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ROTARY WEB CUTTER AND STRIPPER ASSEMBLY

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Fig. 2

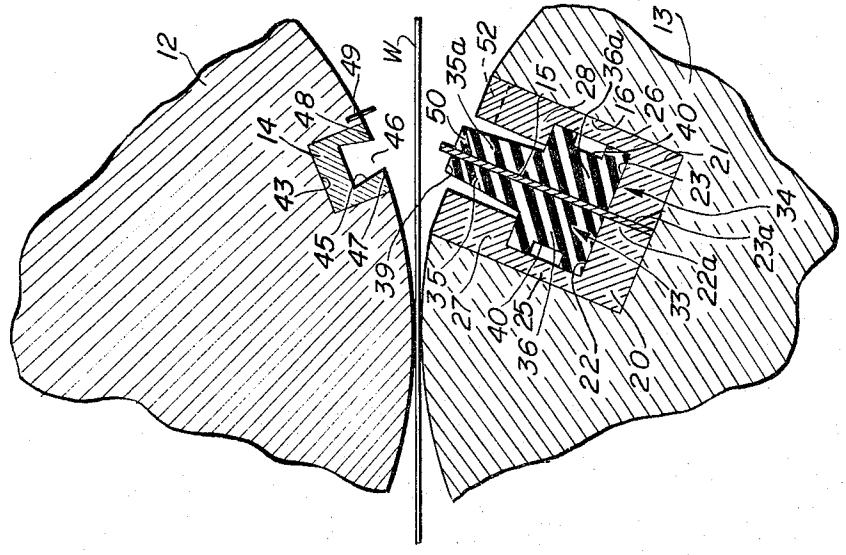


Fig. 3

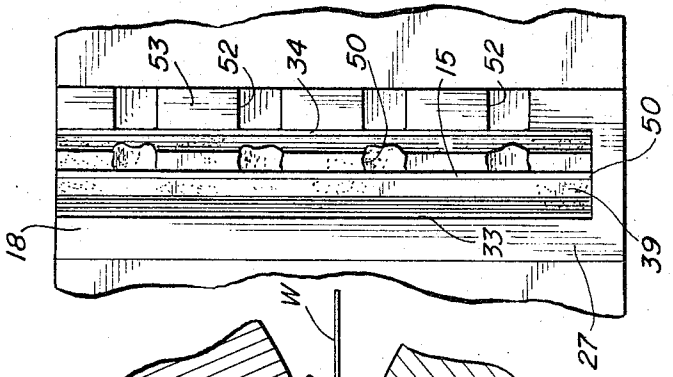
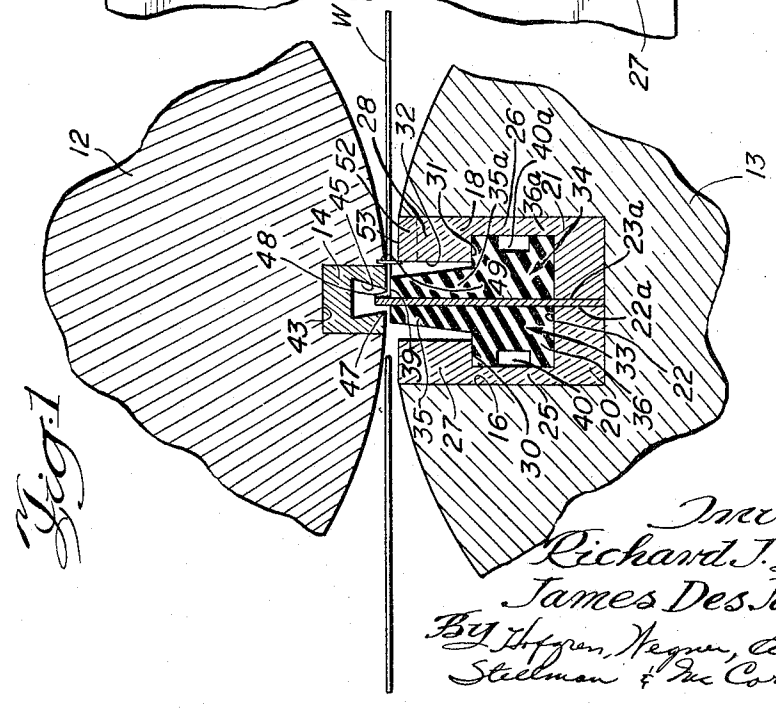


Fig. 1



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ROTARY WEB CUTTER AND STRIPPER ASSEMBLY

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This invention relates to printing presses and more particularly to the web severing mechanisms associated therewith.

In the press rooms of all major printing operations a very high level of noise is present whenever the presses are running. It has been found that this high level of noise contributes immeasurably to fatigue, loss of hearing and other associated conditions of the nervous system of employees forced to be present in the press room for protracted periods of time. Considerable effort has been and is being put forth to reduce the various sources of noise that contribute to the over-all high noise level. This invention is directed primarily to substantially eliminating the noises created during operation of high speed presses by the engagement and disengagement of the hard cheek blocks of the cutter cylinder against the backing block of the mating folding cylinder as printed webs of paper are cut to sheet lengths.

Heretofore, the cheek blocks on either side of the cutting knives have generally been made of wood, canvas impregnated with phenolic material, or hard plastic, and have been resiliently urged forward by springs, hydraulics or other biasing means. As the cutting cylinders with the cutting knives rotate relative to the mating folding cylinders, the cheek blocks engage with the hard surface of the mating folding cylinder and are forced back, causing considerable noise. After the cut takes place the spring or other biasing means drives the cheek blocks toward their fully extended positions relative to the cutting knife, and the stops on the cheek blocks bang against their stops on the cutting cylinder, adding further noise to the operation. These two sets of noises from the cheek block are repeated many hundreds of times a minute which contributes substantially to the high noise level of the press room.

A principal object of the present invention, therefore, is to eliminate or greatly reduce the above described noises and thereby reduce the over-all operating noise of the press.

Another object of the invention is to provide a cheek block construction using noise deadening material in place of the previously used noise creating material.

Still another object of the invention is to provide a cheek block construction in which the inherent resiliency of the cheek block material serves to wipe the knife blade during disengagement of the blade from the folding cylinder without the need for separate biasing means.

And yet another object of the invention is to provide a construction that permits replacement of the cheek blocks to be accomplished without requiring special tools.

Another object of the invention is to provide an improved cheek block construction that is much less expensive to manufacture and maintain than are the structures heretofore commonly used.

Still another object of the invention is to provide an improved cheek block arrangement in which the web or sheet impaling pins chew out or cut out their own clearance openings in the trailing edge of the rearward cheek block, further reducing the cost of the assembly.

Still a further object of the invention is to provide a cheek block arrangement wherein movement of the blocks relative to the blade is accomplished in such a way as to minimize wear both on the block and on the knife blade.

These and other objects, features and advantages of the present invention will be apparent from the following detailed description taken in connection with the accompanying drawing, in which:

FIG. 1 is a cross-sectional view taken through a portion of the cutting couple constructed according to the invention;

FIG. 2 is a cross-sectional view similar to FIG. 1 but showing the relative positions of the cutting couple just prior to the cutting phase of the cycle; and

FIG. 3 is a top view of the cutting portion of the cutting cylinder showing the cheek blocks in position relative to the cutting blade.

FIG. 1 and FIG. 2 illustrate the cutting couple of a printing press, and in particular of a high speed printing press, which comprises a folding cylinder **12** cooperating with a mating cutting cylinder **13** that are provided, respectively, with a female cutting block **14** and knife blade **15** between which a paper web W passes. The knife **15** severes the web W into predetermined sheet lengths as the cylinders **12** and **13** rotate. The cylinders **12** and **13** are driven by conventional power means on the printing press. One or more knives **15** may be positioned in the surface of the cylinder **13** along axes parallel to the axis of the cylinder **13** and are circumferentially spaced apart a predetermined distance to effect the desired length of cut in the paper web W.

At each cutting station in the cutting cylinder **13** there is provided a longitudinal slot or groove **16** having a substantially rectangular bottom and lying along an axis substantially parallel to the axis of the cylinder. The slot **16** extends generally from one end of the cylinder to the other. In each slot or groove **16** is seated a knife box **18** comprising a pair of mating halves or side portions **20**, **21** having coplanar surfaces **22** and **23** that form the bottom wall of the box, and planar mating surfaces **22***a*, **23***a* that flankingly abut the bottom portion of the knife blade **15** throughout the full length of the blade. The two halves of the knife box **18** and the bottom portion of the knife **15** are seated in the groove **16** and are secured therein by means of adhesive, keys, set screws or any other known fastening means. The knife box **18** has side walls **25** and **26** provided with inwardly projecting portions **27**, **28**, respectively, near the cutting edge of the blade so as to provide overhanging portions **30**, **31** that define an undercut or recessed cavity on each side of the knife blade **15**. The projecting portions **27**, **28** of the knife box **18** define an opening **32** through which the knife blade **15** extends and through which access is gained to the cavities in said box.

A leading cheek block **33** and a trailing cheek block **34** are seated in the knife box **18** on opposite sides of the knife blade **15**. Leading cheek block **33** has an extended wiping portion **35** and a rectangularly shaped anchor portion **36** formed integrally therewith. The wiping portion **35** has one side bearing against the blade and has the other or outer side tapered so as to form a relatively thick juncture with the anchor portion and relatively narrow unbroken end surface **39**. The rectangularly shaped anchor portion **36** of the cheek block has a cut out section **40** formed in its outer side wall which extends throughout the length of said anchor portion.

The trailing cheek block **34** is constructed in exactly the same manner as block **33** but is reversed to provide an oppositely facing tapered wiping portion **35***a* and an anchor portion **36***a*. A slot **40***a* is likewise formed in the side wall of the block **34**.

The radial dimension or depth of the cheek blocks is slightly greater than the depth of the knife box from the bottom wall **22**, **23** to the surface of the cylinder **13**, so the cheek blocks project radially a short distance from the cylinder surface.

The cheek blocks **33, 34** are an elastomer having a durometer hardness of 35±5, and are preferably pure natural rubber. It has been found that natural rubber produces the most desirable results in the present apparatus, because it has a long life, a high resiliency rate, a natural biasing frequency eliminating the need for any supplemental springs, is quiet in operation, and when properly used will not leave marks on the paper. The cheek block may be formed by extrusion.

A pair of cheek blocks **33, 34** may be easily installed or replaced in the knife box **18** by removing the knife box **18** from the groove **16** in the cutting cylinder, unbolting the two halves **20** and **21** and removing the old cheek blocks. A new pair of cheek blocks **33, 34** and either a new or a resharpened knife blade **15** are then assembled together with the cheek blocks bearing against opposite sides of the knife blade **15**. The anchor portions **36, 36*a*** are seated in the cavities in the halves of the knife box **18** whereupon the halves are bolted together to form an operative cutter unit. The knife box with the blade **15** and cheek blocks **33, 34** is then reassembled in the groove **16** in the cutting cylinder whereupon the press is ready to roll again. The extended or wiping portions **35** and **35*a*** of the cheek blocks bear against the opposite surfaces of the cutting edge portions of the knife blade **15** for supporting the cutting edge in its transverse position relative to the surface of the cutting cylinder. The cut out portions **40** in the cheek blocks serve the function of providing spaces into which the material of the anchor portions expands, particularly during displacement of the wiping portions **35, 35*a*** during a cutting stroke of the cutting couple. Were the anchor portions completely enclosed, they would be relatively inflexible, and the cut outs **40** permit the material to deform and flex more readily.

The mating or folding cylinder **12** has the cutting block or member **14** anchored in a rectangular longitudinal groove **43** which extends along an axis substantially parallel to the axis of the cylinder **12** in the surface portion of said cylinder. The block **14** has an undercut groove or slot **45** formed throughout its length which is adapted to receive in nesting relationship the cutting edge portion of the cutting blade **15**. The cutting slot **45** has an opening **46** extending across the face of the block **14**, which opening is defined by a pair of edges **47** and **48**. With the paper web W stretched across the opening **46**, the cutting edge of the blade may engage the opposite side of the paper between the edges **47, 48** so that as the knife penetrates into the slot **45**, the cut or slice of the web W takes place. A plurality of impaling pins **49** are positioned throughout the length of said block **14** in a position just to the trailing edge of said block. The pins **49** extend a short distance radially from the face of the folding cylinder and are adapted to impale the uncut web **12** for holding the web in position throughout the cutting operation and for pulling the web through the cutting position of the cycle.

The trailing cheek block **34** is provided with an unrelieved upper marginal portion **39** which is adapted during the initial stages of operating a new pair of cheek blocks **33, 34** to be chewed or cut by the impaling pins **49** along said unrelieved marginal portion **39**. A plurality of small appropriately sized chewed out portions **50** are soon formed throughout the length of the upper marginal edge portion of the cheek block **34** as can be best seen in FIG. 3. The trailing half **21** of the knife box **18** has a plurality of grooves **52** cut through its top surface **53** in spaced relationship and in substantial alignment with the chewed out portions **50** of the cheek block. These notches or grooves **52** are cut in the box in a slightly oversized shape prior to the knife box **18** being installed in the groove **16** in the cutting cylinder **13** and are made to align with the impaling pins **49** so as not to interfere with the action of the impaling pins and still to provide a backing surface for the sheet of paper and for the impaling pins as the pins sweep through their path of movement.

It is now believed to be clear that with the cheek blocks **33** and **34** made of an extrusion of natural rubber, the contact noise caused by the mating contacts between the cheek blocks and the folding cylinder and between the cheek blocks and the portions of the knife box of the cutting cylinder is substantially eliminated.

The wiping portions **35** of the cheek blocks **33, 34** are displaced each time a cut is performed by the knife, due to the engagement of the faces of the mating block **45** with the unrelieved upper marginal portions **39** of the cheek blocks. As the cylinders pass beyond the cutting position the resiliency of the natural rubber in the cheek blocks wipes the paper from the knife blade **15** as the blade continues into its next cutting position. The natural biasing frequency of the rubber cheek blocks eliminates the need for separate biasing means to urge the marginal edges of the blocks to their initial position. The anchor portions of the blocks **33, 34** substantially fill the cavity in the box **18** so that there is no free movement of the block in the box.

We claim:

1. A cheek block for use with a cutting couple of a printing press, comprising: a body member consisting of an elastomer that has a durometer hardness of 35±5, said body member having an anchor portion and a wiping portion, said anchor portion being adapted to fit in a mounting cavity in a cutting cylinder and having a cut out portion which permits a degree of deformation greater than the natural deformation of said portion, and said wiping portion extending along an axis outwardly from said anchor portion and having an outer end lying substantially transverse to said axis.

2. The cheek block of claim **1** which consists of substantially pure natural rubber.

3. The cheek block of claim **1** in which the wiping portion is tapered from a relatively thick section near the anchor portion to a relatively thin outer end.

4. A cheek block for use with a cutting couple of a printing press, comprising an elongate body member having an anchor portion and a wiping portion integrally formed therewith, said anchor portion having at least one substantially square corner near the juncture of said anchor portion with said wiping portion, cut out means in said anchor portion for permitting said anchor portion to be distorted an amount greater than the normal distortion of the material of said body member, and said wiping portion being tapered from a relatively thick section near said anchor portion to a relatively thin outer edge.

5. In a cutter for a rotary printing press, in combination: a cutting cylinder having a continuous longitudinal groove; a knife box secured in said groove, said knife box having side portions which terminate substantially flush with the cylinder surface and which have facing parallel walls; a cutting blade in said knife box which is parallel to said facing walls and generally on the median plane of the space therebetween, said blade projecting radially a short distance outside the cylinder surface; and a pair of resilient cheek blocks removably secured in said knife box flanking said blade, each of said blocks having a lower anchor portion which fits snugly between the blade and one of the facing walls of the knife box and having an upper wiping portion which contacts the blade, tapers away from said one of the facing walls, and has an outer end outside the cylinder surface but inside the edge of the blade, said tapered wiping portions of said cheek blocks providing a close wiping fit for the blade and affording clearance spaces from the facing knife box walls so that said blocks may depress and deform freely during a cutting operation.

6. The combination of claim **5** in which the cheek blocks have a durometer hardness of 35±5.

7. The combination of claim **6** in which the cheek blocks are pure natural rubber.

8. The combination of claim 5 in which the anchor portions of the cheek blocks have lognitudinal grooves facing the knife box walls to permit a degree of deformation greater than the natural deformation of said anchor portions.

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