A dispensing magazine and a mat of wire elements for use in such a magazine

The invention relates to a dispensing magazine for the use in a wire dispensing unit in a book binding machine and holding a mat of wire elements, wherein the magazine includes two side walls and two gable walls the inner distances between which are adapted to the size and the length of the wire elements, the magazine also including a bottom wall provided with through slots for strips holding the wire elements, and that the slots have a different location depending on the distance between the gable walls, to adapt for a corresponding location of the strips holding the wire elements of the corresponding length.

The invention also relates to a mat of wire elements including individual wire elements (35) of the same length mounted on elongated strips (36) of flexible material straddled by prongs of the elements so that the latter are frictionally held thereon to form the mat, wherein the position of the elongated strips (36) are different between mats of different lengths but the same for mats of the same length.
The present invention relates to a dispensing magazine for the use in a wire dispensing unit in a book binding device, as well as a mat of wire elements for use in such a magazine.

The wire elements concerned are such elements that are used with the system of binding known as the WIRE-O® system. The binding elements include a continuous length of wire that has been bent so that at regular intervals along its length it has projecting laterally from it curved prongs in the form of hairpins of which the closed ends lie just within or adjacent to the open ends. When delivered, before the mounting of the sheets to be bound by the wire elements, the prongs are in an intermediate half-closed position in which there is a substantial gap between their closed and open ends and in which they have the shape of a Greek E. When the sheets have been mounted on the prongs in that condition the prongs are bent so as to close the gap between their open and closed ends whereupon the sheets are held against removal from them.

For the transportation and storage of such binding elements they are cut into defined lengths in which they are to be used, and the binding elements are mounted on a number of spaced parallel strips of flexible material straddled by the prongs of the elements so that the latter are frictionally held thereon to form a mat. The mat is being spirally wound into the form of a roll with the elements lying parallel to the axis of the roll.

A mat of the kind described above can be easily transported and fed into a bookbinding machine in which a packet of sheets are received and placed in the half-closed binding elements, whereafter the machine closes the binding elements to hold the sheets. A machine of this kind is described in GB-A-987,116. One of the problems with a machine of this kind is that it is intended for binding in great volumes, i.e. binding with the same size of wire element. If the size of binding it is necessary to make substantial changes in the setting of the binding machine.

To solve the problems with the above described binding machine it has in the Swedish patent application No. 0004180-6, filed 15 November 2000, been proposed a feeder for binding elements of the kind described here above, and in which is used a feeder cassette holding a number of wire binding elements arranged in a mat of a fixed, relatively short, length. Wire elements arranged in mat rolls of a substantial length as described above cannot be used with the novel binding machine, as it requires the use of feeder cassettes. Those feeder cassettes are available in different sizes, adapted to fit only one size of binding elements. The binding machine and the feeder cassettes are adapted so to each other that the binding machine can be used without any changed settings when a new cassette bearing binding elements of another size is mounted in the binding machine. The binding machine is consequently automatically adapted to the size of wire elements used, and it can therefore be used also for binding in small volumes, as it requires no changed settings to adapt to another size of wire elements.

However, even if the problem with adaptation to different wire element sizes has been solved, there are still others remaining. By wire element size is meant the transverse size of the wire elements, the size that is chosen depending on the thickness of the book to be bound. The length of the wire elements shall correspond to the back of the book, and also corresponds to a defined number of loops in a wire element. To work properly it will also be necessary that a feeder cassette of the kind described in the above-mentioned Swedish patent application has an internal length that corresponds to the length of the wire elements. It is evident that a too long element not can be inserted in a shorter cassette, but a shorter wire element can be inserted in a cassette intended for longer elements, and thus causing lengthwise sliding of the elements in the cassette during feeding, or preventing an automation of the binding process.

It is therefore an object of the present invention to provide a solution of this problem, and to facilitate the insertion of the mats of wire binding elements in the correct cassette or magazine.

A more specified object is to provide a new dispensing magazine in which only mats of wire elements having the correct length can be inserted.

The above object of the invention is achieved by a dispensing magazine according to the invention, which magazine include two side walls and two gable walls the inner distances between which are adapted to the size and the length of wire elements, the magazine also including a bottom wall provided with through slots for strips holding the wire elements, and wherein the slots have a different location depending on the distance between the gable walls, to adapt for a corresponding location of the strips holding the wire elements of the corresponding length.

Another object of the invention is to provide a new mat of wire binding elements, that only can be inserted in a magazine intended for the actual length of the wire elements.

The above object of the invention is achieved by a mat of wire elements, the mat including individual wire elements which are mounted on elongated strips of flexible material straddled by prongs of the elements so that the latter are frictionally held thereon to form the mat, wherein the position of the elongated strips are different between mats of different lengths but the same for mats of the same length.

The invention will now be described in further detail in the form of a non-limiting example, shown on the appended drawings, in which Figure 1 in a schematic perspective view shows a part of a binding machine, a wire dispensing unit, in which a dispensing magazine and a mat of wire elements according to the invention are used, Figure 2 shows and end view, par-
tially in section, of the binding machine, especially the dispensing magazine, Figure 3 shows a bottom view of a dispensing magazine according to the invention. Figures 4-7 show schematic plan views of mats of wire elements according to the invention in different lengths, and Figure 8 shows an end view of a mat of wire elements according to the invention.

[0013] The dispensing unit 37 shown in Figure 1 is of the kind described in more detail in the above-mentioned Swedish patent application No. 0004180-6, and includes a dispensing magazine 38, which is to be described in more detail in connection with the description of Figures 2 and 3 here below.

[0014] In Figure 2 is shown an end view of the dispensing unit 37, showing the dispensing magazine 38 holding a number of wire binding elements 35. The wire elements 35 are mounted on elongated strips 36 of flexible material (shown only in Figures 4-8) to form a mat of wire elements. The dispensing magazine 38 includes a front side wall 39 and a back side wall 40, and a bottom wall 41 on which the wire elements are supported within the magazine. The dispensing magazine 38 also includes two gable walls 42,43. The other details shown on the drawing are of no importance for the present invention, and will therefore not be described further.

[0015] Figure 3 shows a bottom plan view of a dispensing magazine 38 according to the invention, of which only the bottom wall 41 is visible in the bottom plan view. However, the important features of the dispensing magazine is shown, namely through slots 44, through which the elongated strips 36 mounting the wire elements can pass when a mat of wire elements is inserted in the dispensing cassette, and further fed out as the wire elements are dispensed from the magazine.

[0016] In Figure 4 is shown a schematic plan view of a mat of wire binding elements 35. The mat as shown consists of eight wire elements 35 mounted on the elongated strips 36. The elongated strips are inserted in and straddled by the prongs of the wire binding elements 35. In Figure 4 the wire elements 35 are shown having their maximum length, and includes thirty-four prongs, indicated by the reference numerals 1-34 on the drawing. As stated earlier the length of the wire element is decided by the number of prongs 1-34, as the distance between the prongs 1-34 always is the same for wire elements of a given size. With this maximal length the strips 36 are mounted in the prongs 2,9,17,26 and 33. A dispensing magazine for accommodation of this length of wire elements have its slots 44 in the bottom wall 41 located at exactly corresponding positions, and as the strips 36 project a slight distance from the lowermost wire element 35 in the mat as shown in the drawing the mat cannot be inserted if the slots 44 do not exactly match the positions of the strips 36 it can not be inserted into the magazine.

[0017] Correspondingly in the mat shown in Figure 5 each wire element 35 consists of only thirty-two prongs 1-32. These elements are consequently somewhat shorter than the elements shown in Figure 4, and could be inserted in a dispensing magazine adapted to accommodate elements of the length as those shown in Figure 4 if they were not mounted according to the invention. With the length of the wire elements 35 as shown in Figure 5 the strips 36 are mounted in the prongs 2,8,16,25 and 31. The dispensing magazine for accommodation of this length of wire elements have its slots 44 in the bottom wall 41 located at exactly the corresponding positions, and these positions differ from the positions in dispensing magazines for accommodating other lengths of wire elements, and consequently only wire elements having exactly the correct length can be inserted into the dispensing magazine. A mat with wire elements of the length shown in Figure 5 can consequently not be inserted into a magazine adapted for a length of thirty-four prongs, as the projecting strips 36 simply don’t match the slots 44 in the magazine bottom wall 41.

[0018] In Figure 6 is shown a mat including wire elements 35 having each only twenty-six prongs 1-26. The mounting strips are herein mounted in prongs 7,13,20 and 25. A dispensing magazine accommodating this length of wire elements consequently has its slots located at the corresponding positions.

[0019] The mat shown in Figure 7 includes wire elements 35 of the shortest available length, namely only twenty-four prongs 1-24. The mounting strips are herein mounted in prongs 6,12,19 and 23. A dispensing magazine accommodating this length of wire elements consequently has its slots located at the corresponding positions.

[0020] Figure 8 shows a side view of a mat of wire elements 35 mounted on an elongated strip 36. The prongs have their open ends on the right hand side of the figure, so that a pusher 45 (see Figure 2) working in the direction of the arrow 46 can push the wire element, as also shown in Figure 2, so that the wire element leaves the mounting strip 36, and can be dispensed from the magazine. When the lowermost wire element has been pushed out from the magazine and the pusher is withdrawn in the opposite direction, the next wire element will fall down onto the bottom wall 41, and the newly free part of the strips 36 will be fed out through the slots in the bottom wall.

[0021] The mounting strips are as shown mounted in the second prongs from the end in each length of the wire elements as well as in one of the prongs closest to the middle of the elements. As the wire elements all consist of an even number of prongs it is not possible to turn the mat in the other way, so that the closed ends of the prongs would be turned towards the pusher, as it in this position would be impossible to push the elements off from the strips.

[0022] The strips 36 are made of a flexible material, preferably plastic, being so flexible that the pusher can push the strip together with the wire element to a position where the wire element leaves the strip and that the
strip after being released returns to its original position to be ejected through the slots.

Claims

1. A dispensing magazine (38) for the use in a wire dispensing unit (37) in a book binding machine and holding a mat of wire elements (35), characterised in that the magazine includes two side walls (39,40) and two gable walls (42,43) the inner distances between which are adapted to the size and the length of the wire elements (35), the magazine also including a bottom wall (41) provided with through slots (44) for strips (36) holding the wire elements (35), and that the slots (44) have a different location depending on the distance between the gable walls (42,43), to adapt for a corresponding location of the strips (36) holding the wire elements (35) of the corresponding length.

2. A dispensing magazine according to Claim 1, characterised in that at least three slots (44) are provided in the bottom wall (41).

3. A dispensing magazine according to claim 2, characterised in that one slot (44a) is provided close to the middle of the bottom wall (41), and that one slot (44b) is provided close to each gable wall (42,43).

4. A mat of wire elements including individual wire elements (35) of the same length mounted on elongated strips (36) of flexible material straddled by prongs of the elements (35) so that the latter are frictionally held thereon to form the mat, characterised in that the position of the elongated strips (36) are different between mats of different lengths but the same for mats of the same length.

5. A mat according to Claim 4, characterised in that each wire element (35) includes an even number of prongs.

6. A mat according to Claim 4 or 5, characterised in that one strip (36) is mounted in one of the prongs closest to the middle of the wire element (35).

7. A mat according to Claim 4 or 5, characterised in that one strip (36) is mounted in a prong close to each end of the wire element (35).

8. A mat according to anyone of Claims 4-7, characterised in that the strips (36) are mounted so that they project from the first wire element (35) in the mat.
Fig. 4
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