March 2, 1954 H. M. YOHN 2,670,768

WORK-ENGAGING CUTTER GUIDE FOR SPLITTING MACHINES

Filed Oct. 26, 1949

Fig. 1

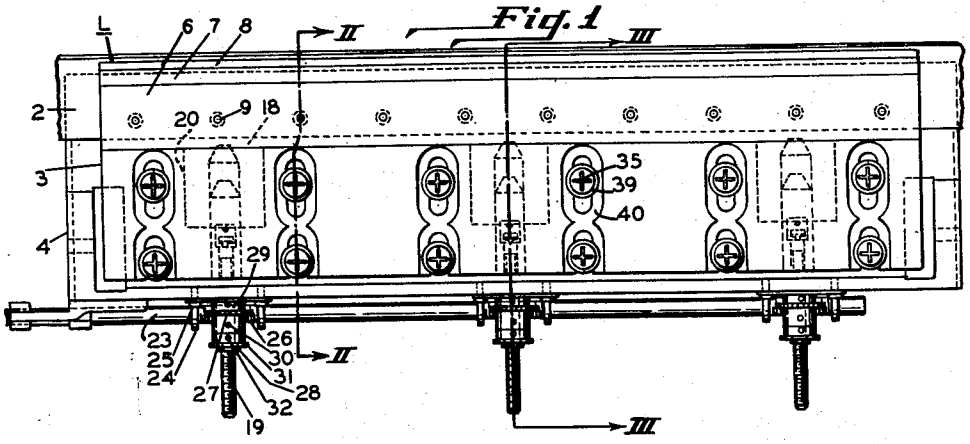


Fig. 2

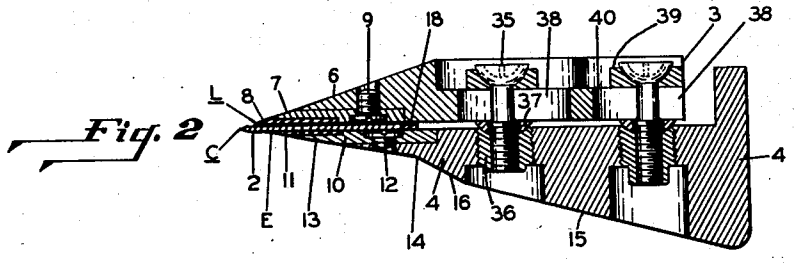


Fig. 3

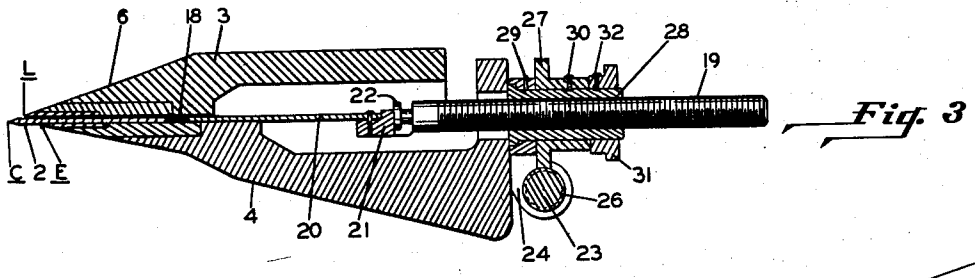
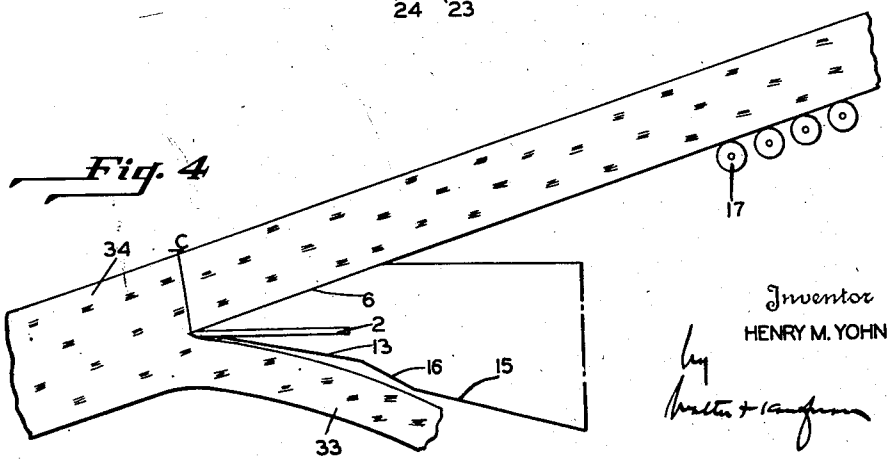


Fig. 4



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Patented Mar. 2, 1954 2,670,768

UNITED STATES PATENT OFFICE

2,670,768

WORK-ENGAGING CUTTER GUIDE FOR SPLITTING MACHINES

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Application October 26, 1949, Serial No. 123,663

4 Claims. (Cl. 143—167)

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This invention relates to splitting machines and is concerned particularly with splitting machines of the band knife type in which the knife has a substantially flat run, and severing action is effected by moving the piece to be split along a path of movement which intersects the path of movement of the knife in its flat run.

In the splitting of cork composition mats, particularly where sheets of considerable thickness are severed, some difficulty has been encountered due to the excessive bend required in the split portion of the mat as it moves under the knife-supporting and guiding jaws, resulting in cracking and uneven severing of the mat.

The principal object of the invention is to provide a splitting machine which will uniformly sever relatively thick slices of material from mats of cork composition or the like without excessive cracking.

Another object of the invention is to provide a knife support and guide arrangement for band knife splitting machines which will permit the severance of sheets from a mat of cork composition or the like without unduly bending the severed sheet to cause cracking or affect uniform splitting.

According to the present invention the splitting machine is provided with guiding jaws, one of which has an inclined surface for supporting the mat as it is split. A conventional knife guiding bar is included in the combination for adjusting the cutting edge of the band knife in its flat run with respect to the inclined supporting surface of the jaw. A second jaw is provided and has its forward edge disposed substantially to the rear of the cutting edge of the band knife along the direction of travel of the mat. The second jaw is also reduced in thickness to permit the severed sheet to move along the second jaw without imparting an objectionable bend. The two jaws are provided with an adjustable clamping arrangement which permits the first jaw to be disposed in its proper position with respect to the cutting edge to properly support the mat during severance and to position the second jaw substantially to the rear of the cutting edge of the band knife.

A preferred embodiment of the invention is illustrated in the attached drawing, in which:

Figure 1 is a top plan view of a portion of a splitting machine incorporating the knife support and guide arrangement of the present invention;

Figure 2 is an enlarged sectional view taken along the line II—II of Figure 1;

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Figure 3 is an enlarged sectional view taken along the line III—III of Figure 1; and

Figure 4 is a diagrammatic view illustrating the severance of a thick sheet from a mat of cork composition.

Referring to Figure 1, there is illustrated a portion of a band knife severing machine of the type disclosed in the copending application of Louis H. Lockwood and me, Serial No. 113,137, filed August 30, 1949. Reference is made to that application for a detailed disclosure of the machine. The invention is not limited to use with machines made in accordance with the invention there disclosed, since the knife support and guide arrangement of the present invention may be used with other splitting machines of this band knife type. The band knife is indicated at 2 in Figure 1 and, as shown, the knife support and guide arrangement is positioned along a portion of the flat run of the knife 2. The arrangement for supporting and guiding the knife includes an upper jaw 3 and a lower jaw 4. The lower jaw is carried by the frame of the splitting machine. The upper jaw 3 is carried by the lower jaw in a manner which will be more fully hereinafter described.

The upper jaw 3 has an inclined surface 6 which is adapted to support the mat after severance as diagrammatically shown in Figure 4. The jaw 3 may be made of cast iron and is provided with a wear-taking inserted guide 7 which includes a wear plate 8 adjacent to its forward end. Screws 9 are provided for attaching the guide 7 to the jaw 3. The width of the guide 7 is such that it overlies the band knife 2 and takes any wear occasioned by movement of the band knife with respect to the jaw. The guide 7 is preferably formed of soft steel and the wear plate 8 of hardened steel, since most of the wear will be taken by the wear plate 8.

The lower jaw 4 is provided with a similar guide 10 having an inserted hardened steel wear plate 11, the guide 10 being secured to the jaw 4 by screws 12. The jaw 4 is provided with an inclined surface 13 which extends from the forward or leading edge E of the jaw and includes a portion of the guide 10 and wear plate 11 and a portion of the body of jaw 4, extending to a point 14 disposed a substantial distance to the rear of the cutting edge C of the knife 2. This inclined surface 13 may be disposed at an angle of about 10° to the horizontal. The jaw is provided with a second inclined surface 15 which may be disposed at an angle of about 15° to the horizontal. The inclined portions 13 and 15 are

connected by an inclined portion 16, directed at about 25° to the horizontal. It will be observed by reference to Figures 2 and 3 that the leading edge E of the jaw 4 is disposed a substantial distance to the rear of the cutting edge C of the blade 2; whereas, the leading edge L of the jaw 3 is disposed closely adjacent to the cutting edge C in order to properly support the band knife 2 during severance with a generally upwardly directed force as indicated in Figure 4, and also to fully support the mat after it is split and prior to engagement of the mat with supporting rollers 17. In the severance of a mat six inches thick by fifty inches long by twenty-eight inches wide into sheets one-half inch thick, the jaws may be adjusted so that the upper jaw 3 has its leading edge L disposed just beyond the cutting edge C of the knife 2, and the lower jaw 4 has its leading edge E five-eights of an inch beyond the cutting edge C of the knife 2. This will bring the declined portion 13 of the lower jaw 4 at the line 14 about three inches from the cutting edge C of the knife 2.

An adjustable knife guide 18 is provided, being disposed between the jaws 3 and 4. The guide 18 preferably extends along the full length of the jaws and is preferably made of hardened steel because it is in continuous contact with the rear edge of the knife 2 during severance of sheets from the mat to be split. The guide 18 is adjustable to properly position the knife 2 with respect to the mat-feeding mechanism, the upper jaw 3, and the mat-supporting mechanism 17.

A knife-adjusting arrangement is shown in Figures 1 and 3. It includes three adjusting screws 19, each of which is connected to a plate 20, the attachment being in the form of a recessed connector 21 which receives within its recess the head 22 of adjusting screw 19. Thus, upon axial movement of the screws 19, the guide 18 will be moved transversely of the jaws 3 and 4 to position the knife 2 in a desired location. The guide 18 is not attached to the plates 20 but abuts against them when urged in the direction of the plates by the knife 2, the guide 18 being in contact engagement with the knife.

In order to effect simultaneous movement of the three adjusting screws 19, there is provided an operating shaft 23 mounted in brackets 24 attached to the lower jaw 4 by machine screws 25. The operating shaft carries three worms 26, one at each of the adjusting screw locations. Worm wheels 27 are also provided at these locations and mesh with the worms 26. A threaded sleeve 28 is provided for each adjusting screw, the sleeve being rotatable within a keeper 29 integral with brackets 24 secured in fixed position on the lower jaw. The worm wheel 27 is keyed to the sleeve 28 by a set screw 30. Thus when the operating shaft 23 is rotated, the worms 26 impart a rotary motion to the sleeves 28 through the worm wheels 27 which are attached to the sleeves, the rotary motion of the sleeves imparting an axial motion to the adjusting screws 19, the keepers 29 preventing axial movement of the sleeves 28. Adjustment of any screw 19 with respect to the others may be obtained by hand wheels 31 which are affixed to sleeves 28 by set screws 32. By loosening set screw 30 at any adjusting screw location, hand wheel 31 may be rotated to rotate sleeve 28 and thus adjust screw 19. After individual adjustment has been effected, set screw 30 may be again tightened and all adjusting screws 19 will operate in unison upon rotation of operating shaft 23.

It will be observed by reference to Figure 4, which diagrammatically illustrates the severance of a thick sheet 33 from a mat 34 of cork composition, that the knife 2 is fully supported by the guide arrangement as the mat is moved in a generally upwardly inclined direction and that the surface 6 supports the split surface of the mat 34 as it moves toward supporting rolls 17. It will be further observed that as the sheet 33 is split from the mat 34 it may assume a generally curved position without obstruction by the lower jaw surfaces 13, 16, and 15 because the lower jaw is disposed a substantial distance to the rear of the cutting edge C of the blade 2, along the direction of travel of the mat 34 and because of the reduced thickness of the lower jaw as compared with the upper jaw. The sheet 33 is not bent beyond its elastic limit and cracking is obviated, a smooth cut is obtained, and the sheet 33 is of uniform thickness.

The upper jaw 3 is adjustably secured to the lower jaw 4 by screws 35 which are received within threaded bushings 36 received in the lower jaw 4. Spacers 37 are provided to position the upper jaw a sufficient distance above the lower jaw to permit the knife and knife guide to be positioned for proper operation therebetween. Each of the bushings 36 is provided with a projection for the reception of a wrench for adjustment of the position of the spacers 37. The screws 35 pass through slots 38 in the upper jaw and each is provided with a washer 39 which lies on a flange surface 40 formed in the upper jaw. Horizontal adjustment of the upper jaw 3 with respect to the lower jaw 4 is accomplished without changing the vertical adjustment between the jaws. This is accomplished by loosening screws 35 and sliding the upper jaw to the desired position and retightening the screws. Other adjusting arrangements may be provided.

I claim:

1. In a splitting machine of the type including a band knife having a substantially flat run, the combination of means for supporting a mat to be split during movement thereof in a fixed plane of travel, the path of which is inclined with respect to the flat run of said knife and intersects the cutting edge thereof in said flat run, and a knife support and guide arrangement comprising an upper jaw over which said mat to be split passes during splitting, a mat-supporting surface on said upper jaw which is disposed closely adjacent to the cutting edge of said knife and lies in a plane coincident with the plane of travel of said mat and which cooperates with said means for supporting said mat to direct the same along said fixed plane of travel, a lower jaw disposed in cooperative relationship with the upper jaw to guide said band knife along its substantially flat run and under which the split portion of the mat passes during splitting, a knife guide disposed between said jaws, means carried by one of said jaws for adjusting the cutting edge of said band knife in a desired location forwardly of said jaws, and means for adjustably securing said jaws together with the upper jaw over which the mat passes during splitting disposed a substantial distance in advance of the lower jaw along the path of movement of the mat to be split to provide clearance for the passage of the split portion of the mat below the lower jaw without bending beyond the elastic limit thereof.

2. In a splitting machine of the type including a band knife having a substantially flat run, the

combination of means for supporting a mat to be split during movement thereof in a fixed plane of travel, the path of which is inclined with respect to the flat run of said knife and intersects the cutting edge thereof in said flat run, and a knife support and guide arrangement comprising an upper movable jaw over which said mat to be split passes during splitting, a mat-supporting surface on said upper jaw which is disposed closely adjacent to the cutting edge of said knife and lies in a plane coincident with the plane of travel of said mat and which cooperates with said means for supporting said mat to direct the same along said fixed plane of travel, a fixed lower jaw disposed a substantial distance to the rear of the movable jaw along the path of movement of the mat to be split and disposed in cooperative relationship with the movable jaw to guide said band knife along its substantially flat run, a knife guide disposed between said jaws, means carried by said fixed jaw for adjusting the position of the cutting edge of said band knife in a desired location forwardly of said jaws, and means for adjustably securing the movable upper jaw to the fixed lower jaw with the movable upper jaw disposed a substantial distance in advance of the fixed lower jaw along the path of movement of the mat to be split to provide clearance for the passage of the split portion of the mat below the fixed lower jaw without bending beyond the elastic limit thereof.

3. In a splitting machine of the type including a band knife having a substantially flat run, the combination of means for supporting a mat to be split during movement thereof in a fixed plane of travel, the path of which is inclined upwardly with respect to the flat run of said knife and intersects the cutting edge thereof in said flat run, with the major force of splitting directed upwardly at an angle to the plane of the band knife in said flat run, and a knife support and guide arrangement comprising a movable upper jaw over which said mat to be split passes during splitting, a mat-supporting surface on said upper jaw which is disposed closely adjacent to the cutting edge of said knife and lies in a plane coincident with the plane of travel of said mat and which cooperates with said means for supporting said mat to direct the same along said fixed plane of travel, a fixed lower jaw disposed in cooperative relationship with said movable upper jaw and under which the split portion of the mat passes during splitting, a knife guide disposed between said jaws, means carried by said

fixed lower jaw for adjusting the position of the cutting edge of said band knife in a desired location forwardly of said jaws, and means for adjustably securing the movable upper jaw to the fixed lower jaw with the fixed lower jaw disposed a substantial distance to the rear of the cutting edge of said band knife along the path of movement of the mat to be split to provide clearance for the split portion of the mat to pass below the fixed lower jaw without bending beyond the elastic limit thereof.

4. In a splitting machine of the type including a band knife having a substantially flat run, the combination of means for supporting a mat to be split during movement thereof in a fixed plane of travel, the path of which is inclined upwardly with respect to the flat run of said knife and intersects the cutting edge thereof in said flat run, with the major force of splitting directed upwardly at an angle to the plane of the band knife in said flat run, and a knife support and guide arrangement comprising an upper jaw over which said mat to be split passes during splitting, a mat-supporting surface on said upper jaw which is disposed closely adjacent to the cutting edge of said knife and lies in a plane coincident with the plane of travel of said mat and which cooperates with said means for supporting said mat to direct the same along said fixed plane of travel, a lower jaw disposed in cooperative relationship with the upper jaw to guide said band knife along its substantially flat run and under which the split portion of the mat passes during splitting, said lower jaw having a surface declining from the forward edge thereof a substantial distance, with the angle of declination with respect to the plane of the band knife in said flat run being in the order of 10°, the forward edge of said lower jaw being disposed a substantial distance to the rear of the leading edge of the upper jaw to provide clearance for the passage of the split portion of the mat below the lower jaw without bending beyond the elastic limit thereof.

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