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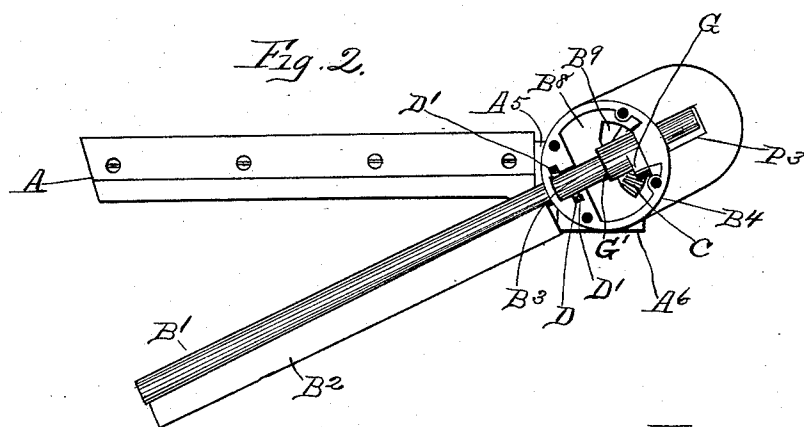
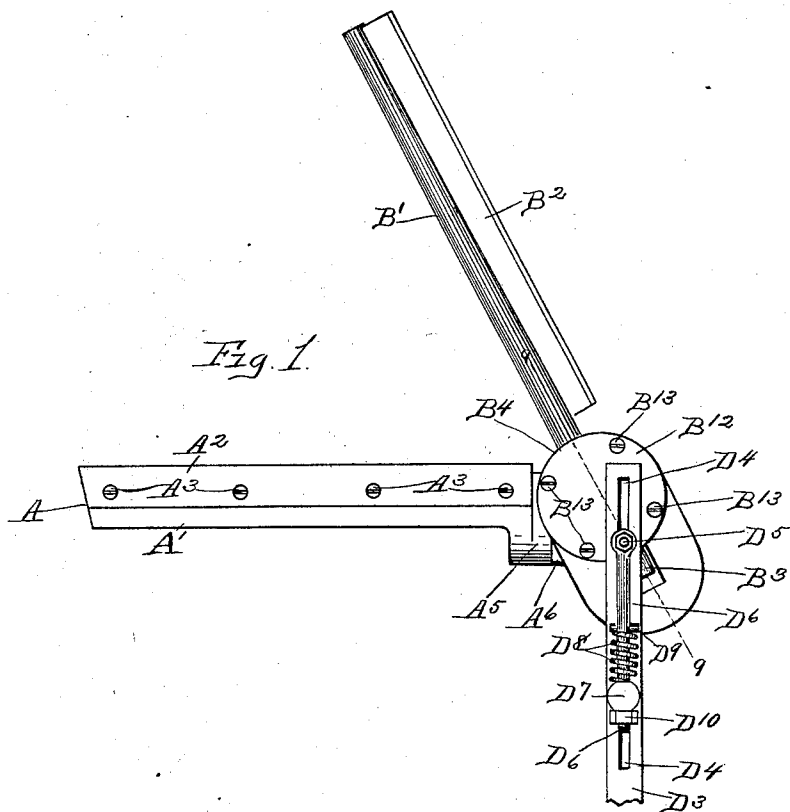
Patented Aug. 23, 1898.

A. H. MORRISON.  
PAPER CUTTING SHEARS.

(Application filed Aug. 13, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
V. M. Wheaton  
J. L. Curtis.

Inventor:  
Augustus H. Morrison  
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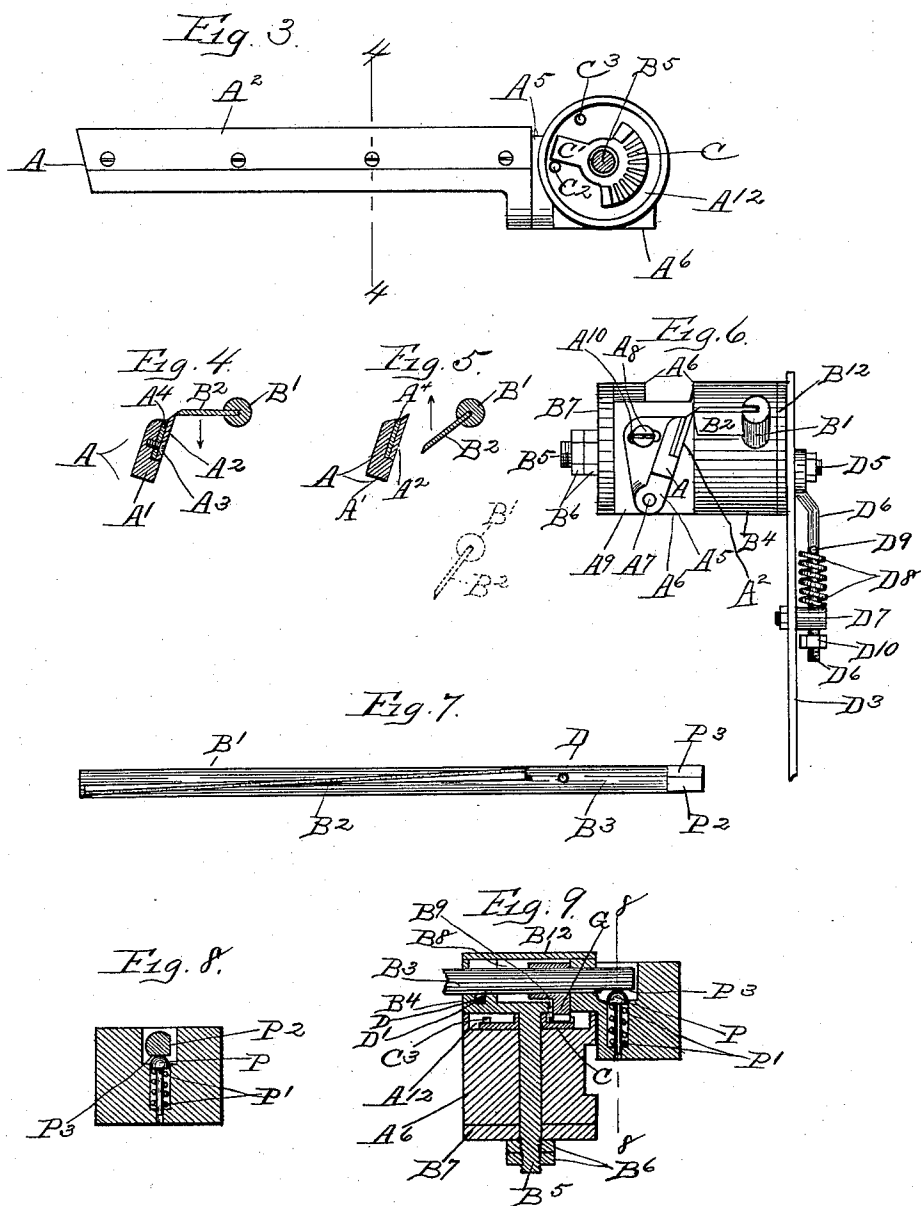
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# UNITED STATES PATENT OFFICE.

AUGUSTUS H. MORRISON, OF AMSTERDAM, NEW YORK.

## PAPER-CUTTING SHEARS.

SPECIFICATION forming part of Letters Patent No. 609,622, dated August 23, 1898.

Application filed August 13, 1897. Serial No. 648,095. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUSTUS H. MORRISON, a citizen of the United States, residing at Amsterdam, county of Montgomery, and State of New York, have invented certain new and useful Improvements in Shears, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a view in side elevation of my improved shears, showing the position of the blades after being opened. Fig. 2 is a similar view showing the position of the blades after being closed, with the cover of the gear-case removed. Fig. 3 is a similar view of the stationary blade after the movable blade has been detached. Fig. 4 is a vertical cross-section taken on the broken line 4 4 in Fig. 3 and showing the relative position of the movable blade while passing the stationary blade during a closing movement. Fig. 5 is a similar view of the same parts during an opening movement of the movable blade. Fig. 6 is a front end view of the blades, showing their pivotal connection. Fig. 7 is an edge view of the movable blade detached. Fig. 8 is a vertical cross-section taken on the broken line 8 8 in Fig. 9. Fig. 9 is a section taken on the broken line 9 9 in Fig. 1 through the pivotal connection of the blades and showing the pivot with its axis in a vertical position.

My improved shears are especially adapted for cutting paper wet with paste in the manufacture of paper boxes.

It is well known that wet or moistened paper is more difficult to cut than dry paper and that cutting pasted paper soon deposits sufficient paste upon the blades of shears to render them useless until cleaned.

The object of my invention is to so improve the shears as to overcome or materially reduce such defects.

The invention consists of a pair of shear-

blades, one of which is stationary and the other movable, and mechanism for imparting to the blades not only the usual shear movement, but a longitudinal movement of one of the blades, thereby producing a compound shear movement of the blades relatively to each other; also, of means for imparting to one of the blades a rotary movement on its longitudinal axis, whereby the blades can be brought into engagement with each other while closing and disengaged from each other while opening, thereby preventing the movable blade from taking paste from the stationary blade while opening. When cutting the freshly-pasted paper, the paste side of the paper rests upon the stationary blade, so that the movable blade does not come in contact with the paste in cutting, and whatever paste is removed from the paper is mostly forced toward the outer side of the stationary blade and the successive cuts continually force the paste outward from the edge. By disengaging the blades before the opening movement none of the paste on the edge of the stationary blade is deposited on the edge of the movable blade.

Referring to the drawings, A is the stationary blade, comprising a supporting-bar A' and a cutting-bar A<sup>2</sup>, secured thereto, as by the screws A<sup>3</sup>, with a thin strip of rubber A<sup>4</sup> interposed between the bars to permit the cutting-bar to yield slightly in cases of emergency. The inner end of the supporting-bar is provided with an attaching-shank A<sup>5</sup>, by which it is attached to the pivot-hub A<sup>6</sup> by means of pin A<sup>7</sup> and adjusting-screw A<sup>8</sup>. The plane end of the shank rests upon the plane surface A<sup>9</sup> of the hub and is provided with the slot A<sup>10</sup>, through which the adjusting-screw passes. By loosening the adjusting-screw the shank can be made to swing or oscillate upon the pin A<sup>7</sup> until the cutting-bar assumes the desired inclination relatively to a vertical plane passed through the axis of pin A<sup>7</sup> and then secured in that position by tightening the adjusting-screw.

The movable blade comprises a grooved supporting-rod B' and a cutting-bar B<sup>2</sup>, secured in the groove. The rod is provided on its inner end with a shank B<sup>3</sup>, which passes transversely through the pivot-hub B<sup>4</sup>. The two pivot-hubs are secured together by means

of a pivot-stud B<sup>5</sup>, projecting from the hub B<sup>4</sup> at right angles to supporting-rod B' and passed through a socket adapted to receive and fit the stud in the pivot-hub A<sup>6</sup>. The stud is secured in the socket by means of the nuts B<sup>6</sup> on its projecting end and the interposed washer B<sup>7</sup>. The inner end of the hub A<sup>6</sup> is provided with a cylindrical chamber A<sup>12</sup>, adapted to receive the segmental gear-plate C, which is provided with an aperture adapted to receive the pivot-stud B<sup>5</sup>, also with a shank C', located between two stop-pins C<sup>2</sup> and C<sup>3</sup>, projecting into the chamber from the body of the hub. The shank B<sup>3</sup> of the movable supporting-rod, which passes transversely through its supporting-hub, is provided with a segmental gear G, feathered on the shank to turn with it and at the same time permit the shank to slide through the gear. The feather G' is shown in Fig. 2. This gear is located within a cylindrical chamber B<sup>8</sup>, formed within the hub B<sup>4</sup>. An opening B<sup>9</sup> is formed through the inner end of the hub B<sup>4</sup>, which connects the two gear-chambers, whereby the segmental gear is permitted to project through such opening and engage the segmental gear-plate, and the gear and plate are maintained in engagement when the parts are bound together by the pivot-stud and nuts. The gear-plate has a rotary movement upon the pivot-stud, which is limited by the stop-pins C<sup>2</sup> and C<sup>3</sup>. During the opening and closing movements of the movable blade of the shears the gear-plate rotates on the pivot-stud until its shank engages one of the stop-pins, whereupon it causes the gear, and with it the movable blade, to rotate upon the longitudinal axis of the blade.

Now if the stop-pins are so located that the movable blade continues to rotate to the end of its closing movement (shown in Fig. 2) the cutting-bar of such blade will turn upon its longitudinal axis from the approximately horizontal position when in engagement with the stationary blade, as seen in Fig. 4, to the inclined position shown in Fig. 2 and indicated by dotted lines in Fig. 5; but when the movable blade starts from this position on its opening movement the gear-plate rotates until it comes into engagement with the other stop-pin, and not until it has engaged said other pin does it act through the gear to rotate the movable blade, and by the time it has fairly commenced to rotate back toward the horizontal position it has passed the stationary blade.

The relative position of the movable blade while passing the stationary one is approximately shown in Fig. 5. This movement of the blade to one side of the plane of its oscillatory or vibratory movement on the pivot which connects the hubs I term a "lateral" movement or deflection, in which sense the blade is deflectable laterally. As illustrated in the drawings, the blade B<sup>2</sup> has an oscillating movement upon the axis of the supporting-rod B', which causes the cutting edge

of the blade B<sup>2</sup> to travel in a certain curved path during the closing movement of the blade, such that the cutting edges of the two blades will engage each other, while during the opening movement of the blade the same degree of path curvature and lateral deflection of the cutting edge is obtained; but owing to the yielding movement of the gear-plate between the limiting-stops C<sup>2</sup> and C<sup>3</sup> the deflection of the cutting edge does not commence until the blade has traveled through a considerable part of its opening movement, whereby the maximum deflection of the cutting edge is too late to cause the two cutting edges of the blades to engage each other.

The opening, closing, and deflectable movements of the cutters may be accomplished in any known manner.

Any known frictional or retarding device may be employed to hold the movable blade in the rotary position assumed at the end of the closing movement while the gear-plate is passing from one stop-pin to the other. I have shown a plunger P, actuated by spring P', adapted to press upon a plane surface P<sup>2</sup> on the shank of the movable blade, which yielding holds the blade from rotating. By having a second plane surface P<sup>3</sup> on the shank located at an angle to the surface P<sup>2</sup> the same plunger will also hold the blade at the end of its opening movement.

To impart a longitudinal movement to the movable blade during its opening and closing movements, I provide the shank with a pin-follower D, adapted to travel in a spiral cam-groove D' in the pivot-hub in which the shank rotates, Figs. 2 and 9, whereby the blade and its shank are caused by their rotary movement to move longitudinally or lengthwise of the blade and transversely of the pivot which connects the two blades, the amount of movement depending upon the pitch of the spiral groove. The gear being feathered upon the shank, the latter slides through the gear while rotating with it.

I prefer to rigidly attach the hub A<sup>6</sup> to some fixed support, which may be a part of a box-machine, so that the blade A will remain stationary in an approximately horizontal position, as seen in Figs. 1 and 2, which attaching mechanism may be of any known form and is not shown; but either blade can be made stationary or both may be movable.

The movable blade may be vibrated to open and close the shears by hand or in any known manner. I have shown a link connection D<sup>3</sup>, pivoted at one end to one edge of the rotary hub and adapted to be secured at the other end to some reciprocating motor. (Not shown.) The link may be cushioned to prevent too great strain upon the parts where a quickly-moving motor is employed to close the shears. As a means for cushioning the connection I provide the link D<sup>3</sup> with a longitudinal slot D<sup>4</sup>, adapted to receive and form a slideway for the stud D<sup>5</sup>, projecting from

the hub or from the disk-cover B<sup>12</sup>, which closes the gear-chamber in the hub, the disk being held in place by screws B<sup>13</sup>. The rod D<sup>6</sup> is fixed at its upper end to the stud D<sup>5</sup>, and its lower end is passed loosely through a transverse aperture in a stud D<sup>7</sup>, fixed to and projecting from the link. A coil-spring D<sup>8</sup>, slipped upon the rod, bears at its lower end upon the link-stud and at its upper end upon a pin D<sup>9</sup>, projecting from the rod. The lower projecting end of the rod is provided with a nut D<sup>10</sup> to prevent its escape from the link-stud. An excess of power is taken up by the spring.

The resultant movement imparted to the movable blade by the mechanisms above described especially adapts my improved shears for cutting paper having one of its surfaces enameled or otherwise ornamentally finished, in which case the paper is placed with its said finished surface in contact with the stationary blade, the result being a clean cut which exposes on the under surface of the paper nothing but the perfectly-finished surface to the extreme cut edge.

The cutting-bar of the movable blade is spiral in form, so that its parts successively enter a horizontal plane in coöperating with the stationary blade.

By having the stationary blade rotatively adjustable upon its hub, as above described, the blade can be adjusted to compensate for wear and at all times to present an undercut cutting edge to coöperate with the movable blade.

The details of construction and means for supporting and operating the several elements, either by hand or in connection with a machine, may be varied as desired without departing from the spirit of my invention, and my improved shears can be employed for any purpose for which shears are usually employed, although particularly adapted for cutting sheets of fibrous material—such as paper, pasteboard, and cloth—to one surface of which has been applied a coating of paste, glue, or other adhesive substance.

What I claim as new, and desire to secure by Letters Patent, is—

1. A shears comprising a pair of pivotally-connected blades one of which is movable lengthwise and transversely of the blade-connecting pivot, and provided with means for imparting lengthwise movements to the movable blade, substantially as described.

2. In a shears, the combination with pivotally-connected blades, one of which has its cutting edge deflectable laterally of the plane of vibratory cutting movement; means for forcing the deflectable edge into engagement with the cutting edge on the other blade during the closing vibratory movement; and

means for suspending the deflectable movement during a part of the opening movement whereby the blades are prevented from engagement with each other during such opening movement, substantially as described.

3. In a shears, the combination with pivotally-connected hubs; of a blade fixed on one hub; a blade rotatively mounted on the other hub with its axis of rotation in line with the longitudinal axis of the blade; means for imparting rotative movements to the rotary blade during a part of the closing and opening movements; and means for securing the rotary blade against rotative movements during the other part of its opening and closing movements, substantially as described.

4. In a shears, the combination with a pair of pivotally-connected hubs, of a blade fixed upon one of the hubs; a blade rotatively secured to the other hub with its axis of rotation in line with the blade; a segmental gear-plate rotary upon the pivot connecting the hubs; stops on one of the hubs for limiting the rotative movements of the gear-plate; and a gear fixed upon the rotative blade and engageable with the gear-plate, substantially as described.

5. In a shears having one of its blades rotatively mounted in a pivot-hub, and provided with means for imparting rotative movements upon its longitudinal axis to such blade, the combination with the hub having a spiral cam-groove, of a cam-follower on the blade adapted to travel in such groove, whereby longitudinal slide movements are imparted to the blade simultaneously with the rotative movements, substantially as described.

6. In a shears, having its blades mounted upon pivotally-connected hubs, and one of the blades provided with means for imparting to it rotative movements upon its longitudinal axis during a part of each opening and closing movement of the shears, a spring-actuated stop for controlling the rotative movements of the blade, substantially as described.

7. In a shears having a pair of blades with supporting-hubs pivotally connected together, the combination with one of the blades and its supporting-hub; of a pivotal connection between such blade and hub having the pivotal axis of such connection approximately parallel with the longitudinal axis of the blade; and means for adjustably securing such blade against pivotal oscillation on its supporting-hub, substantially as described.

In testimony whereof I have hereunto set my hand this 2d day of August, 1897.

AUGUSTUS H. MORRISON.

Witnesses:

JOHN H. RUSSELL,  
SAML. P. MCCORDY.