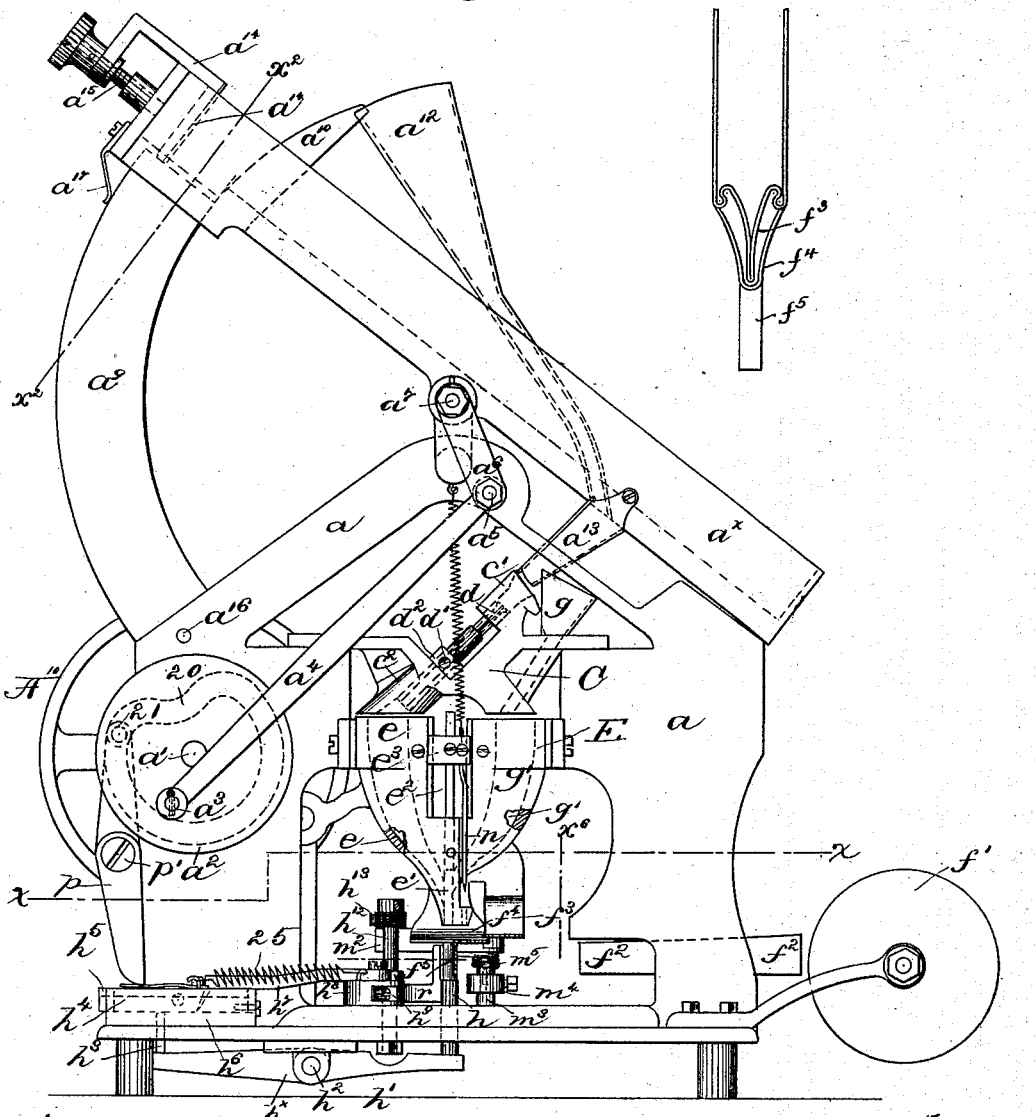

Fig. 1a

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NAIL ASSORTING MACHINE.

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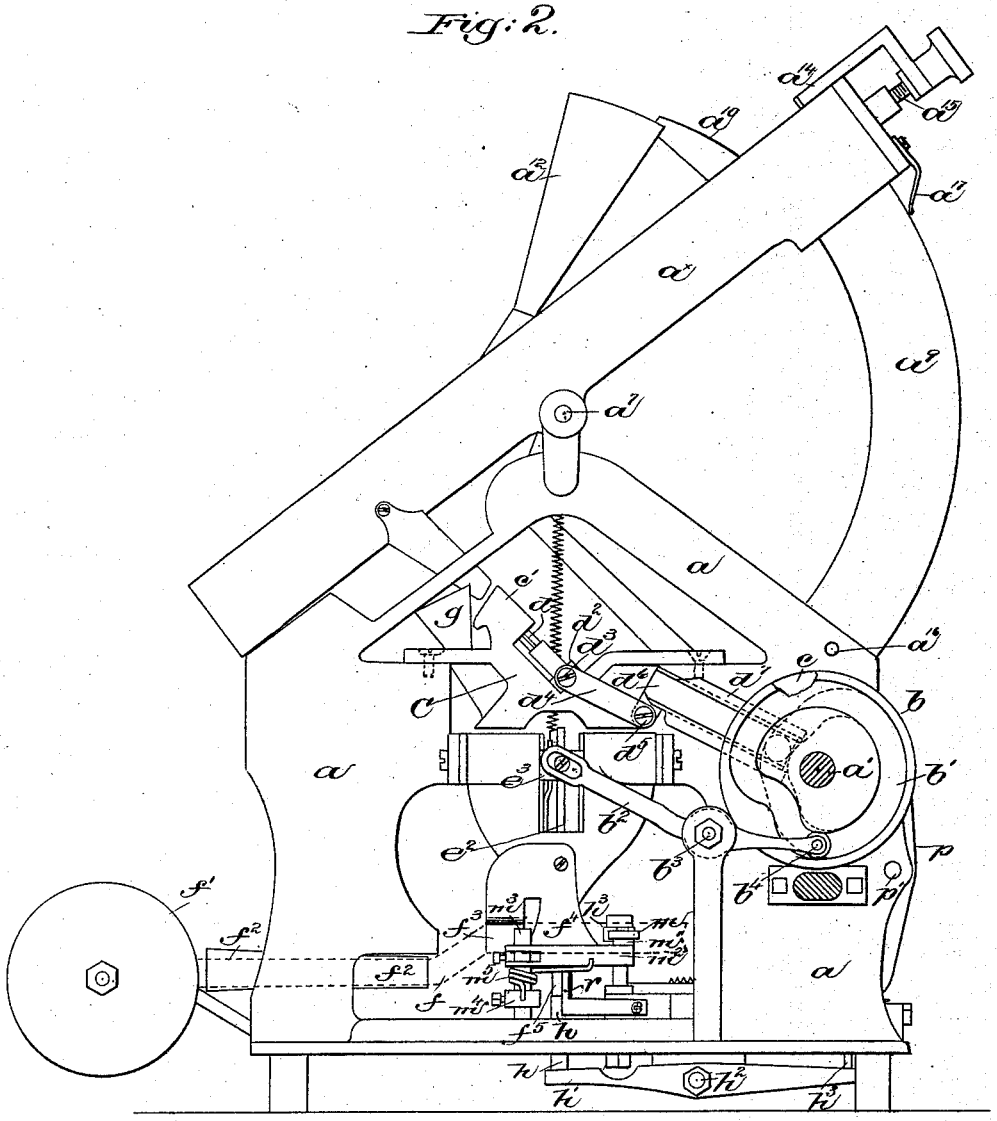
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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NAIL ASSORTING MACHINE.

No. 384,735. Patented June 19, 1888.

Fig: 3.

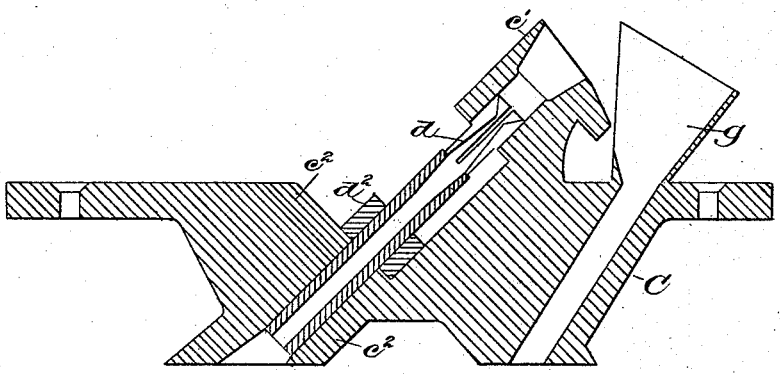
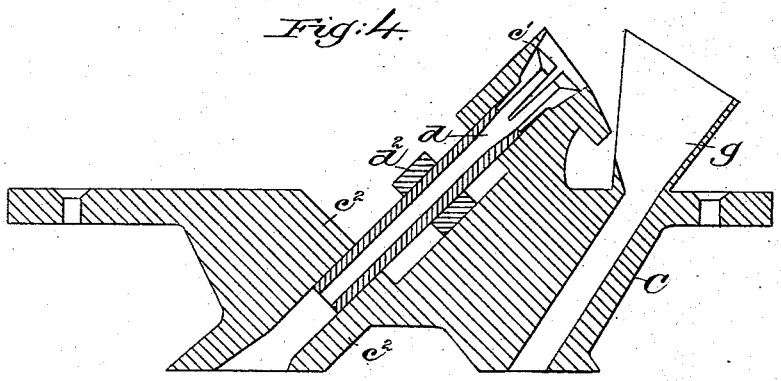


Fig: 4.



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NAIL ASSORTING MACHINE.

No. 384,735. Patented June 19, 1888.

Fig: 5.

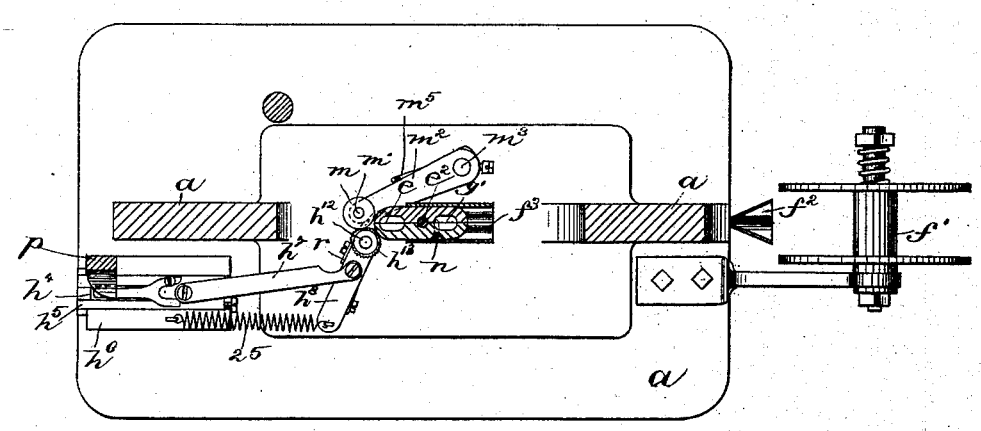


Fig: 7

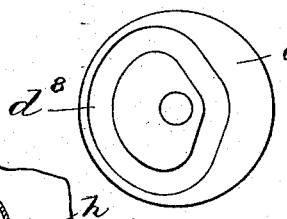


Fig: 8.

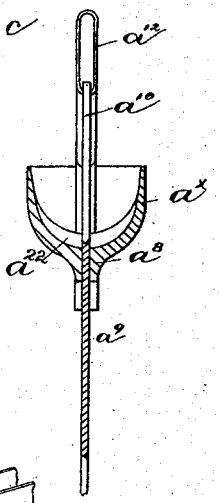


Fig: 6.

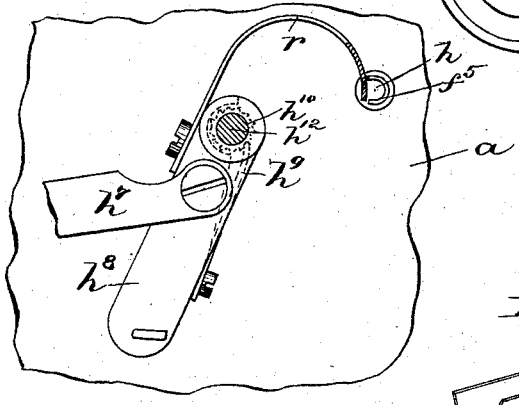
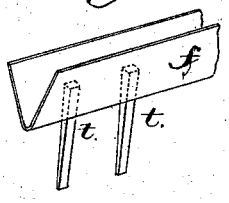


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF PORTLAND, MAINE, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF CAMBRIDGE, MASSACHUSETTS.

NAIL-ASSORTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,735, dated June 19, 1888.

Application filed August 22, 1887. Serial No. 247,551. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, of Portland, county of Cumberland, and State of Maine, have invented an Improvement in Nail-Assorting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a novel machine for automatically driving headless nails into a flexible strip, preferably paper, in order that the said nails may be readily used in a heel-nailing or in any other usual form of nailing-machine, the nails being driven from the strip into the heel or other article to be made.

In this invention I have provided means for lifting, one at a time, the headless nails from a nail-box and depositing the same in a chute, said nail, if its head end is pointed in one direction, taking one course into position under the driver, and if its head end is in the other direction taking another course and arriving in position under the driver, the nail on its arrival under the driver, no matter which course taken by it, being delivered point downward ready to be driven into the strip. The strip is fed forward automatically after the driving of each nail into it; but in case the nail is not driven the feed does not operate; so it will be seen the feed depends upon the insertion of a nail into the strip at the last descent of the driver.

The particular features in which my invention consists will be hereinafter described, and pointed out in the claims at the end of this specification.

Figure 1 in side elevation represents a machine embodying my invention, the neck and guide for the paper and nail being partially broken out. Fig. 1ª is a detail showing the guides below the neck at the left of the dotted line x^6, Fig. 1. Fig. 2 is an opposite side view of Fig. 1, the driving-wheel being broken out and the belt-wheel omitted; Fig. 3, an enlarged vertical longitudinal section of part of the frame-work and bearings in which the hollow spindle reciprocates. Fig. 4 is a similar section showing the hollow spindle in a different position. Fig. 5 is a section below the irregular dotted line x, Fig. 1. Figs. 6 and 7 show details to be referred to; Fig. 8, a section in the line x^2, Fig. 1; and Fig. 9 shows a piece of the paper strip with nails therein.

The frame-work a, of suitable shape to sustain the working parts, has a main shaft, a', driven in any usual way. This shaft has fast upon it a belt-wheel, A^{10}, and side by side two cams, b c, the latter shown separately in Fig. 7, and a cam, a^2, the latter cam, as herein shown, having a crank-pin, a^3, which, by a connecting-rod, a^4, is joined to a stud, a^5, on an arm, a^6, of a rock-shaft, a^7, to which is secured the oscillating hopper $a^\times$.

The hopper $a^\times$ has a slot, a^8, (see Fig. 7,) through which passes a rest, a^9, grooved at its upper end to receive in it a nail whenever in the operation of the machine the left-hand end of the hopper is in its most elevated position, as in Fig. 1, that end of the hopper (see Fig. 8) having its floor somewhat reduced or cut away to form a pocket, a^{22}, (see Fig. 8,) into which will enter and remain one or more nails when that end of the hopper is in its lowest position, that one of the nails which enters the slot in the bottom of the said recessed portion falling directly upon the top of the rest a^9 and remaining there while the left-hand end of the hopper (see Fig. 1) is depressed. As soon as the upper end of the nail lying on the rest a^9 arrives in the descent of the hopper above the upper end of the guide a^{10}, secured to the hopper, the said nail slides from the top of the said rest and enters the upper enlarged end of the chute a^{12}, and as the hopper continues to descend the nail deposited in the said chute slides through it and through the chute a^{13} at the lower side of the hopper, the said nail entering, if its point is foremost, a conical opening, c', made in a yoke, C, rigidly attached to the frame-work a, and thereafter an opening in the upper end of an expanding hollow spindle, d. The left-hand end of the hopper, (see Fig. 1,) as herein shown, has a head, a^{14}, made adjustable by a screw, a^{15}, to regulate the length of the pocket a^{22} to the length of the nail to be used.

The rest a^9, herein shown as of segmental

shape, is loosely connected with the frame-work by a pin, a^{16}, a spring, a^{17}, attached to the hopper, acting against one edge of the rest to keep its opposite edge pressed closely against the guide a^{10}.

The spindle d has attached to it by a screw, d', (see Fig. 1,) a block, d^2, having a stud, d^3, (see Fig. 2,) over which is passed one end of a connecting-link, d^4, jointed at its opposite end by a stud, d^5, to a slide-bar, d^6, placed in a guideway, d^7, secured to the frame-work, and adapted to be moved in a direction diagonal to the shaft a', the said slide-bar having a stud which enters a cam-groove, d^8, in the cam-disk c, (see Fig. 8 and dotted lines, Fig. 2,) the rotation of the said cam-disk reciprocating the hollow spindle in the bearings c' c^2. The upper end of the spindle is slotted, so as to form a sort of spring-chuck, and the outer sides of the arms so formed are outwardly beveled to co-operate with the beveled guide c', so that when the spindle is drawn down, as in Figs. 1, 2, 3, its jaws will be closed, leaving but a small hole at its upper end for the entrance of any nail the point of which is foremost, and thereafter, the point of the nail having entered the hole in the spindle, the spindle at its next rise will be expanded, permitting the nail t so entered to pass readily through the said spindle and enter the guide-passage e in the neck E, shown as a metal block having two guide-passages, e and g', both in communication with a driver-passage, e', (see dotted lines, Fig. 1,) so that the driver e^2, carried by the reciprocating cross-head e^3, set in motion by the lever b^2, pivoted at b^3 and having a stud, b^4, which enters the cam-groove b' of the cam b, before referred to, will act upon the head of the said nail and drive it into the paper or other strip f. (See dotted lines, Fig. 2, and full lines, Fig. 9.)

In case the nail t emerging from the chute a^{13} should have its head end foremost, the said nail will drop into the bearing c', just as before, while the spindle is in its lowest position; but the head end of the nail is too large to enter the hole in the spindle, and consequently, as the spindle next rises with a quick blow, it strikes the head of the nail, knocks it point foremost out of the bearing c', causing the said nail to enter the auxiliary chute g point foremost, the nail descending in the said chute and entering the guideway g', also in communication with the driver-passage e'. By this arrangement of chutes and the intervention of the hollow spindle the nails are compelled to enter the passages e and g' point foremost, and consequently they arrive in the driver-passage point foremost.

The strip f will in practice be taken from a suitable reel or cylinder, f', and led through a folding-guide, f^2, which will double the strip substantially at its center. The upper edges of the folded strip next pass into guiding-grooves at the upper end of a V-shaped guide, f^3, (see Figs. 1, 1^a, and 5,) against the bottom of which the said strip is held by a back piece, f^4, attached to the neck E, containing the passages e, g', and e', the said back piece having a depending slotted leg or tube, f^5, which terminates substantially at the upper end of an anvil, h, movement of which by the action of the end of the nail upon it determining whether or not the feeding mechanism, to be described, shall operate to feed the strip.

The cross-head to which the driver is attached is provided with an awl, n, which, as the driver descends, punches a hole in the paper strip to prepare it for the reception of a nail when the strip is next moved under the driver.

The anvil h, made as a sliding pin, extends through a hole in the bottom plate of the frame-work and rests upon one arm, h', of the a lever, h^*, pivoted at h^2, the opposite end of the said lever having a pin, h^3, which, when the anvil is depressed by the pressure of a nail just driven into the strip, rises and acts upon a latch, h^4, (see Fig. 5,) pivoted upon a carriage, h^5, adapted to slide in guideways h^6, attached to or forming part of the frame-work. This carriage is joined by a connecting-rod, h^7, with a pawl-carrying arm, h^8, having a pawl, h^9, (see Fig. 6,) which engages a ratchet, h^{10}, secured to the shaft h^{12}, carrying the feeding-roll h^{13}, (see Figs. 1 and 5,) the latter being shown as corrugated to engage the strip and feed it intermittingly. The opposite side of the strip is pressed against the supporting-roll m, mounted on a stud, m', of an arm, m^2, loosely held upon a post, m^3, secured in the bed of the frame-work, the said post having attached to it a collar, m^4, to which is attached one end of a spring, m^5, the opposite or free end of the spring bearing against the arm m^2, (see Fig. 2,) keeping the said roll pressed toward the feeding-roll, the said two rolls gripping the strip at both sides. The cam-disk a^2 at its rear side has a groove, 20, (see dotted lines, Fig. 1,) of suitable shape to receive the stud 21 of a lever, p, pivoted at p', the said lever, whenever the latch h^4 is lifted, as described, coming against the said latch and moving the carriage to effect the movement of the feed-wheel; but if the said latch is not lifted the said arm in its vibration will not effect the movement of the feed.

The pawl-carrying arm h^8 is provided with a guard, r, made as a spring-arm, the end of the said guard closing the open side of the open leg or tube f^5 while the nail is being driven down through it by the driver, thus insuring a straight movement for the nail and insuring its contact with the upper end of the anvil.

United States Patents Nos. 348,091 and 348,092, heretofore granted to me, show an oscillating hopper somewhat like the one herein shown.

The pawl-carrying bar is herein shown as restored to its normal position (shown in Fig. 5) by a spring, 25, secured to the said bar and to the guideway h^6, the said spring becoming

operative when the lever p is disengaged from the latch h^4, which occurs when the pressure is removed from the anvil h.

I claim—

1. In a nail-assorting machine, a movable hopper having a pocket at one end and a rest to enter said pocket, combined with a chute carried by the said hopper and into which each nail deposited upon the rest is delivered singly, substantially as set forth.

2. The oscillating hopper, its guide, the chute connected to its upper side, and the chute extended from its lower side, combined with the rest adapted to work through a slot or pocket in the bottom of the said hopper, substantially as described.

3. The oscillating hopper $a^\times$, having a slotted pocket or recess at one end for the retention of one or more nails, combined with an adjustable end plate to graduate the length of the recess to the length of the nail to be used, substantially as described.

4. In a nail-assorting machine, a beveled guide, and a hollow spindle having spring-jaws reciprocating in the said guide, combined with a chute to deliver the said nails to the said spindle, and with a block having a guide-passage in communication with the said spindle for the reception of such nails as pass point foremost through the said spindle, substantially as described.

5. In a nail-assorting machine, a hollow spindle having spring-jaws, a beveled guide therefor, and a chute to deliver nails to the said spindle singly, combined with an auxiliary chute into which the said spindle rejects the nails delivered to it with the head end foremost, substantially as described.

6. In a nail-assorting machine, a reciprocating hollow spindle having spring-jaws, a bearing beveled at its upper end in which the said spindle slides, and a chute to deliver nails to the said spindle, combined with an auxiliary chute into which such nails as are delivered to the spindle head end foremost are rejected, the nails delivered to the spindles point foremost being permitted to pass through the said hollow spindle at its next ascent, substantially as described.

7. In a nail-assorting machine, the guide to hold and present a strip of flexible material for the reception of nails, the nail-driver to drive nails point foremost into the said strip, and the movable anvil, combined with a strip-feeding mechanism, substantially as described, and means to connect the said anvil and feeding mechanism, whereby the latter is set into operation by the movement of the anvil when acted upon by the point of the driven nail, substantially as described.

8. The vibrating lever, the carriage, its latch, and feeding mechanism, substantially as described, actuated by it, combined with a lever, h^*, and an anvil which is depressed intermittingly by the point of the driven nail.

9. The guide f^3 and its open slotted leg or tube, and a spring-arm guard, combined with the anvil h, to operate substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD B. ALLEN.

Witnesses:

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C. M. CONE.