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(54) Web material for web handling machine.

(57) A web of material adapted to be driven through a machine by sprocket wheels having projecting sprocket pins comprises a series of main sprocket holes (2) at standard half-inch pitch and a second sprocket hole (3) located midway between each main sprocket hole. A set of radial cuts or lines of weakness (4-7) extend from each secondary sprocket hole so as to a define readily deformable zone (8) on each longitudinal side of each secondary sprocket hole and readily deformable zones (9) on each lateral side of each secondary sprocket hole. The readily deformable zones are deflected out of the plane of the web material if they encounter a sprocket hole located in the zone of but out of direct register with the secondary sprocket holes (3).

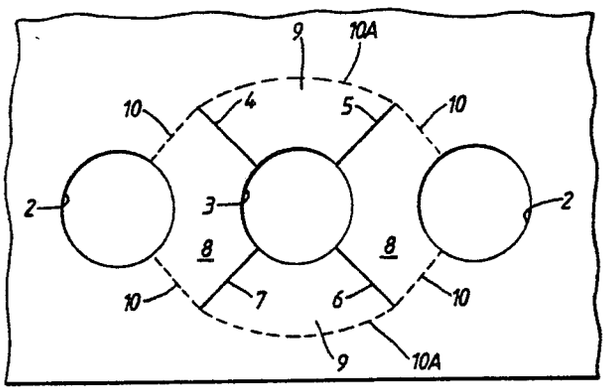

Fig. 2.

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WEB MATERIAL FOR WEB HANDLING MACHINE

This invention relates to web material for use in web handling machines. More particularly, the present invention relates to web materials adapted to be driven through a machine by means of sprocket wheels having projecting sprocket pins which engage in sprocket holes provided along the longitudinal margins of the web.

Such webs are commonly used in a wide range of machines, including, by way of example, printers, plotters, and sign making machines. The most common industry standard for the pitch of the sprocket holes is half-inch (12.7mm) although a pitch of quarter-inch (6.25mm) is used in some applications. In most machines, sprocket wheels have a plurality of equi-angularly spaced sprocket pins providing a sprocket pin pitch corresponding to the regular sprocket hole pitch referred to above.

In certain machines, however, one or more additional sprocket pins are provided on the sprocket wheels. One such machine is illustrated in GB-B-2146311. It will be readily appreciated that if one or more additional sprocket pins are provided on a sprocket wheel having a set of standard half-inch pitch sprocket pins, web material having standard half-inch pitch sprocket holes will not have a sprocket hole corresponding to each and every sprocket pin. If the additional sprocket pin is provided equi-distant from two sprocket pins of the standard half-inch pitch set, web material having a quarter-inch sprocket hole pitch may be run satisfactorily through the machine. If, however, the additional pin is located otherwise than equi-distant between two adjacent half-inch pitch pins, web material with a quarter-inch pitch will not provide a sprocket hole in register with each sprocket pin.

If the web material is relatively easily torn, and is intended to run continuously in one direction through the machine, the fact that there may not be a sprocket hole corresponding to the additional sprocket pins may not present a problem since the additional sprocket pin will simply result in local tearing of the web. If, however, the material of the web is relatively tough, for example if it is self adhesive vinyl material mounted on a release paper backing and/or the web must run backwards and forwards through the machine, it has been found that the material will not feed satisfactory through a machine unless means are provided for accommodating the additional sprocket pin or pins.

Of course, web material can be provided with additional sprocket holes adapted specifically to mate with a particular sprocket wheel configuration. A web material specifically adapted to mate with the sprocket wheel configuration of GB-B-2146311 is disclosed in that specification. However, such a specifically designed web will not, of course, be suitable for machines having other arrangements of additional pins.

One possible solution to the provision of a universally usable web of material is to provide sprocket holes at the standard half-inch pitch, and to provide an elongate or over-sized hole between each adjacent pair of standard pitch sprocket holes whereby an additional pin may be accommodated regardless of its position relative to the adjacent sprocket pins. However, in order to accommodate all possible positions of the addition sprocket pin the elongate or over-sized hole must come very close to each standard pitch sprocket hole - i.e. only a very thin bridge of web material must be left between each elongate hole, and each standard sprocket hole. Such small bridges are liable to be incapable of withstanding the stresses imposed upon them during feeding of the web especially bidirectional feeding, and in any event render the margins of the web undesirably flexible.

According to one aspect of the present invention there is provided a web of material adapted to be driven through a machine by sprocket wheels having projecting sprocket pins wherein the web has a series of equally spaced main sprocket holes along each edge thereof and a secondary sprocket hole between each adjacent pair of main sprocket holes, and wherein the web on at least one side of each secondary sprocket hole is readily deformable whereby if, during passage of the web through a machine, a sprocket pin registers with a readily deformable zone, the web material will deform to accommodate the sprocket pin and permit smooth feeding of the web.

In general, the main sprocket holes will be located at the standard half-inch pitch. Preferably, the secondary sprocket holes are located centrally between each adjacent pair of main sprocket holes whereby the web has a uniform sprocket hole pitch of quarter-inch. Such web material may, of course, readily be fed through standard half-inch or quarter-inch pitch sprocket drives. It should be appreciated, however, that the secondary sprocket holes may be located other than centrally between the main sprocket holes.

The web and material is rendered readily deformable on at least one side of each secondary sprocket hole so that the secondary sprocket hole and readily deformable zone together span the whole area in which a secondary sprocket pin may be encountered. If, as will usually be the case, the secondary sprocket hole is located equi-distant from each adjacent main sprocket hole, a readily deformable zone is provided on each longitudinal

side of each secondary sprocket hole, each readily deformable zone extending from its associated secondary sprocket hole towards the adjacent main sprocket hole a distance sufficient to accommodate all possible postions of secondary sprocket pin.

In the preferred embodiment of the invention, readily deformable zones are also provided on each lateral side of each secondary sprocket hole whereby secondary sprocket pins located out of line with the main sprocket pins may be accommodated.

In the preferred embodiment of the invention the readily deformable zones are formed by either through cuts or lines of weakness extending radially outwardly from each secondary sprocket hole. It has been found that four such cuts located at 90° relative to each other, and each extending at 45° to the longitudinal direction of the web give particularly satisfactory results. Such a pattern of cuts forms at each longitudinal and lateral side of each secondary sprocket hole a substantially triangular zone of web material which can be readily flexed out of the plane of the web material upon encountering a sprocket pin. At the same time, it has been found that the web material is not weakened by the provision of the cuts to an extent which affects adversely the operational characteristics of the web.

The invention will be better understood from the following description of a preferred embodiment thereof, given by way of example only reference being had to the accompanying drawing wherein:

Figure 1 illustrates schematically a web of material according to a preferred embodiment of the present invention; and

Figure 2 is an enlarged view of a portion of the web of Figure 1.

Referring now to Figure 1, the illustrated web 1 may be of any material, and may, for example, comprise self-adhesive sheet vinyl material mounted on a release sheet backing. Such materials are commonly used for the production of vinyl signs as described, for example, in GB-B-2146311 referred to above.

Along each longitudinal margin of the web a series of main sprocket holes 2 is provided. The main sprocket holes 2 are at a uniform half-inch (12.7mm) pitch, and accordingly the web material may run through any machine having a standard half-inch pitch sprocket drive.

Located equi-distant between each adjacent pair of main sprocket holes 2 are secondary sprocket holes 3. It will be appreciated that the combination of main sprocket holes and secondary sprocket holes together provide sprocket holes at a quarter-inch pitch thereby allowing the web material to be run through a machine having a standard quarter-inch pitch sprocket drive.

Referring now to Figure 2, each secondary sprocket hole 3 has cuts 4-7 extending radially outwardly therefrom. The cuts are angularly spaced at 90° from each other, and each cut extends at an angle of 45° to the longitudinal and transverse directions of the web. The cuts 4-7 are preferably through cuts, but this is not essential provided that the required readily deformable regions are formed. In the illustrated embodiment, a readily deformable region 8 is formed on each longitudinal side of each secondary sprocket hole 3, and a readily deformable region 9 is formed on each lateral side of each secondary sprocket hole 3. Each readily deformable region 8 is bounded by a portion of the periphery of the secondary sprocket hole 3, a portion of the periphery of the adjacent main sprocket hole 2, two of the cuts, and by imaginary lines 10 which connect the outer ends of the cuts to the adjacent main sprocket hole 2. Each readily deformable portion 9 is bounded by a portion of the periphery of the secondary sprocket hole 3, by a pair of cuts, and by a somewhat curved line 10A connecting the outer extremities of the relevant pair of cuts.

If the illustrated web is run through a machine having standard half-inch pitch sprocket drive with one or more additional sprocket pins located other than equi-distant between two adjacent main sprocket pins, the additional sprocket pin will register with one of the readily deformable zones 8,9 as the web is run through the machine. This will result in the readily deformable zone hinging out of the plane of the web to accommodate the additional sprocket pin. It has been found that with the arrangement illustrated the web is not weakened sufficiently to impair normal feeding of the web through a machine.

It should be appreciated that whilst a particular and preferred means of achieving the required readily deformable zone has been described, other means may be employed and the invention is to be construed as encompassing all constructions in which the required readily deformable zone is provided.

Claims

1. A web of material adapted to be driven through a machine by sprocket wheels having projecting sprocket pins wherein the web has a series of equally spaced main sprocket holes along each edge thereof and a secondary sprocket hole between each adjacent pair of main sprocket holes, and wherein the web on at least one side of each secondary sprocket hole is readily deformable whereby if, during passage of the web through a

machine, a sprocket pin registers with a readily deformable zone, the web material will deform to accommodate the sprocket pin and permit smooth feeding of the web.

2. A web of material according to claim 1 wherein the secondary sprocket holes are located centrally between each adjacent pair of main sprocket holes whereby the web has a uniform sprocket hole pitch.

3. A web of material according to claim 1 or claim 2 wherein the web and material is rendered readily deformable on at least one side of each secondary sprocket hole so that the secondary sprocket hole and readily deformable zone together span the whole area in which a secondary sprocket pin may be encountered.

4. A web of material according to any preceding claim wherein a readily deformable zone is provided on each longitudinal side of each secondary sprocket hole, each readily deformable zone extending from its associated secondary sprocket hole towards the adjacent main sprocket hole a distance sufficient to accommodate all possible longitudinal positions of a secondary sprocket pin.

5. A web of material according to any preceding claim wherein readily deformable zones are also provided on each lateral side of each secondary sprocket hole whereby secondary sprocket pins located out of line with the main sprocket pins may be accommodated.

6. A web of material according to any preceding claim wherein the readily deformable zones are formed by either through cuts or lines of weakness extending radially outwardly from each secondary sprocket hole.

7. A web of material according to claim 6 wherein there are four such cuts located at 90° relative to each other, and each extending at 45° to the longitudinal direction of the web.

8. A web of material substantially as hereinbefore described with reference to the accompanying drawing.

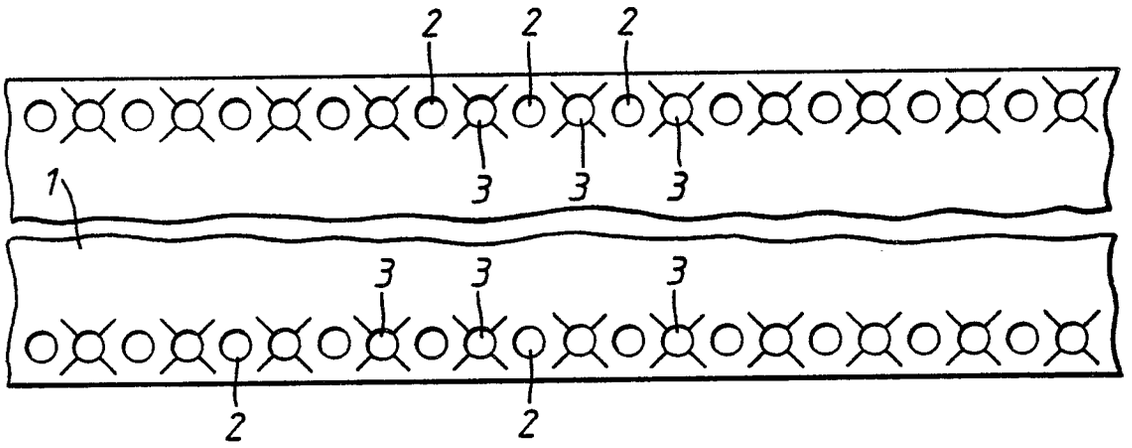

Fig. 1.

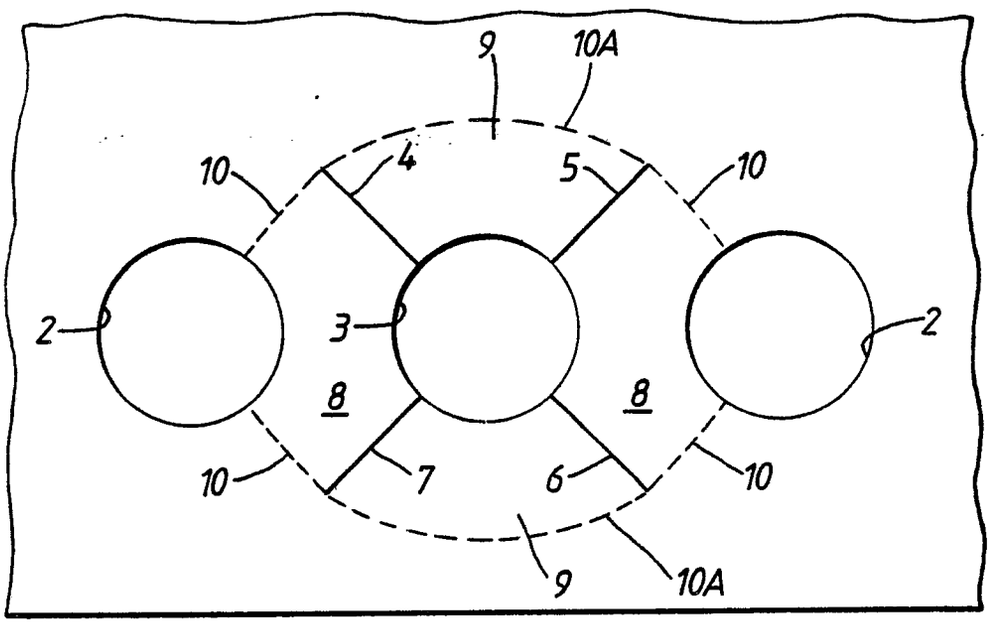

Fig. 2.