

[54] **OFFSET STACKING MECHANISM**

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[52] U.S. Cl. **214/6 N**

[51] Int. Cl. **B65g 57/00**

[58] Field of Search **214/6 N, 6 S**

[56] **References Cited**

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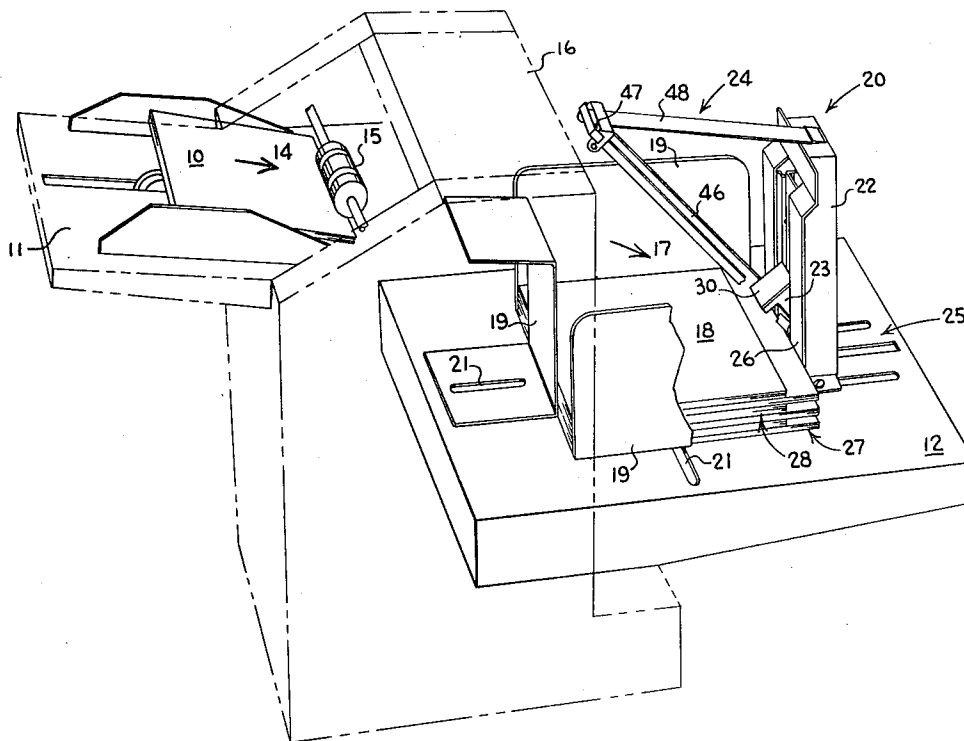
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[57]

ABSTRACT

An offset stacking mechanism for grouping a number of bundles of sheets being delivered by a collating device. The offset stacking mechanism comprises a stationary supporting tray; an offset finger which acts as an alternating stop upon said tray for incoming bundles; and a mechanical linkage for moving the offsetting finger between a first stop position and a second stop position.

8 Claims, 3 Drawing Figures



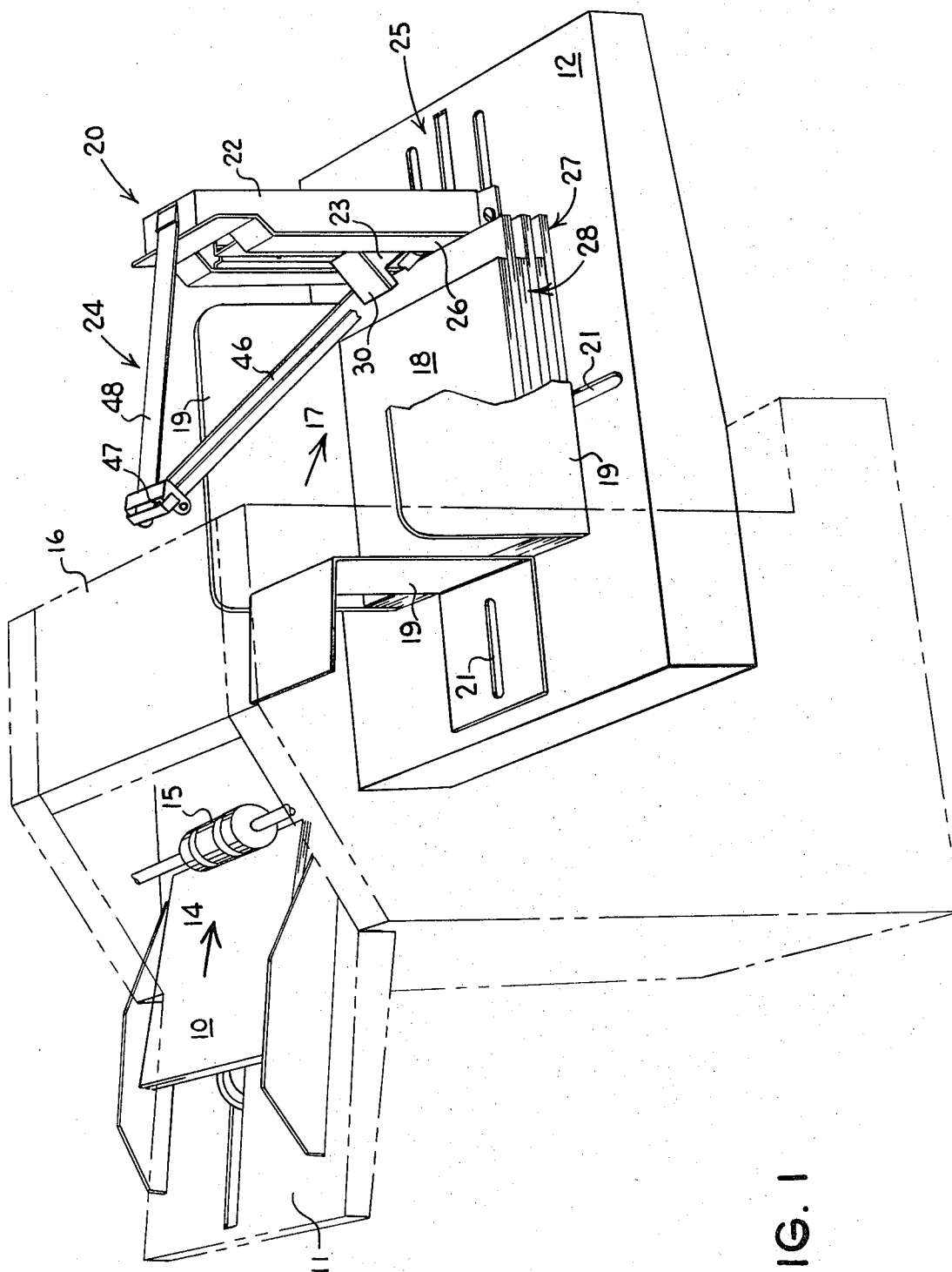
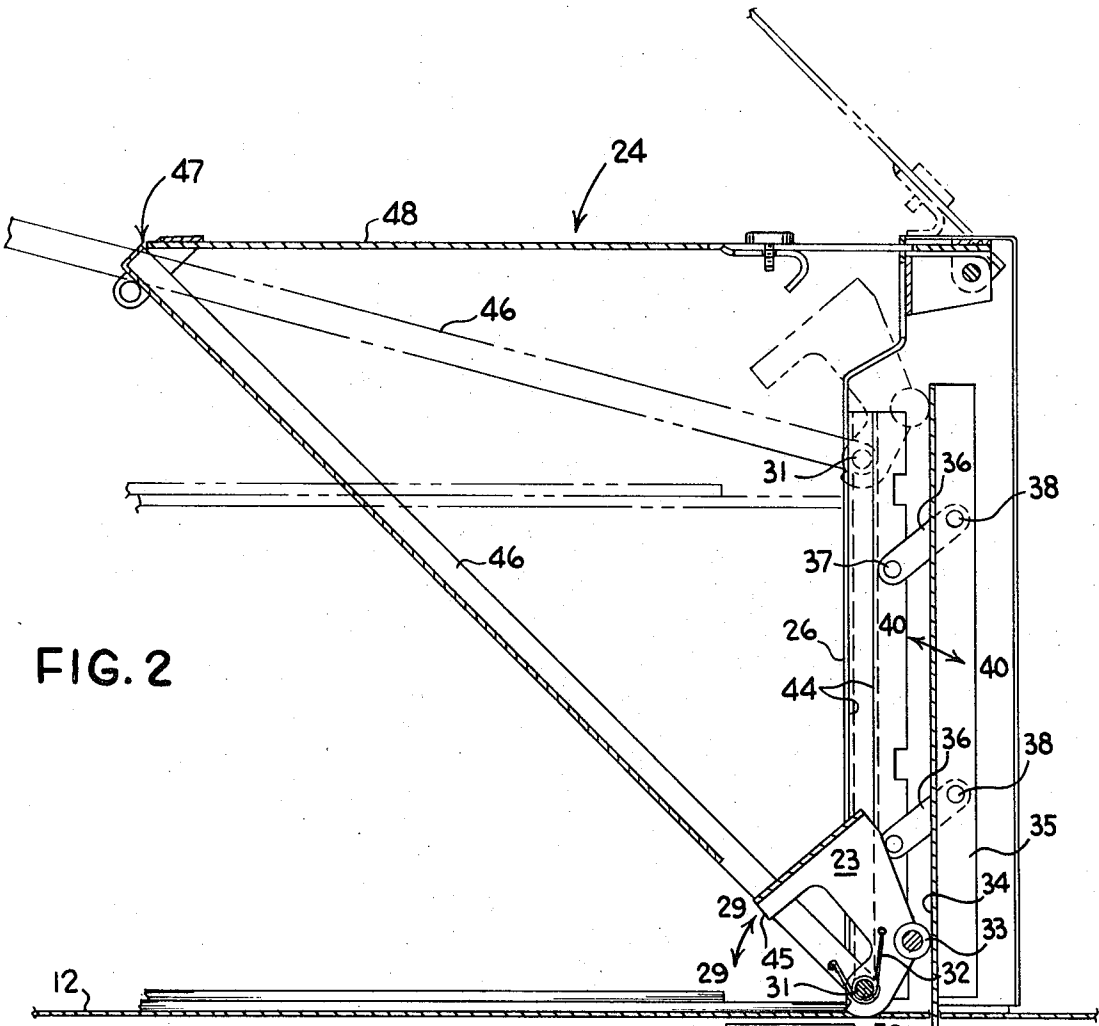
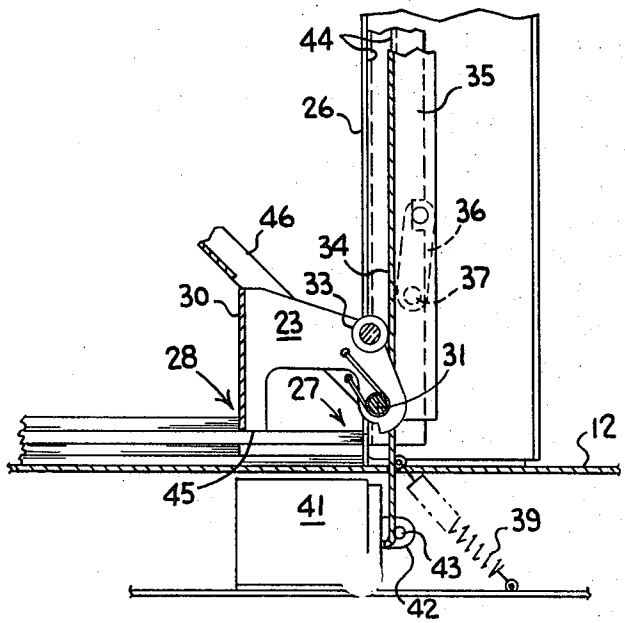


FIG. 1



OFFSET STACKING MECHANISM

This invention pertains to offset stacking mechanisms, and more particularly to an offset stacking mechanism of the type which receives a plurality of bundles of sheet material from a collator, and which stacks the bundles in alternating grouped sets within a pile.

BACKGROUND OF THE INVENTION

The stacking mechanism of this invention is of the type that provides a finished pile of bundles, each bundle alternately off-set from a prior and successively stacked bundle in said pile.

Heretofore, stacking mechanisms of the above type generally required that the stacking tray be movable, in order to vary the offset position of the bundles within the pile. These aforementioned mechanisms did not always function properly. This was so, because the movement imparted to the tray would often cause the stacked bundles to shift upon the tray due to inertial and momentum effects.

Also, the force required to move the tray was usually gaged to accommodate a maximum load condition. In this mode of operation, the partially filled tray was apt to receive an excessive stacking force. This excessive force, also contributed to a shifting of the stacked bundles.

The present invention eliminates the need for moving the tray in order to obtain the offset in the stack. Thus, the off-set operation of the invention is more reliably controlled. In addition, the inventive mechanism is generally less complicated than the prior stacking devices.

SUMMARY OF THE INVENTION

The offset stacking mechanism of the invention comprises a stationary supporting tray; an offset finger movable between two alternate positions with respect to the tray, so that incoming bundles of sheets are caused to abut the finger and become offset from each other upon said support tray; and a solenoid controlled linkage for moving the offset finger between the alternate positions. The offset finger acts as a stop or abutment for incoming material. In a first finger position, an incoming bundle will come to rest in the first stop position, and in a second finger position, a successive bundle will be stopped in an offset position relative to said first bundle. A third incoming bundle will be stopped in the first finger position, and so on, until a stack of two groups of offset bundles is obtained.

The advantages of the present system are that it is more reliable than previous systems, requires less power, and is mechanically less complicated than prior devices.

It is an object of the present invention to provide an improved offset stacking mechanism;

It is another object of this invention to provide an offset stacking mechanism having a stationary support for supporting the stack of offset bundles;

It is a further object of the invention to provide an offset stacking mechanism which is more reliable in its operation.

These and other objects of the invention will become more apparent and will be better understood with reference to the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a prospective view of the offset stacking device of this invention as shown in situ;

FIG. 2 is a side view of the offset stacking device of FIG. 1 with the offsetting finger shown in a retracted position and the height adjustment mechanism shown in a raised phantom position;

FIG. 3 is a partial side view of the offset stacking device of FIG. 1 with the offsetting finger cammed to its most forward position;

Generally speaking, the offset stacking mechanism of this invention, comprises means for supporting a stack of material having two groups of bundles of sheets, which are alternately offset from each other.

Means are provided for delivering a quantity of these bundles one bundle at a time to said stack supporting means. Stop means is movably disposed with respect to said supporting means for stopping each delivered bundle of sheets at a given position upon the supporting means. The stop means is movable between a first position and a second position in an alternating fashion. Thus, each bundle which is delivered to the supporting means is uniformly stacked and respectively offset from a previously delivered bundle, and also from a successively delivered bundle in the stack. Two groups of stacked alternately offset bundles of sheets are thus formed. Means are also provided for moving the stop means between the first and second positions in alternating fashion.

Now, reference is made to FIG. 1, wherein a bundle of sheets 10 is shown upon a receiving tray 11. The receiving tray 11, receives bundles of sheets from a collating device. The bundles are fed, one at a time, to a feed roller 15 (arrow 14). The bundles pass under feed roller 15 to a stapling and/or hole punching station, shown generally at 16. From station 16, the bundles are delivered to a stacking platform 12, as depicted by arrow 17.

The stacking platform 12 is shown supporting a stack of bundles 18 which have been alternately offset into two groups of bundles. The platform 12 carries an offsetting apparatus generally illustrated by arrow 20, and a number of guide members 19, which form a tray-like area for the bundles 18. The guide members 19 are adjustable upon the platform to accommodate different sized sheets, by means of adjustment slots 21, which allow the guide members to slide to new positions about the platform.

The offsetting apparatus 20 comprises a vertical stand 22, an abutment finger 23, and an overhanging slide mechanism 24. The offsetting apparatus 20 can be adjusted in its position upon the platform, similar to the tray guides 19, by means of slots 25 as shown.

When a first bundle of sheets is delivered to platform 12, it comes to rest against the vertical stand 22 and abuts surface 26, when finger 23 in a retracted position as seen in FIGS. 1 and 2. Finger 23 is then moved forward as shown in FIG. 3, and the next bundle to be delivered is stopped in an offset position from the first bundle. The finger is continually alternated (see arrows 29 of FIG. 2) between its retracted position in FIG. 2 and its forward position in FIG. 3, so that two groups of alternating offset stacks of bundles are formed. The first group which abuts surface 26 being depicted by arrow 27, and the second group that abuts surface 30 being shown by arrow 28 (see FIGS. 1 and 3).

The finger 23 is pivotable about shaft 31 shown in FIGS. 2 and 3. The finger 23 is biased urged to its re-

tracted position of FIG. 2 by means of a torsion spring 32, which is wrapped about shaft 31. The finger is moved to its forward position against the opposing force of spring 32.

A roller 33 is rotatably mounted upon finger 23. Roller 33 is always in contact with camming surface 34 of bar 35. Bar 35 is part of a four-bar linkage system, which allows bar 35 to move forward and backward (arrows 40). When bar 35 moves forward to the left from its retracted position in FIG. 2, it pushes against roller 33, thus causing the finger 23 to move to its forward position (FIG. 3).

There are four links 36 of the four bar linkage, two links on each side of bar 35. The links 36 are pivotable about stand 22 by means of bearings 37. The bar 35 is pivotable with respect to the vertical stand 22 and links 36 by means of bearings 38. The bar 35 is spring biased toward its retracted position of FIG. 2 by means of tension spring 39.

The bar 35 is caused to move by means of solenoid 41, which withdraws rod 42 (arrow 50, FIG. 2). Pin 43 of rod 42 pushes against bar 35 as it is withdrawn by the solenoid, thus forcing bar 35 forward.

On an alternate cycle, the solenoid returns rod 42 to its extended position in FIG. 2, thus causing bar 35 to move to its retracted position under the influence of spring 39.

The shaft 31 of the finger is free to move vertically with respect to platform 12, within guide walls 44. As the stack of bundles 18 grows higher upon platform 12, the nose 45 of the finger 23 comes to rest at a higher elevation, thus causing the shaft 31 to move upwardly within walls 44. This causes the finger 23 to rise, and the slide bar 46 to project through aperture 47 of overhanging bar 48. This overhanging height adjusting apparatus generally depicted by arrow 24, and inclusive of elements 46 and 48, has as its purpose to prevent shaft 31, and hence finger 23 from "walking" back down, and also for guiding the bundles, so that they fall neatly upon platform 12 and form a uniform stack 18.

Naturally, other schemes may be obviously devised for causing an alternating abutting surface to stop incoming bundles, and cause an offset stacking to occur.

Therefore, the drawings are deemed to be merely exemplary of the invention, and the detailed description merely as a means of understanding one particular way of carrying out the inventive concept.

The invention should, therefore, only be interpreted with respect to the appended claims.

What is claimed is:

1. An offset stacking mechanism, comprising: means for supporting a stack of material having a top surface thereon and comprised of two groups of bundles of sheets which are alternately offset from each other, said supporting means including an abutting surface member; means for delivering a quantity of said bundles one bundle at a time to said stack supporting means; stop means movably disposed with respect to said supporting means for stopping every other delivered bundle of sheets at a given position upon said supporting means relative to said abutting surface member, said stop means being movable between a first bundle contacting position and a second non-contacting bundle position in an alternating fashion such that bundles which are not stopped by said stop means are stopped by said abutting sur-

face member, wherein every bundle which is delivered to said supporting means is uniformly stacked and respectively offset from a previously delivered bundle and also from a successively delivered bundle in said stack thus forming two groups of stacked, alternately offset bundles of sheets, said stop means being caused to pivotally move into contact with said top surface of said stack and then slidably adjust its height to a higher position relative to said supporting means when moved to the first bundle contacting position, such that a progressively higher position is achieved with every subsequent movement to said first bundle contacting position, which said height adjustment is for the purpose of accommodating the stop means to the progressively increasing height of said stack; and means operatively connected to said stop means for alternately moving said stop means between said first and second positions.

2. The offset stacking mechanism of claim 1, wherein said stop means further comprises a height adjusting means which positions the height of the stop means relative to said supporting means in conjunction with the deliverance of said bundles to said supporting means.

3. The offset stacking mechanism of claim 1, wherein said supporting means comprises a stacking tray for receiving said delivered bundles, said tray having adjustably positioned guides at opposite ends thereof for the purpose of uniformly stacking each bundle as it is delivered to said tray.

4. The offset stacking mechanism of claim 1, wherein said stop means comprises a pivotable finger having an abutment surface upon which each delivered bundle is made to come to rest, said pivotable finger being made to alternately pivot between said first bundle contacting position and said second non-contacting bundle position, whereby each bundle is offset with respect to a prior or subsequently delivered bundle.

5. The offset stacking mechanism of claim 1, wherein said means to alternately move said stop means comprises a four-bar linkage mechanism that abuts said finger and which moves reciprocally back and forth, said linkage in so moving, causing said finger to pivot between said first and second positions.

6. The offset stacking mechanism of claim 5, wherein said linkage is reciprocally controlled by a solenoid connected to said linkage.

7. The offset stacking mechanism of claim 2, wherein said height adjusting means comprises a vertical guide in which the stop means travels progressively upward with respect to said supporting means as more and more bundles are delivered to said supporting means.

8. An offset stacking mechanism for stacking a plurality of bundles of sheet material, said bundles being delivered by a collating device for deposit upon a support of the offset stacking mechanism, said offset stacking mechanism comprising:

means for supporting a stack of material having a top surface thereon and comprised of two groups of bundles of sheets which are alternately offset from each other, said supporting means including an abutting surface member;

stop means movably disposed with respect to said supporting means for stopping every other delivered bundle of sheets at a given position upon said supporting means relative to said abutting surface member, wherein every bundle which is delivered

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to said supporting means is uniformly stacked and
respectively offset from a previously delivered bundle
and also from a successively delivered bundle
in said stack thus forming two groups of stacked,
alternately offset bundles of sheets, said stop means
being caused to pivotally move into contact with
said top surface of said stack and then slidably adjust
its height to a higher position relative to said
supporting means when moved to the first bundle
contacting position, such that a progressively

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higher position is achieved with every subsequent
movement to said first bundle contacting position,
which said height adjustment is for the purpose of
accommodating the stop means to the progressively
increasing height of said stack; and
means operatively connected to said stop means for
alternately moving said stop means between said
first and second positions.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,860,127 Dated January 14, 1975

Inventor(s) Arnold Fassman

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 41, change "deviced" to -- devised --.

Cancel Claim 2

On the Cover Sheet under the Abstract, "8 Claims"
should read -- 7 Claims --

Signed and sealed this 8th day of April 1975.

(SEAL)

Attest:

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Attesting Officer

C. MARSHALL DANN
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