Nov. 12, 1935. E. P. DESBRUÈRES 2,021,051

SAFETY SCREW

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Fig. 1.

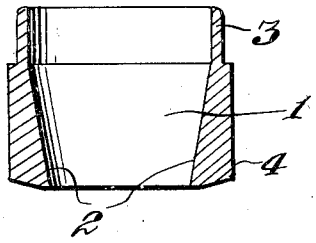


Fig. 3.

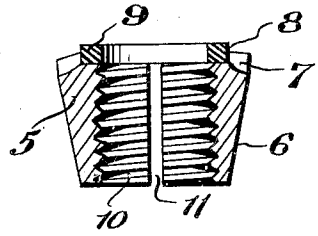


Fig. 2.

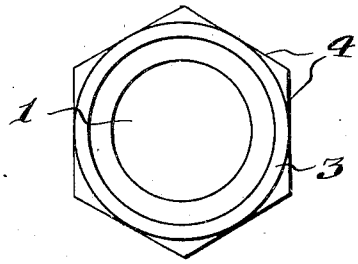


Fig. 4.

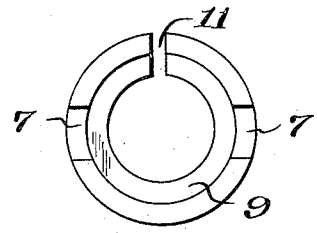


Fig. 5.

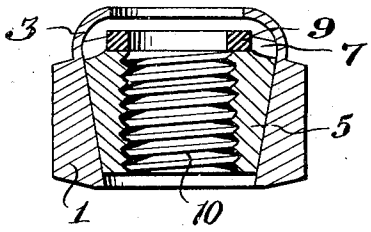
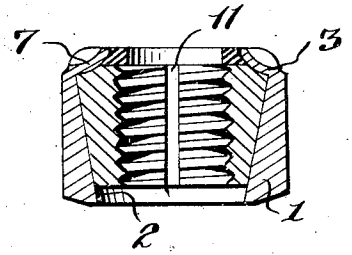


Fig. 6.



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Fig. 7.

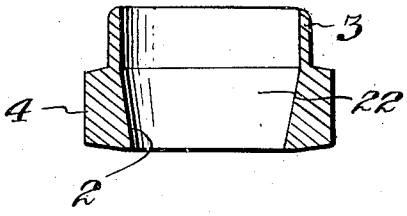


Fig. 8.

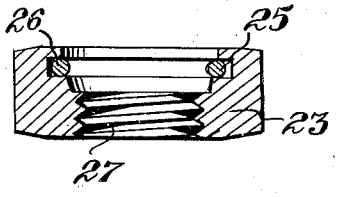


Fig. 9.

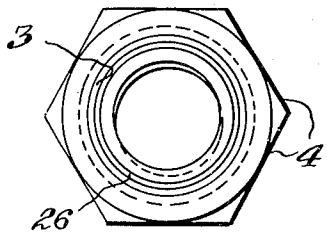


Fig. 10.

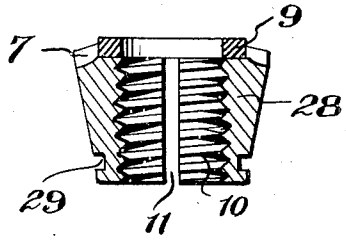


Fig. 11.

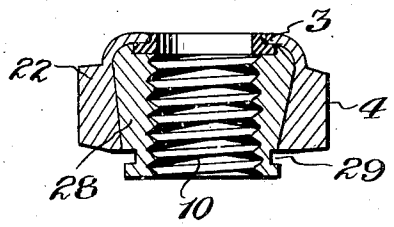


Fig. 12.

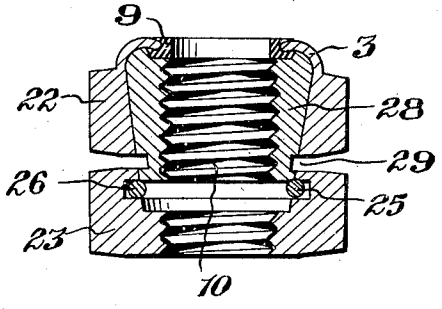
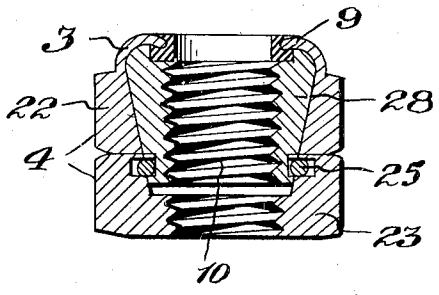


Fig. 13.



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UNITED STATES PATENT OFFICE

2,021,051

SAFETY SCREW

Edmond Pierre Desbruères, Paris, France

Application November 30, 1932, Serial No. 645,085
In France November 26, 1932

2 Claims. (Cl. 151—19)

Safety-screws consisting of two pieces entering each other are already known, the walls of which in contact are tapered, the inner piece being split lengthwise and bearing a thread destined to be screwed on a bolt. But, in order to make it possible to screw this nut on to a bolt by turning the outside piece, these two pieces, i. e. the inside and the outside pieces, must be united to each other and the inside piece must be capable of moving axially when the safety-screw is tightened up on any assembly.

Several means of consolidating these two inside and outside pieces have been sought which would nevertheless enable the said pieces to move axially with respect to each other.

In one form of execution, the two pieces are united by means of a key which is attached to the outside piece and arranged longitudinally. This key is placed in a slot located in the wall of the inside piece.

In another form of execution, the two pieces are united by drilling a hole through the wall of the outside piece, then introducing a pin which projects, the latter being introduced into the recess lying in the inner piece, so that the pin is soldered or riveted to the outside piece.

One has thought of constructing the inner piece of two or more segments so as to leave a certain space between them. The segments are threaded inwardly and their exterior wall is pyramidal as well as the inner wall of the exterior piece. These pyramidal walls are destined to unite the pieces.

The safety-screw in accordance with the present application surmounts certain disadvantages inherent in and common to the above-mentioned known forms of nuts. Besides, its construction is extremely simple; its cost price is much lower than that of other similar nuts; it can be screwed at will on to bolts of slightly different diameters, without damaging the threads. Further, thanks to its supple ring forming a watertight joint, its tapered walls and the threads cannot corrode under the action of water or mud and consequently always remain smooth, thus enabling the safety-screw to retain its full efficiency.

The safety-screw according to the present invention comprises a longitudinal slit inside piece provided with a thread inside, tapered on the outside, having at its upper extremity a circular recess for the repose of a supple ring, an outside piece for receiving the inside piece and having a correspondingly tapered inside, perfectly smooth, means provided at the upper part of the inside and outside pieces for preventing them from turning with respect to each other, said means including a neck on the upper part of the outside piece which when pressed down push the supple ring onto the upper part of the inside piece thus closing up the inside piece like in a watertight box which has for a result to prevent the tapered walls and the threads from corroding, but permitting the inside piece to move slightly either vertically or radially inside the outside piece, whereby the above-mentioned slot is widened or made narrower, whilst as a result of the protection afforded by the supple sealing ring, the inside piece retains its elasticity and freedom of movement so that the lock-nut continues to absorb vibrations and can be screwed or unscrewed on or off of the bolt as often as necessary, even if the said bolts are of different diameters.

In the accompanying drawings, which represent different forms of execution of a safety-screw according to the invention:

Fig. 1 shows, in axial vertical section, the outside piece in a first form of execution,

Fig. 2 is a front view of Fig. 1,

Fig. 3 shows, in axial vertical section, the inside piece of this first form of execution, with a supple ring,

Fig. 4 is a front view of Fig. 3,

Figs. 5 and 6 show, in axial vertical section, the fittings together,

Fig. 7 shows, in axial vertical section, the outside upper piece of a fourth form of execution,

Fig. 8 shows, in axial vertical section, the outside under piece with its ring in this form of execution,

Fig. 9 is a front view of the two outside pieces fitted together,

Fig. 10 shows the inside piece in axial vertical section,

Figs. 11 to 13 show, in axial vertical section, the fitting together of the pieces in this fourth form of execution.

The outside piece 1 has a tapered wall inside 2 and a neck 3 in its upper part. The outside of this piece 1 is preferably hexagonal in shape, as indicated at 4. The inside piece 5 has a tapered part 6 outside of the same conicity as the wall 2 of the piece 1. This piece 5 has, in its upper part notches 7, a circular recess 8 and a supple ring 9. It has a thread 10 and a longitudinal slot 11.

The mounting of the safety-screw according to the invention is accomplished in the following way: The ring 9 being disposed in the recess 8, the inside piece 5 is placed in the outside piece 1. By means of pressure, the neck 3 is gradually

turned down towards the axis of the screw thus perfectly covering the upper face of the inside piece 5, whereby it engages in the notches 7, so as to avoid any relative rotation of the two pieces 1 and 5, imprisoning the ring 9 which forms a watertight joint, and this bringing the tapered walls 2 and 6 into contact.

The two pieces 1 and 5 thus being united, form an homogenal block of perfect rigidity, which possesses a maximum elasticity, which prevents all vibrations.

The safety-screw thus obtained can be screwed on to a bolt or unscrewed, as a result of the elasticity of the inside piece, as often as necessary, without danger of damaging the threads of the bolt or the safety-screw, i. e. without the least jamming, and further, as a result of the fact that the tapered walls are perfectly smooth and cannot jam, the inside piece retains its radial elasticity, i. e. can open or close according to the axial motion of the outside piece. An assembly comprising this safety-screw can undergo vibrations without danger of the safety-screw loosening. As a result of the elasticity of the inside piece, the same safety-screw can be screwed on to bolts, the diameters of which vary within certain limits. When the safety-screw is screwed on to the bolt, the supple ring, which engages in the thread of this bolt, prevents water, mud, dust etc., from coming between the tapered walls, thus preventing the said tapered walls from corroding and, consequently, from jamming, and, on the other hand, prevents the threads from jamming, so that the safety-screw can be screwed on and off as often as is desired.

The safety-screw has its maximum efficiency when the generatrixes, of the tapered walls form an angle of 10 degrees with the axis of the screw. Besides, the longitudinal slot 11 is designed to suit the limit to which the safety-screw is tightened up.

The safety-screw according to the invention works in the following way.

The nut, screwed on to the shaft of a bolt, is brought into contact with the object to be pressed; then, when the tightening is continued, the inner part 5 gradually becomes smaller in the outside piece 1; the force concentrated upon the shaft of the bolt increases progressively up to the moment at which the resistance of the nut prevents the possibility of continuing the tightening, the nut thus ensuring security of the assembly to which it is screwed, in spite of any vibrations.

According to the form of execution shown in Figs. 7 to 13, the outside piece consists of two elements 22 and 23. The element 22 resembles the outside piece 1 of the first form of execution; but it is preferably lower in its hexagonal part. The element 23 has a tapered wall 24 and a circular recess 25 with a split steel ring 26 and an inside thread 27. The two elements 22 and 23 have their conicity in the prolongation of each other, when their sides touch each other. The inner piece 28 resembles that of Fig. 3; but it has a circular recess 29 at the bottom.

The mounting of the safety-screw according to this form of execution is performed in the following way:

The inside piece 28 is introduced into the element 22 of the outside piece and the whole is placed in the element 23 which is provided beforehand with its split steel ring 26. When the whole has been subjected to a slight pressure, the inside piece 28 opens the elastic ring 26, which gives way to let the under part of the inside piece pass and engages in the recess 29 which thus keeps the elements 22 and 23 of the outside piece in assembled relation.

The safety-screw according to this form of execution can either be stopped on the thread in any position, or rest upon an assembly giving it complete security against loosening.

For this purpose, after having made sure that the thread of the piece 23 is in the prolongation of the element 22, the whole is screwed freely on the bolt up to the desired point, then by means of two spanners, the two elements 24 and 25 are turned in the opposite direction until the two sides press hard against each other.

The safety-screw described above has numerous advantages, the principal one being:

It prevents the production of play, as would be produced by vibrations with an ordinary nut.

In fact, when the safety-screw has been screwed to an assembly, the inside piece has entered farther into the outside piece, the said inside piece has tightened up and its thread envelops the thread of the bolt perfectly, equal pressure being produced on the upper and lower faces of its thread and on those of the thread of the nut.

The play which is always produced with an ordinary nut under the action of vibrations, cannot be produced in an assembly comprising the safety-screw described above, because of the fact that the thread of the inside piece, as a result of its design, remains pressed against the thread of the bolt with a certain pressure, even when the assembly is subject to vibrations, which are annulled by the uniform adhesion of the safety-screw.

The safety-screw in accordance with the fourth form of realization does not rest on an assembly; it limits the play given voluntarily to the said assembly. It imprisons it on its axis, but leaves it full liberty of motion.

The supple ring, let into the upper face of the inside piece and rabbeted, shrinks when the safety-screw is tightened up and engage with the thread of the shaft of the bolt, thus forming a watertight joint between the safety-screw and the bolt.

The safety-screw described above comprises no key, wedge, pin or split pin, so that the surface of the two tapered walls can remain absolutely smooth and polished, so that no jamming is possible.

The tapered wall of the outside piece being absolutely smooth this piece may easily be turned out by the press down to one eighth of an inch diameter.

As it is produced entirely on the press the cost price of the nut defies all competition.

Numerous modifications could be made in the details during the manufacture of the safety-screw in accordance with the present application, without changing the principle of the invention.

What I claim is:

1. A nut assembly comprising, a longitudinally slit, internally threaded and externally tapered inside piece, a supple ring carried by the inside piece, an internally tapered outside piece mounted on the inside piece, the inside piece being formed with notches and the outside piece having a neck bent inwardly into compressing engagement with the ring, said compression being transmitted through the supple ring to the inside piece and said neck also having locking

engagement with the inside piece to prevent relative movement of the pieces.

2. A nut assembly comprising, a longitudinally slit, internally threaded and externally tapered inside piece formed adjacent its larger end with a recess, a supple ring disposed in the recess, an internally tapered outside piece mounted on the inside piece, the inside piece being formed with notches communicating with the recess and the outside piece having a neck bent inwardly into compressing engagement with the ring, said compression being transmitted through the supple ring to the inside piece and said neck also having locking engagement with the inside piece to prevent relative movement of the pieces.

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