

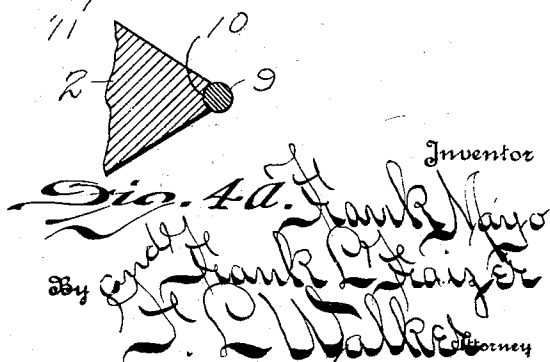
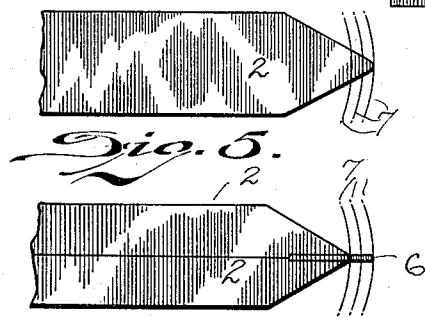
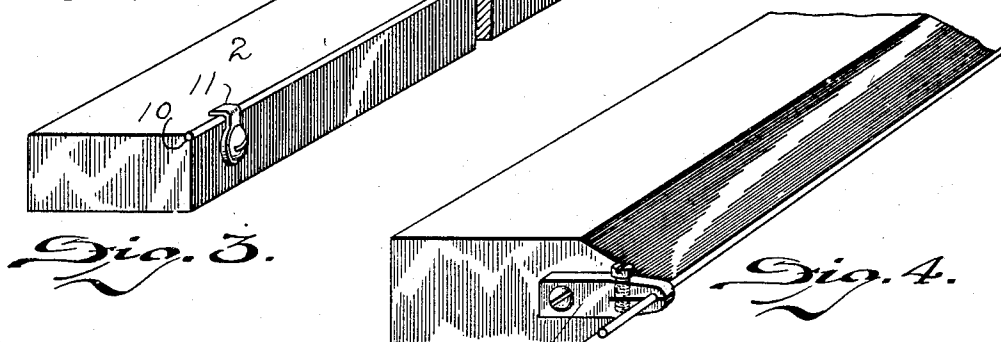
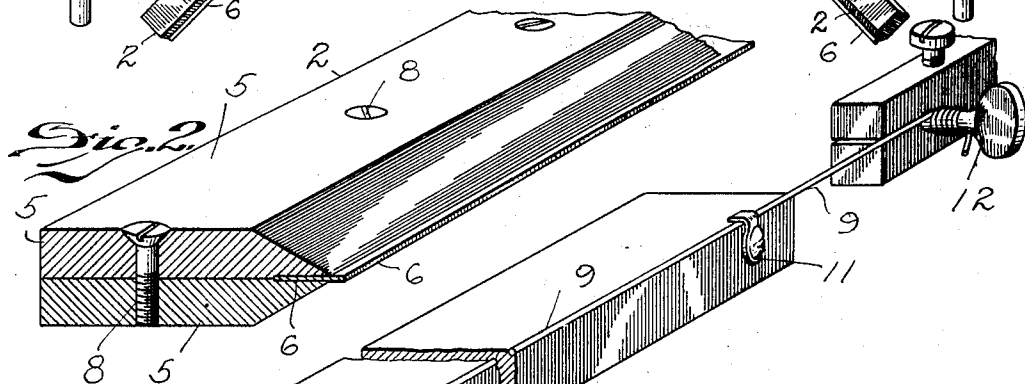
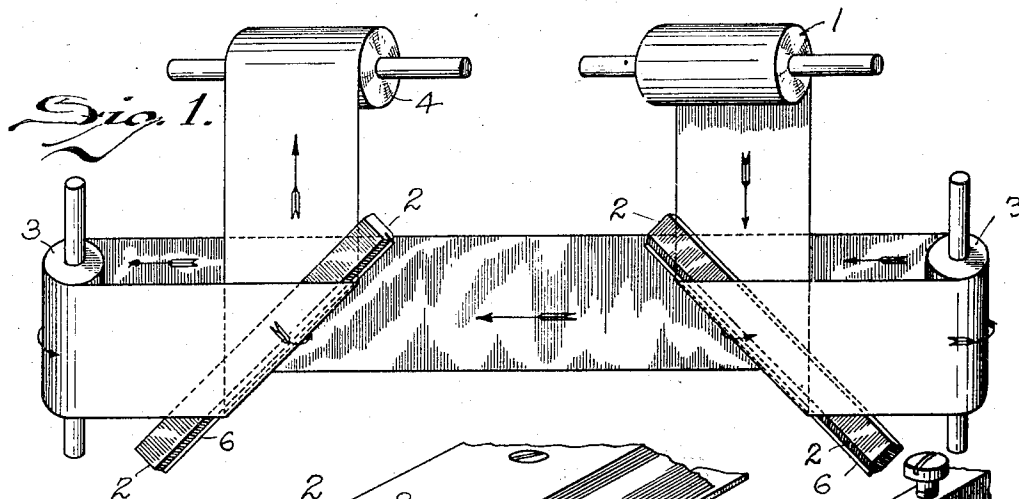
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F. MAYO ET AL

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BREAKER BAR FOR GUMMED PAPER AND THE LIKE

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BREAKER BAR FOR GUMMED PAPER AND THE LIKE

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Our invention relates to means for the treatment of coated flexible sheet material, and more particularly to an improved form of breaker bar for breaking the dry coating on thin sheet material such as gummed paper, cloth and the like to remove the tendency of the material to curl and to flatten and straighten the stock.

Due to the shrinkage of the gum coating, there is a strong tendency for gummed paper to curl or warp. It is common practice to draw the coated stock under tension when dry over a comparatively sharp edged breaker bar, causing the direction of travel of the stock to abruptly change as it passes the bar. Usually the breaker bars are arranged in pairs in reverse diagonal relation across the path of travel of the paper. As the coated stock passes about the breaker bar, the surface coating is progressively broken into a close succession of fine, hair-like, surface cracks. The reverse diagonal relation of the bars causes such cracks to be produced in intersecting relation.

For efficient operation it is necessary that the bearing edges of the breaker bars be maintained comparatively sharp or acute, without, however, possessing a cutting edge. It is the present practice to grind such bars to a substantially right angle or to somewhat less than a right angle to afford the required bearing or breaking edge. The constant friction of the traveling stock soon wears such edge round thus materially thickening or widening the bearing surface, thus greatly impairing the efficiency of the bar and necessitating frequent regrinding. The breaker bars being rather long, accurate grinding is a tedious and expensive operation and more or less difficulty is experienced in securing a uniform bearing edge. Moreover, there is a tendency of the edge of the bar to wear to greater extent at some points than at others, due not only to variation in the density or hardness of the material but also to variations of the tension of the stock and the thickness of the coating.

The present invention does not pertain to any new method of operation nor to a machine for carrying out the process of break-

ing, but is confined to the breaker bar per se. It consists in providing the working edge of the breaker bar with a replaceable, hardened insert or wear strip. This wear strip is of uniform thickness throughout, the thickness of the wear strip being equivalent to that of the most efficient and desirable thickness of the working edge. The thickness of such edge is not increased by wear, as is the case with the ordinary solid or one piece bar. The inserted wear strip may be a thin, flat strip of hardened material, clock-spring material having been successfully employed, or it may be a length of piano wire of the requisite diameter seated in the angle of the breaker bar.

The object of the invention is to simplify the structure as well as the means and mode of operation of breaker bars for coated flexible materials, whereby they will not only be cheap in construction, but will be uniform in operation, of increased durability necessitating minimum maintenance expense and unlikely to get out of repair.

A further object of the invention is to provide a breaker bar which will maintain a uniform degree of efficiency over a long period of time, retaining its maximum degree of sharpness without the necessity for regrinding.

A further object of the invention is to provide a breaker bar affording uniform degree of effectiveness throughout its entire length and subjecting the stock to uniform treatment throughout the full width of the sheet.

A further object of the invention is to provide a replaceable bearing or wear strip which may be quickly and readily interchanged without the employment of highly skilled mechanics.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof and the mode of operation or their equivalents as hereinafter described and set forth in the claims.

Referring to the accompanying drawings wherein is shown the preferred, but obviously not necessarily the only, form of embodi-

ment of the invention, Fig. 1 is a plan view somewhat diagrammatic of a gummed paper breaking apparatus illustrating the course of the coated paper stock about the reversely disposed diagonal breaker bars, the particular construction of which forms the subject matter of the present application.

Fig. 2 is a sectional perspective view of a portion of one of the breaker bars embodying the present invention.

Fig. 3 is a similar perspective view of a portion of one of the breaker bars employing a length of piano wire as a reinforcement strip.

Fig. 4 is a similar view of a further modification.

Fig. 4^a is an enlarged sectional view of the arrangement illustrated in Fig. 4.

Figs. 5 and 6 are diagrammatic views illustrating comparatively the effect of wear upon the present form of breaker bar and that upon the breaker bars as heretofore constructed.

Like parts are indicated by similar characters of reference through the several views.

While the breaker bar herein described is especially designed for the treatment of gummed paper to effect a succession of surface cracks in the dried gummed coating, thereby reducing or eliminating the tendency of the paper to curl and warp, it is to be understood that the invention is also applicable to sheet material other than paper and also to paper and other sheet materials coated with substances other than adhesive gum. Furthermore the present breaker bar may be embodied in various machines or apparatus for performing its function.

Referring to the accompanying drawings, Fig. 1 illustrates in simplified form the method of operation or treatment to which the gummed material is subjected. Such material is ordinarily treated in roll form or in a continuous strip which is advanced under tension by suitable power driving means. The previously gummed and dried material is supplied from a roll 1 from which it passes about a breaker bar 2 arranged in diagonal relation to the path of travel. In passing about this breaker bar 2, the course of the paper web is changed to one at approximately a right angle, the web passing thence over spaced guide rollers 3—3 from the second of which the web is carried about a second breaker bar 2 also arranged in diagonal relation with the path of travel of the paper web but inclined thereto reversely of the inclined relation of the first breaker bar. Again the direction of travel of the web is changed at a right angle as it passes about the breaker bar, and the treated material is received on the roll 4. In its travel about the breaker bars 2—2, the paper web is bent rather abruptly. The bend in the material thus effected travels progressively the entire length

of the paper subjecting all parts of the coating to the same progressively advancing line of stress causing the coating to be flexed and broken. Under such progressive treatment, all parts of the coated surface are subjected to a uniform breaking effect. This breaking of the coated surface does not loosen the attachment of the gum or other adhesive material, but merely flexes the stock to effect cracking thereby making the coated stock flexible and relieving the stresses and strains which cause the coated material to curl and warp. By passing the stock over different breaker bars arranged in reverse oblique relation to the path of travel, the lines of breakage are effected first in one direction and then in a transverse direction thus thoroughly flexing the coated material, leaving it limp and flat.

Ordinarily the breaker bars heretofore employed have been either of substantially rectangular cross-sectional form affording a comparatively sharp right angle about which the coated material is drawn or they have been formed with intersecting bevels affording a V-shaped margin or edge engaging the traveling coated material. In either case, as the bearing edge of the breaker bar wears due to friction of the traveling web of coated material, it becomes more and more rounded, affording a bearing surface of gradually increasing width and consequently the coated web is less abruptly turned or deflected thereabout. As the bearing edge widens through use, the efficiency of the bar is materially decreased and the material is not so thoroughly and uniformly flexed or broken. Moreover this change occurs progressively so that while the bar may be effective at the beginning of a run of coated material, its efficiency will decrease and the resulting product will not be uniform. Frequent regrinding of such breaker bars has been found necessary.

To overcome these difficulties, the present breaker bar preferably, though not necessarily, consists of two beveled plates 5—5 arranged face to face, affording substantially the typical V-edge breaker bar as heretofore employed. However, intermediate these plates 5—5 there is interposed a strip of thin hard material as shown at 6. This material 6 forms a bearing strip projecting a short distance beyond the plates 5—5 between which the strip 6 is clamped. In practice, a strip of clock-spring steel has been very successfully employed, such strip being approximately seventeen thousandths of an inch in thickness. Such strip may be of any suitable or desired width. Not only is such material extremely hard and able to resist wear, but being a flat strip of uniform thickness, the wearing away of the edge of the strip does not increase the area of the bearing surface as does the usual V-shaped or angle bar. This is best illustrated in Figs. 5 and 6. Fig. 5 illustrates the

contour of a typical V-shaped bar as heretofore employed, showing by spaced lines 7 successive stages of distortion and broadening of the bearing edge by wear. Fig. 6 is a similar view of the present breaker bar illustrating by like spaced lines 7 that under like degrees of wear the area and shape of the bearing surface remains unchanged.

Not only does the use of the wear strip 6 in the angle of the breaker bar insure uniformity of the product, but it materially increases the life of the bar and entirely eliminates the necessity for frequent regrinding. When the inserted wear strip 6 has been worn down into proximate relation with the angle of the bar, the clamp screws 8 which hold together the beveled plates 5 may be relieved and the wear strips 6 may be adjusted relative to the plates to project a more or less distance therebeyond. The insert or wear strip 6 is firmly and securely clamped at all times between the sections 5-5 of the breaker bar. Its material advantage, as before pointed out, lies in the fact that the shape and extent of the bearing edge is not changed or distorted by wear, it possesses increased resistance, provides a uniform bearing surface, and obviates the necessity for regrinding.

In lieu of a flat wear strip inserted in the angle of the breaker bar as heretofore shown and described, such wear strip or insert may be round when of the required diameter. For this purpose, a length of piano wire 9 may be employed. In Fig. 3 this piano wire insert 9 has been shown seated in the angle of a rectangular bar while in Fig. 4 the wire is seated in the angle of a V-shaped breaker bar. The angle of the bar in either instance is formed with a semi-cylindrical groove 10 to receive the hardened wire insert 9. Clamps 11 are provided for securing the wire 9 in its grooved seat. One of the clamps 11 is tightened upon the wire while the wire is subjected to tension by means of a suitable tightening or tensioning device 12. Thereafter the second clamp 11 is tightened to grip and hold the tensioned wire in its seat. The piano wire being hard and wear-resistant will withstand a long period of operation. The wear of the material upon the wire will not increase the bearing surface nor materially change its contour. The seat 10 in the angle of the bar is preferably, though not necessarily, slightly less in width than the diameter of the wire 9. That is to say, the grooved seat is slightly less than semi-cylindrical so that the bearing strip or wire 10 projects laterally slightly beyond such grooved seat. The wire employed has a diameter substantially equivalent to the maximum thickness of the working edge of the breaker bar. When the wire shows signs of wear, the clamps 11 are relieved and the wire drawn along the bar 2

to present a new section of wire in operative position. Such new section is tensioned and clamped as before described.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect and the invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described our invention, we claim:

1. In a breaker bar for breaking the dried coating upon coated flexible sheet material, a bar having angularly disposed faces across which the material is drawn, and a replaceable insert of uniform thickness located at the intersection of said faces and forming a wear strip for the material.

2. As an article of manufacture, a breaking bar for breaking the dried coating upon coated flexible sheet material, an angular bar and a hardened thin bearing strip the maximum thickness of which is that of the desired breaker edge disposed at the angle of said bar to receive the material.

3. A breaker bar for breaking the dried coating upon coated flexible sheet material, including a hardened wire, the diameter of which is substantially equal to the desired thickness of the breaking edge, an angular bar, a seat formed in the angle of the bar in which the hardened wire over which the material travels is removably mounted.

4. A breaker bar for breaking the dried coating upon coated flexible sheet material including a thin flat strip of hardened material the acting edge of which is the entire thickness of the strip, and a supporting bar upon which the strip is mounted with its margin projecting beyond the bar to receive the material.

5. In a breaker bar for breaking the dried coating upon coated flexible material, a pair of clamp plates having reversely beveled margins, and a thin flat strip of hard material clamped between the plates and marginally extending therebeyond for engagement with the coated material.

6. In a breaker bar for breaking the dried

coating upon coated flexible material; a thin flat strip of hard material about the margin of which the coated material is drawn in reverse directions, the strip having a substantially uniform thickness equivalent to the maximum bearing surface for the coated material whereby the wearing away of the edge of the strip will not increase the width of the bearing surface, and means for rigidly supporting the strip the thickness of which is that of the desired breaking edge:

7. As an article of manufacture, a breaker bar for breaking the dried coating of coated flexible material, a hardened wire strip, the acting edge of which is of the entire thickness thereof, and a support therefor of angular cross-sectional form and having a longitudinal recess therein coincident with one of its angles, said hardened wire strips being seated in said recess for engagement with the coated material, and means for releasably holding said strip in said seat.

8. As an article of manufacture, a breaker bar for breaking the dried coating of coated flexible material including a hardened wear strip, the acting edge of which is the entire thickness thereof, and a support therefor in which the wear strip is adjustably mounted.

In testimony whereof we have hereunto set our hands this 16th day of September A. D. 1929:

FRANK MAYO:
FRANK L. FRAIZER: