

No. 655,695.

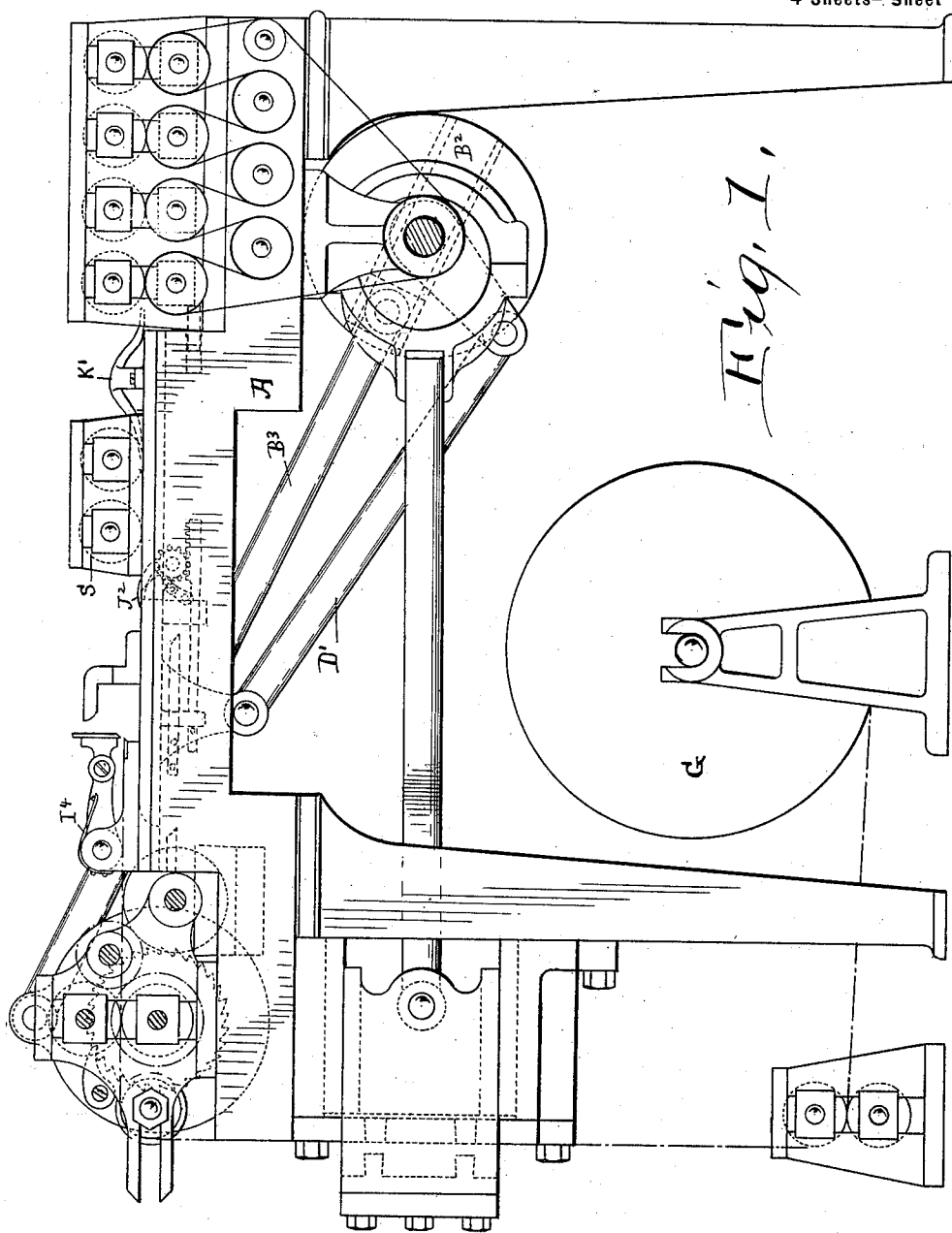
Patented Aug. 14, 1900.

J. W. DENMEAD.
PAPER BOX MAKING MACHINE.

(Application filed Feb. 5, 1900.)

(No Model.)

4 Sheets—Sheet 1.



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4 Sheets—Sheet 2.

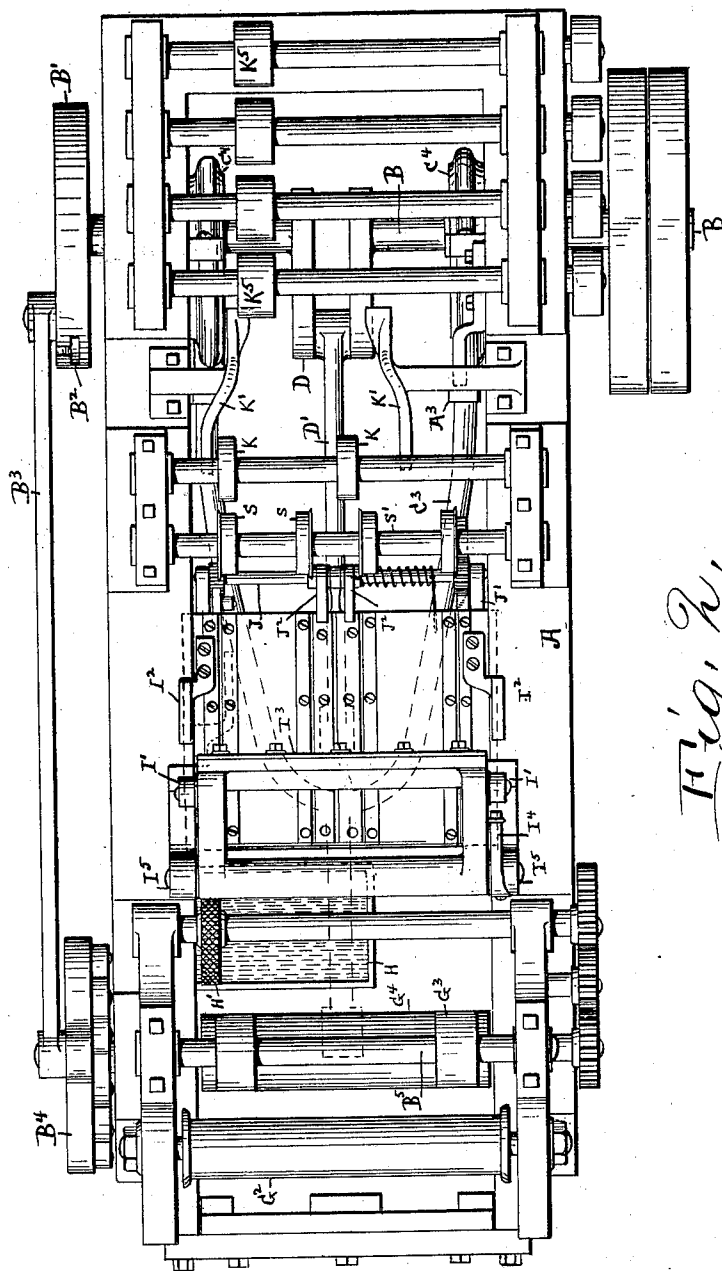


Fig. 2.

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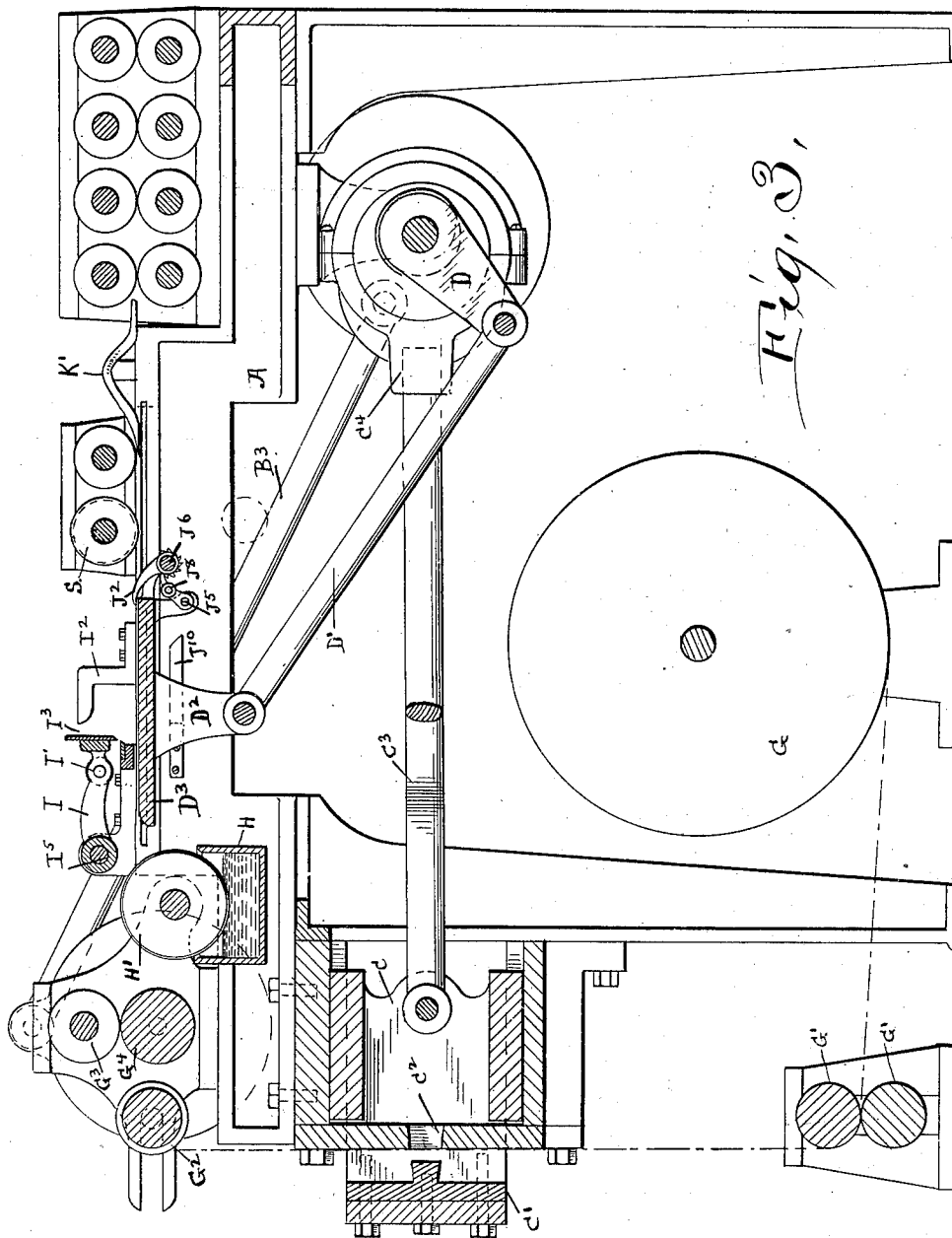
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Fig. 1,

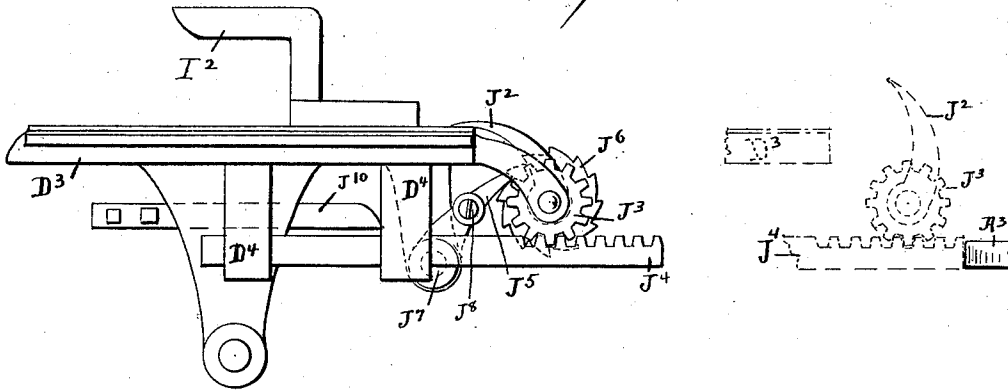


Fig. 5,

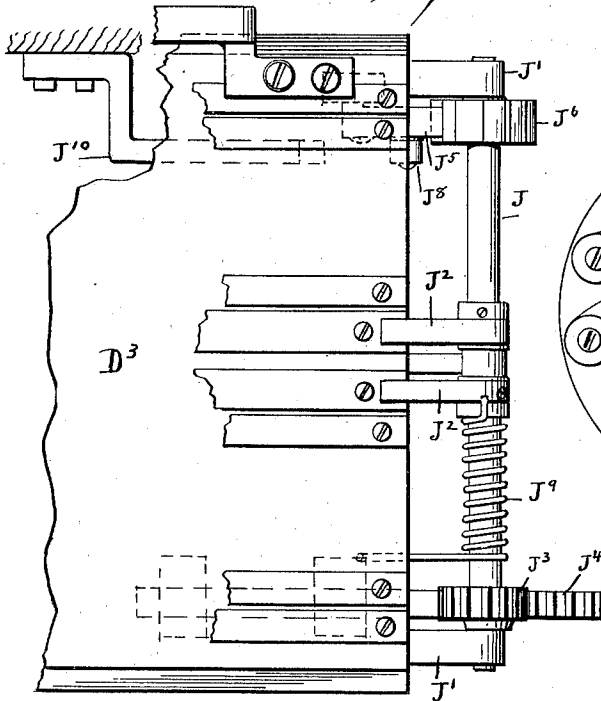
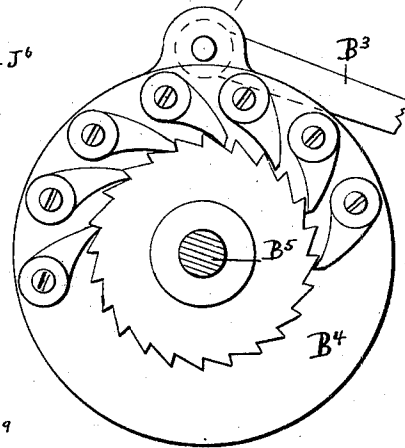


Fig. 6,



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UNITED STATES PATENT OFFICE.

JOHN W. DENMEAD, OF AKRON, OHIO.

PAPER-BOX-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 655,695, dated August 14, 1900.

Application filed February 5, 1900. Serial No. 4,093. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. DENMEAD, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Paper-Box-Making Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 This invention relates to paper-box-making machines for folding paper boxes or cartons.

The primary object of the invention is to provide a simple efficient machine which can be adapted to automatically form boxes of various sizes from a continuous roll of paper or pieces that may be fed from a hopper in the ordinary way. The material when intermittently fed from a continuous roll or sheet passes upwardly between horizontally-reciprocating punching-dies that cut from it only such corners or parts that will facilitate the closing of the box when used, thence passing horizontally between intermittently-actuated feed-rolls over a gluing-roll that applies the glue to one edge, thence passing beneath a vertically-vibrating knife that cuts off a predetermined length for a box, which piece falls upon a reciprocating table having secured thereon plates forming scoring-grooves, its outer end being seized by vibrating holding-nippers secured to an arm of the table which moves onward, carrying the paper as it is firmly held on the table by means of the nippers beneath revolving scoring-wheels having scoring-edges that crease the paper at points where it is to be folded as it is brought beneath the holding pressure-rollers and in contact with stationary angularly-formed guides, one on each side, that bend or fold the paper over, so that its two outer edges, one of which has been previously glued, are brought in contact and passed beneath the next succeeding rollers, to which it is delivered by the reciprocating table. Said latter rollers press and firmly secure these edges together as the now flat-folded completed box passes outwardly and is discharged from the machine.

In the accompanying drawings I have shown my improvements as arranged in the most practical way to secure rapid accurate work without liability of disarrangement or injury

to any portion of the material or stock that is being used. Obviously, however, some of the parts may be used without others and the construction somewhat varied without departing from the main features of my invention, as hereinafter more fully described.

In the drawings, Figure 1 represents a side elevation of my improved machine, showing the material as being received from a continuous roll of paper. Fig. 2 is a plan of the same, showing the main drive-pulleys and the several operative parts of the machine; Fig. 3, a longitudinal vertical section of the same. Fig. 4 is a detail view of the reciprocating table and the vibrating holding-nippers, that are also shown separately open in dotted lines. Fig. 5 is a plan view of the same; Fig. 6, the intermittent-feed operating-pawl and ratchets and its pitman connection that is actuated by the sliding crank connection in the slotted wheel of the main drive-shaft.

In the drawings, A represents the main frame; B, the main drive-shaft; B', the continuously-revolving feed-driving wheel that imparts intermittent motion to the feed mechanism; B'', its grooved crank-actuating slot; B³, the pitman connection, imparting intermittent action to the feed-operating pawls mounted on their carrying-disk that is loosely journaled at the side of the ratchet-wheel B⁴, that is secured to the drive-shaft B³, that is provided with gearing at the other end, imparting motion to corresponding gear-wheels for actuating the feed-rollers and gluing-roll.

C is the horizontally-reciprocating punching-die; C', its punching-plate; C'', the die-plates; (these plates may be removable and of any form;) C³, its forked actuating-pitman; C⁴, its eccentric connection with the main drive-shaft.

D is the double-armed crank, secured centrally to the main driving-shaft and actuates the pitman-rod D', that is secured to the lug D'' of the horizontal laterally-reciprocating table D³.

G is the roll of material; G' G', paper-guiding rolls; G'', a paper-guiding roll at the top of the machine, provided with flanges at each end. It is mounted in a slotted support on the main frame, and is therefore adjustable and can be secured at any desired point to register the paper in relation to the point

where it is cut off, which secures the proper position as regards the die-punching mechanism; G³, the upper holding pressure-roll bearing on the paper that passes over roll G⁴.

- 5 H is the glue-reservoir; H', the gluing-roll. I, the vertically-vibrating knife-arm, pivoted on the main frame at I⁵; I', its friction-rolls, that are caused to vibrate the knife downwardly as the projecting knife-actuating arms
- 10 I'' I'', that are secured at each side to the reciprocating table, pass over said rolls; I⁴, the knife-retracting spring, secured near its pivotal support; I³, the knife-blade.
- J is the vibrating-holder nipper-shaft; J', its supporting-arms, secured to the horizontal laterally-reciprocating table; J'', the centrally-secured paper-holding nippers; J³, the actuating-pinions, secured on the nipper-shaft; J⁴, the pinion-actuating rack, that is movably
- 20 supported in sliding bearings D⁴, secured on the reciprocating table. The nipper J is provided at the other end with a ratchet-wheel J⁶ and held by the pawl J⁵, which pawl is provided with a friction-roll J⁸.
- 25 A pressure holding-spring J⁹ holds the nippers down firmly on the table, and as it is moved outwardly its end will contact with a fixed lug A³, secured to the main frame. This contact will move the rack J⁴ backward
- 30 in its sliding bearings D⁴ and its teeth will revolve the pinion J³ and its shaft J to open the nippers up and over away from the table, in which position they are held by means of the pawl J⁵ and ratchet-wheel J⁶, and thus
- 35 release and open the way for the paper as it is seized by the pressure-roller K⁵. As the table passes back the pawl-releasing friction-roller J⁸ on the pawl J⁵ will come in contact with the disengaging-stop J¹⁰, secured to the
- 40 main frame, and lift the pawl out of engagement with the ratchet-teeth J⁶, secured to the shaft J, and permit the force of the pressure-spring J⁹ to return the holding-nippers J'' to the table and renew its functions.
- 45 The paper is received by the pressure-rollers K and folding-guides K', by means of which it is folded over and the two outer edges firmly pressed between the pressure-rollers K⁵, of which I have shown in use four
- 50 above and four below, between which the outgoing box passes. Motion is imparted to the outside of the lower pressure-rollers K⁵ by means of an endless belt that receives its motion from a pulley on the main driving-shaft,
- 55 and the upper rollers will revolve by frictional contact with the moving paper. Thus the drawings will clearly show a machine which in its operation will carry the paper from a continuous roll to a point where it is acted
- 60 upon by the punching-dies, thence over a guiding-roll, presenting it to the force feeding-rolls G³ and G⁴, that force it over the glue-roll H' and under the vibrating knife I³, and when a sufficient length has passed beneath the knife
- 65 it will be cut off, as the projecting arms I'', secured to the reciprocating table, press down upon the friction-rollers I' of the vibrating

knife-arm I, the severed piece falls upon the surface of the table, and its outer edge is seized and held upon the table by the nippers J'', and the table moves outwardly beneath the scoring-rolls S, of which there are four secured to the shaft S' and actuated by frictional contact with the paper, the scoring edges being placed to be above the corresponding grooves in the table upon which the paper rests, and as it is scored it passes onward beneath the pressure-rollers K and against the folding-guides K', that cause it to assume a flat-folded condition. The outer edges being brought in contact, the glue will cause them to adhere as the pressure-rollers K⁵ firmly press upon them and discharge them from the machine.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a box-making machine the horizontally-reciprocating die located at the front of the machine, the guiding-roll G³, the intermittently-actuated feed-rolls G³ G⁴, the glue-roll H', the vertically-vibrating knife combined with the reciprocating table that moves in a direction parallel with the line of the movement of the outgoing or traversing paper, that is being scored and folded substantially as shown and described.

2. In a paper-box-making machine the intermittently-actuated feed-rollers G³ G⁴, the glue-roll H', knife-arm I and knife I³, combined with the reciprocating table D³ provided with paper-holding nippers that carry forward the paper in the process of scoring and folding the same and deliver it to the pressure-rollers substantially as shown and described.

3. In a paper-box-making machine the main shaft B, its forked die-actuating pitman and their eccentric connection therewith, combined with the slotted crank-wheel B' its pitman B³ actuating the feed ratchet-wheel B⁴, and the crank D and its pitman D' actuating the horizontal laterally-reciprocating table D³ substantially as shown and described.

4. In a paper-box-making machine the ratchet-wheel B⁴ the intermittent-feed rollers G³ G⁴, glue-roller H', vibrating knife-arm I and its knife combined with the intermittently-reciprocating table D³, the scoring-knives, the folding-guides, and pressing-rolls for completing the box, substantially as shown and described.

5. In a paper-box machine the combination of the horizontally-reciprocating table that moves forward to receive and support the blank, and the paper-holding nippers J'' secured to the shaft J and provided with the pressure-holding spring J⁹ actuating-pinion J³, its movable rack J⁴, and the reversing-lug A³, the pinion J⁶, its pawl J⁵, pawl-releasing friction-roller J⁸ and disengaging-stop J¹⁰ substantially as shown and described.

6. In a paper-box-making machine the main driving-shaft B provided with the pitman C³ for operating the punching or cutting die;

and the crank-wheel B' for operating the pitman B³; and its ratchet-wheel B⁴ that imparts an intermittent reciprocating action to the feed-rolls; combined with the crank D and the reciprocating scoring-table D³, that carries the paper beneath the scoring-rolls, and onward to the folding-guide and pressing-rolls substantially as shown and described.

7. In a paper-box-making machine the vibrating knife-arm I its friction actuating-roller I', retracting-spring I⁴, combined with the reciprocating scoring-table D³, its knife-actuating arm I'', and the nipper-shaft J, and its paper-holding nippers J'', operating substantially as shown and described.

8. In a paper-box machine, the main shaft B, its feed-driving wheel B', crank-slot B'', pitman B³, actuating feed-operating pawls se-

cured to the loosely-journaled disk B⁴ mounted on the drive-shaft B⁵ to which the ratchet-wheel is secured to impart an intermittent movement to the feed-rolls and its gear that actuates the gluing-roll, substantially as shown and described.

9. In a paper-box-making machine the horizontally-reciprocating table D³ having the scoring-grooves and paper-holding nippers and knife-actuating arms mounted thereon, combined with the rotary scoring-rolls and folding-guides K' operating substantially as shown and described.

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