

"FOAM MATERIAL-BASED SPRING MATTRESS"

DESCRIPTION

Purpose of the Invention

This invention concerns foam material-based spring mattresses that provide essential new features and significant advantages compared to what is known and used for the same purposes in the current state of technology.

More particularly, the invention proposes to develop elements that act as springs, especially suitable for producing mattresses by using a number of these spring elements distributed spatially in place of conventional metallic springs, obtained by cutting and hollowing out a sheet of foam material of a predetermined thickness, such as flexible polyurethane foam, to obtain the desired configuration and design for each particular foam spring. The mattress is composed of a number of these springs emerging from a laminar lower portion of the original sheet, whereby it is possible to sheathe the assembly in a separate operation, either directly or by topping the upper ends of the springs with a continuous sheet of the same material, or whereby this sheet is of a foam material with a different hardness, and is fixed using a gluing operation.

The field of application of the invention is in the industrial sector that works with foam materials, in particular, flexible polyurethane-based materials.

Background and Summary of the Invention

It is well known that in the sleep sector, it is common to use so-called "spring mattresses", which are formed by a metallic wire box enclosing a number of helicoidal springs formed from metallic wires of an elastic nature. Evolution in this sector has led to the introduction of certain innovations in the system, whereby the so-called "bagged springs" system is also known, in which the springs consist of helicoidally rolled wires sheathed with a fabric that forms a type of bag which holds the spring. Other systems are also known, one of particular importance being the so-called "TwinSpring System", where metallic helicoidal springs are enclosed within a cylinder of high-density foam (rigid polyurethane).

However, there is no known alternative spring system on the market similar to that proposed by this invention, where the springs have no metallic parts, but are made entirely of a foam material, thus giving mattresses made in this way a number of beneficial properties for the people who use them for something as important as their daily rest.

Thus, the main purpose of this invention is to provide a spring mattress made of a foam material, such as flexible polyurethane-based foam, which provides practical results that are more beneficial than those provided by traditional mattresses that use helicoidal metallic springs. This goal has been completely achieved by producing mattresses using the springs described hereunder, whose main features are described in the characterizing part of Claim 1 below.

Essentially, the springs used in the type of mattress in the invention are produced through configuration operations that include cutting and hollowing out an initial sheet of foam material of a predetermined thickness that determines the final height of the springs, these configuration operations being performed in such a way that successive portions with varying dimensions are formed so that the springs give way elastically when compressed. The mattress is obtained by using a set of these springs emerging from a laminar lower portion of the original sheet of predetermined dimensions, with an additional sheathing or similar operation. Thus, in this first implementation, the springs are in one piece with the laminar lower portion, while, in an alternative version, a second continuous laminar portion can be used, likewise as a sheet, and placed over the upper part of the springs, to which it is fixed by gluing or some other similar operation.

Brief Description of the Drawings

These and other features and advantages of the invention will be clarified by the detailed description below of a preferred implementation, given solely as an illustrative and not limiting example, with reference to the accompanying drawings, where:

Figures 1 and 2 show perspective views of two examples of the foam material springs of the type used in the mattresses of the invention, with predetermined configurations;

Figure 3 shows a schematic view of a possible mattress based on the springs of the invention that appear rising from the lower portion of the continuous sheet, from which they emerge in one piece; and

Figure 4 is a schematic view of an alternative implementation of the mattress based on spring forms in accordance with the invention, which likewise has a second continuous foam sheet on the upper part.

Description of a Preferred Implementation

As was indicated above, a detailed description of the preferred implementation of the invention will be given below using the annexed drawings, with the same numerical references being used to designate the same or similar parts. Thus in the first instance, in Figure 1, a schematized representation, in perspective, can be seen of an example of an implementation of an elastic spring of the type proposed by the invention, generally indicated by the reference 1. As can be seen, the spring element consists of a block of foam material, normally polyurethane foam, formed into an initial sheet of appropriate thickness, and rises in a predetermined configuration, obtained by cutting and hollowing out operations, from the remaining portion of a lower sheet (6), which serves as a support. As can be seen, the above-mentioned form gives the spring (1) smaller-sized areas such as, for example, the recessed parts (2) in various positions and of varying sizes, on one or more sides, and projecting portions such as those marked with reference numbers 3 and 4, on one or more sides of the spring element (1). In this way,

differentiated flexion and compression effects are obtained when the spring element is subjected to pressure, as is graphically indicated by the arrow F.

As will be understood, by applying cutting and hollowing out techniques to an original sheet with a predetermined thickness, a number of such forms of spring 1, distributed spatially over the sheet, are obtained, in accordance with a predetermined design.

Figure 2 shows another example of an implementation of a second spring element generally indicated by the reference 1', the fabrication of which follows the same principles as for spring 1, i.e., an original block of appropriate thickness is cut and hollowed out to give it recessed portions (2)', which might affect one or more of the sides, or projecting portions (3'), which can also extend outwards from one or more of the sides with varying projection distances and different thicknesses. In this case, the spring element (1') also has holes (5) that go through portion 7 of the lower sheet from which the spring (1') emerges in the longitudinal and transversal directions.

As will be understood, Figures 1 and 2 only show two possible examples of physical implementations of the spring elements obtained by cutting and hollowing out an initial sheet of an appropriate thickness, and will be used to produce a mattress in accordance with the invention. Nevertheless, many other configurations are proposed for the invention that are not shown in the drawings because the construction philosophy behind these configurations is always the same, i.e., cutting and hollowing out operations are performed on an original sheet of an appropriate thickness to produce spring elements that are spatially separated by the sheet, in pre-established positions, where there are recessed portions that affect one or more of their faces, of varying sizes and preferably always with rounded profiles, and with protruding parts that project outwards from one or more sides of the spring element, alternating with the recessed portions, extending outwards to a greater or lesser distance and with varying thicknesses. Thus, each element of the spring flexes differently when it is subjected to compression caused by incorporating it into a mattress or similar assembly, and recovers its elasticity when this compression ceases.

Thus, the springs may be of any design whose behaviour when compressed is similar to that of traditional springs, namely, they can be used directly by applying a protective sheath or cover, or, in an alternative implementation, by applying an additional sheet of the same material over the upper ends, or by applying a sheet of foam material of a different hardness.

These construction forms are shown in Figures 3 and 4. The first one shows a mattress obtained from a number of elastic foam springs of the type proposed in the invention, indicated by the numerical reference 10, distributed spatially in accordance with the pattern used in its formation, completely connected on the lower part by the portion (6) of the original sheet that remains after the cutting and hollowing out operations are performed to form said elements of spring 10. In this case, there is no additional protection for the upper ends of the springs (10).

However, unlike the implementation just described, Figure 4 schematically shows a situation in which the mattress is likewise obtained from a number of foam springs (10'), integrated with a laminar portion (7) remaining from the original sheet, spatially distributed in accordance with the pattern used in its formation, whose upper ends have an additional sheet (8) that tops and protects them. The springs (10') are fixed to the sheet (8) by gluing or using a similar operation.

As will be understood, the finishing of the mattresses in Figures 3 and 4 can include enclosing the assembly in appropriate sheathes or using any other conventional techniques not included in the invention.

It is not considered necessary to describe the invention in greater detail in order for subject matter experts to be able to understand its importance and advantages or how to develop and produce these springs.

Nevertheless, it should be understood that the invention has been described based on a preferred implementation thereof. Thus, it can be modified without altering the basis of the invention in any way, with such alterations possibly including changes in the form, the size and/or the foam materials used in producing these springs.

CLAIMS

1.- A mattress with springs based on a foam material, specifically built with a number of elastic spring elements distributed spatially, finished by using some type of sheath or similar covering, characterized in that the said multiplicity of the elastic spring elements (1, 1') is obtained from an initial sheet of foam material of a thickness appropriate to the desired height of the springs, with a predetermined spatial distribution, successively separated from each other and connected on the lower part by a laminar portion (6, 7), the continuous remainder of the original sheet, with the spring elements (1, 1') and which is formed using cutting and hollowing out operations that form recessed portions (2, 2') on one or more sides, with a rounded profile, of varying sizes and depths, and protruding forms (3, 4; 3'), projecting out from one or more sides of the spring, with differing thicknesses and projection distances, thus allowing the spring element to flex and compress when subjected to pressure.

2.- A mattress in accordance with Claim 1, characterized in that the foam material used to fabricate each spring element (1, 1') consists of flexible polyurethane foam.

3.- A mattress in accordance with Claims 1 and 2, characterized in that, in an alternative implementation, the elastic spring elements (1, 1') are fixed at the top to a topping sheet (8) of the same foam material, whereby the upper ends of the spring elements (1, 1') are fixed to said additional upper sheet by gluing or using a similar operation.

4.- A mattress in accordance with Claim 3, characterized in that, in an alternative implementation, the topping sheet (8) is composed of foam materials of a different hardness, whereby the upper ends of the spring elements (1, 1') are fixed to this additional upper sheet by gluing or using a similar operation.