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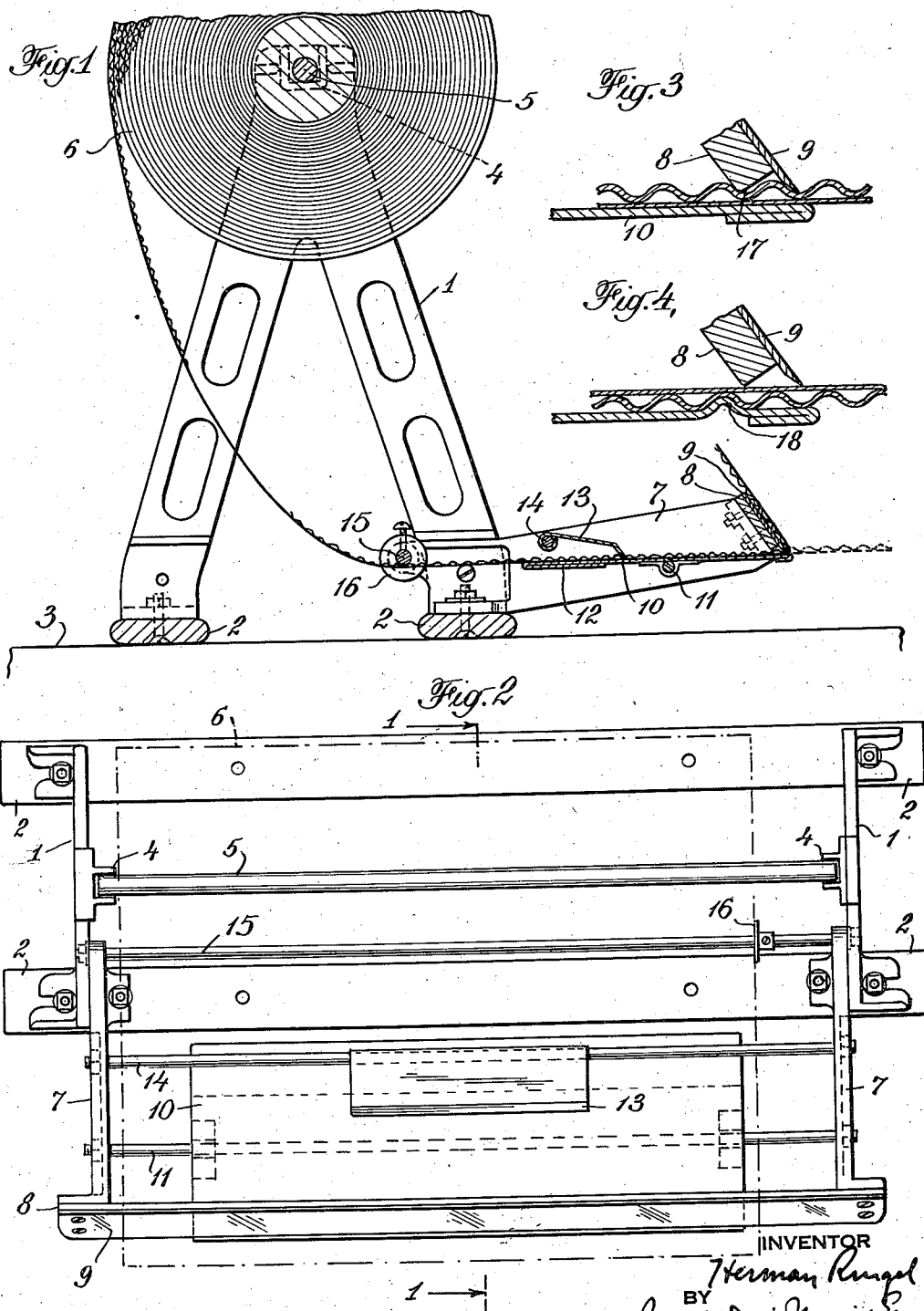
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METHOD AND APPARATUS FOR TEARING CORRUGATED PAPER

Filed July 16, 1937

2 Sheets-Sheet 1



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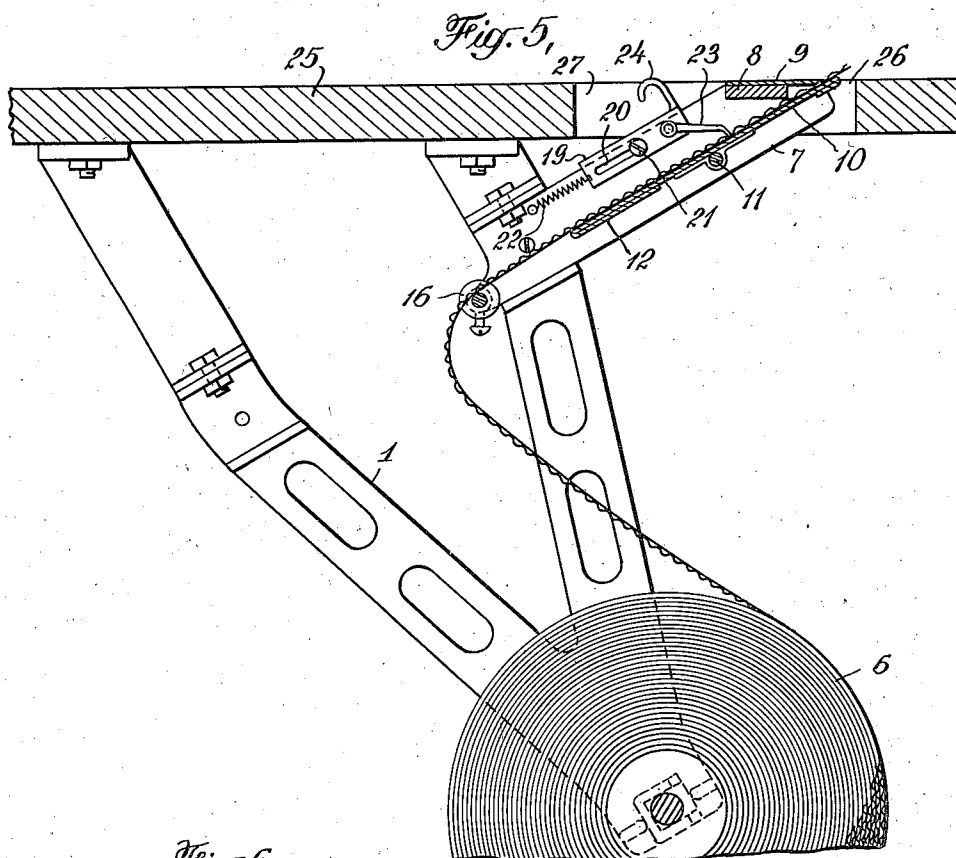
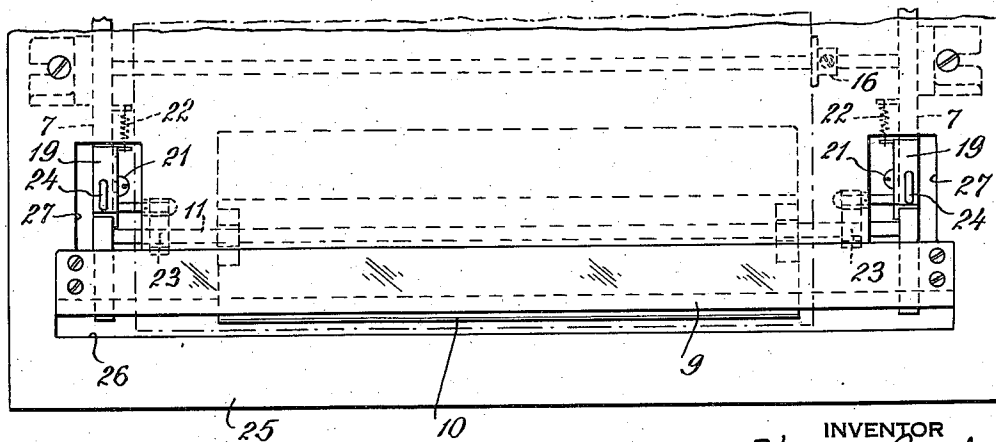


*Fig. 6.*



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## UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR TEARING  
CORRUGATED PAPER

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15 Claims. (Cl. 164—84.5)

This invention relates to method and apparatus for tearing corrugated paper. This paper, widely used for wrapping and packaging, consists of two plies, one smooth, one corrugated, forming together a tough cellular structure, well adapted for its protective function, but difficult to handle. It is almost impossible to tear this paper in the ordinary way and when a section of it is to be detached from its roll a hand-operated sharp knife is usually resorted to. The devices in common use for tearing other papers will not serve for this, yet, so far as I am aware, no method or apparatus particularly designed for tearing corrugated paper has been devised. The object of the present invention has been to devise such method and apparatus.

In obtaining this object I have mounted a knife on the necessary support and behind and below it have provided a pivoted counterweighted plate which normally bears against the knife edge and serves three purposes: to guide the paper, to protect the operator's fingers, and to yieldably urge the paper into contact with the knife during the tearing operation. In order to minimize the pressure required to be exerted by the plate against the knife to prevent slipping of the paper while it is being torn, I provide means extending within the valleys of the corrugated face of the paper to anchor it in position during the tearing operation. I preferably tear the paper with the corrugated face adjacent the knife because in this way the knife itself assists in holding the paper while it is being torn. I have, however, provided means for tearing the paper with the smooth face adjacent the knife edge. Although the counterweighted plate exerts sufficient pressure to hold the paper against the anchoring means, the pressure exerted is not so great as to prevent the operator from easily tilting the plate and moving the paper forward so that he can seize the forward end and pull out the desired length for tearing. I have also provided means for preventing backlash after tearing so that the paper is always in position for a new tear.

In the accompanying drawings I have illustrated certain preferred embodiments of my invention. In these drawings Figure 1 is a vertical transverse section through the apparatus showing the paper threaded between the counterweighted plate and the knife with the corrugated face uppermost and in contact with the knife edge; Figure 2 is a plan view of the apparatus shown in Figure 1; Figure 3 is an enlarged sectional detail through the forward end of the knife and forward end of the counterweighted

plate, showing the relation of the paper to these parts prior to tearing, and with the corrugated face of the paper in contact with the knife edge; Figure 4 is a view similar to Figure 3 showing the paper reversed with its plane face in contact with the knife edge; Figure 5 is a modified form of the apparatus shown in Figure 1 with the paper mounted below the operating table instead of above it, as in Figure 1; and Figure 6 is a fragmentary plan view of the apparatus shown in Figure 5.

The apparatus of Figures 1, 2 and 3 comprises a pair of frames 1 bolted to slats 2 and mounted upon a table 3. The upper ends of these frames 1 carry inwardly facing cups 4 which support a spindle rod 5 on which a roll of corrugated paper 6 is mounted. A pair of forwardly extending brackets 7 are bolted to the base of the frame and make a slight angle with the table. To the outer ends of these brackets is bolted a transverse knife bar 8 which carries a knife 9 making an acute angle with the plane of the table and with the brackets. A plate 10 is pivotally mounted behind the knife on a bar 11. This plate is counterweighted at 12 so that its forward edge normally lies in contact with the knife edge and extends slightly beyond it, thereby serving as a guard. Above and at the rear of the plate 10 a short pawl plate 13 is pivotally mounted on a rod 14. This pawl is designed to lie within one of the valleys of the corrugated face and prevent backlash. The inner ends of the brackets support a transverse rod 15 on which is mounted a longitudinally slidable collar 16 for preventing sidewise motion of short rolls.

The apparatus operates as follows: The paper 6 has been rolled, according to the usual practice, with its corrugated side facing the axis of the roll. The forward end of the web is carried downward and forward under the rod 15, under the pawl 13, over the plate 10 and between the plate and the knife edge. In threading the paper through the apparatus, the operator depresses the forward side of the plate 10 with his hands and slides the paper forward until a sufficient length extends beyond the knife to enable him to grasp it and pull forward the length which he desires to cut off. When the plate 10 is released the counterweighted 12 urges the paper into contact with the knife, as shown most clearly in Figure 3. It will also be noted that the knife bar 8 terminates along its lower edge in a square corner 17 so that the plate 10 forces the paper into contact not only with the knife edge, but with this corner of the knife bar. The paper is, there-

fore, not only anchored by the knife itself, but also by the knife bar. The operator then bends the paper upward and backward along the face of the knife until the section to be torn off forms an acute angle with the remaining web, and the paper cut or torn starting at one end of the knife and travelling across. Unless the paper is firmly held at this time, it will slip forward and this will result in a ragged and unsatisfactory tear. Hence the counterweighted plate 10, which holds the paper firmly in contact with the knife and also with the corner of the knife bar.

After the paper is torn, it is desirable that it shall be held in position and not slip back. The corner 17 of the knife bar tends to hold it in place, but I have also provided a secondary backlash retarder in the form of the pawl plate 13, the action of which will be clear. This pawl prevents any backward movement of the paper, but does not interfere with its forward movement.

Although the paper is preferably torn with the corrugated face in contact with the knife edge, it is, nevertheless possible to tear it with the smooth face in contact with the knife. In order to anchor the paper when in that position, I provide the counterweighted plate with an upstanding bead 18 paralleling the forward edge of the plate and extending across its upper face. This bead, as shown clearly in Figure 4, enters one of the valleys of the corrugated face and holds the paper against slippage during the tearing operation.

The apparatus which I have just described is designed to be mounted above the work table. It may be advantageous at times to mount the apparatus below the table, thus affording more room for wrapping and packing; in Figures 5 and 6, I have shown the apparatus so mounted. This apparatus is substantially the same as that previously described, except that the mounting of the frame is necessarily modified to some extent and the brackets are reversed. With the apparatus in this position, however, it is impossible for the operator to reach the forward end of the paper web with his hands and move it forward between the knife and the counterweighted plate. The table is in the way. I have, therefore, provided a pair of pawl-carrying slides 19 one mounted on the upper edge of each bracket which enable the operator to advance the web. Each of these slides is provided with a slot 20 through which extends a headed bolt 21 which guides and limits the movement of the slide on the bracket. A spring 22 normally urges the slide toward the frame. Pivotaly mounted on each slide is a pawl 23 designed to engage the corrugated face of the paper and so positioned that as the slide is moved forward the paper is carried with it, but on the return spring-impelled movement the pawl rides over the paper. A finger hold 24 extends upwardly from each slide and is designed to be grasped by the operator to pull the slide forward and advance the paper. The table 25, from which the apparatus depends, is provided with a slot 26 adjacent the knife edge through which the paper passes and with two slots 27 through which the operator may have access to the hand holds 24.

I claim:

1. Apparatus for tearing corrugated paper comprising a knife disposed at an angle to the paper and parallel to the corrugations, and means for holding the knife within one of the valleys of the corrugated face of the paper during the tearing operation.

2. Apparatus for tearing corrugated paper comprising a knife disposed at an angle to the paper and parallel to the corrugations, and a counterweighted pivoted plate for holding the corrugated face of the paper against the knife edge during the tearing operation so that the knife edge extends within one of the valleys of the corrugated face of the paper.

3. Apparatus for tearing corrugated paper comprising a knife disposed at an angle to the paper and parallel to the corrugations, and a counterweighted pivoted plate for holding the corrugated face of the paper against the knife edge during the tearing operation so that the knife edge extends within one of the valleys of the corrugated face of the paper, the plate extending beyond the knife edge to protect the fingers of the operator.

4. Apparatus for tearing corrugated paper comprising a knife, anchoring means behind the knife extending within one of the valleys of the corrugated face of the paper, and a counterweighted pivoted plate for holding the paper against the anchoring means and the knife edge during the tearing operation.

5. Apparatus for tearing corrugated paper comprising a knife, a bar on which the knife is mounted terminating in a corner behind the knife edge, a counterweighted pivoted knife-guard for holding the corrugated face of the paper in contact with the knife edge and the knife bar corner during the tearing operation.

6. Apparatus for tearing corrugated paper comprising a knife, a counterweighted pivoted plate for holding the paper against the knife edge during the tearing operation and a pawl engaging the corrugated face of the paper for preventing backlash.

7. Apparatus for tearing corrugated paper comprising a spindle frame for a roll of paper, brackets on the frame, a knife carried by the brackets, a counterweighted plate pivoted on the brackets urging the paper into contact with the knife edge, and a pawl pivoted on the brackets above the plate engaging the paper to prevent backlash.

8. Apparatus for tearing corrugated paper comprising a spindle frame for a roll of paper, brackets on the frame, a knife bar supported by the brackets, a knife carried by the bar, a corner on the bar behind the knife designed to lie within a valley of the corrugated face of the paper during the tearing operation, a counterweighted knife-guard pivoted on the brackets urging the paper into contact with the knife edge and the corner of the bar, and a pawl plate pivoted on the brackets above the knife-guard designed to lie within one of the valleys of the corrugated face of the paper and prevent backlash.

9. Apparatus for tearing corrugated paper comprising a knife, a counterweighted pivoted plate for holding the paper against the knife edge during the tearing operation, and a projection on the plate behind the knife edge designed to lie within a valley of the corrugated face of the paper during the tearing operation.

10. Apparatus for tearing corrugated paper comprising a table, a spindle frame for a roll of paper depending from the table, brackets on the frame, a knife carried by the brackets, a counterweighted plate pivoted on the brackets urging the paper into contact with the knife edge and means slidable on a bracket for advancing the paper.

11. Apparatus for tearing corrugated paper

comprising a spindle frame for a roll of paper, brackets on the frame, a knife bar supported by the brackets, a knife carried by the bar, a counterweighted knife-guard pivoted on the brackets urging the paper into contact with the knife edge, a slide mounted on a bracket behind the knife, a pawl pivoted on the slide and engaging the corrugated face of the paper, and means whereby the operator can move the slide and pawl toward the knife to push the forward edge of the paper between the knife edge and the plate into such position that it may be grasped.

12. Apparatus for tearing corrugated paper comprising a table, a spindle frame for a roll of paper depending from the table, brackets on the frame, a knife bar supported by the brackets, a knife carried by the bar, a slot in the table along the knife edge through which the paper passes, a counterweighted knife-guard pivoted on the brackets urging the paper into contact with the knife edge, a slide mounted on a bracket behind the knife, a pawl pivoted on the slide and engaging the corrugated face of the paper, a slot in the table through which the operator can move the slide and pawl toward the knife to push the forward edge of the paper between the knife edge and the plate into such position that it may be grasped.

13. Apparatus for tearing corrugated paper comprising a table, a spindle frame for a roll of paper mounted on the table, brackets on the frame extending forwardly at an acute angle to the table, a knife carried by the brackets and a counterweighted plate pivoted on the brackets urging the paper into contact with the knife edge.

14. Apparatus for tearing corrugated paper comprising a knife mounted to have the corrugated paper pass in contact with an edge thereof along which the corrugated paper is adapted to be torn, and means carried by said knife and adapted to extend within a valley of the corrugated face of the paper to anchor it during the tearing operation.

15. The method of tearing corrugated paper which comprises placing the corrugated face of the paper in contact with a tearing edge so that said edge extends within one of the valleys of the corrugations, bending the part of the corrugated paper to be torn off around said edge so that the part of the paper to be torn off and the part to remain form an acute angle having its apex at said edge, and tearing the paper across said edge by beginning at one side thereof and continuing across.

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