United States Patent [19]

Welbergen et al.

[11] **3,863,302**

[45] **Feb. 4, 1975**

[54] **APPARATUS FOR ANCHORING WIRES OR STRANDED WIRES**

[75] Inventors: **Gerard Welbergen**, Zumikon; **Hans Rudolf Seigwart**, Kilchberg, both of Switzerland

[73] Assignee: **Bureau BBR Ltd.**, Zurich, Switzerland

[22] Filed: **Oct. 10, 1973**

[21] Appl. No.: **404,989**

[30] **Foreign Application Priority Data**

Oct. 16, 1972 Switzerland 15074/72

[52] **U.S. Cl.** ..... **24/122.6**, 24/115 M, 52/223 L, 403/374

[51] **Int. Cl.** **F16g 11/04**

[58] **Field of Search** ..... 24/136 B, 115 R, 122.6; 52/223 L; 403/374

[56] **References Cited**

UNITED STATES PATENTS

2,346,706	4/1944	Stoner	24/136 B
2,761,649	9/1956	Woolcock	52/223 L
3,412,511	11/1968	Dietrich	52/223 L
3,701,509	10/1972	Stinton	52/223 L
3,778,869	12/1973	Andrews	24/122.6
3,795,949	3/1974	Shorter	24/115 R

FOREIGN PATENTS OR APPLICATIONS

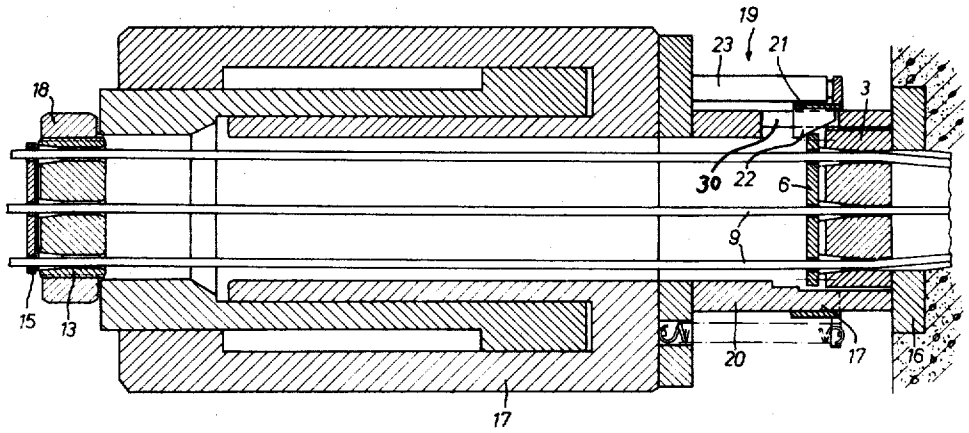
1,526,738	4/1968	France	52/223 L

Primary Examiner—Bernard A. Gelak

[57] **ABSTRACT**

An apparatus for anchoring wires or stranded wires incorporating an anchor plate equipped with through-passage bores for the wires or stranded wires, and clamping wedges associated with the anchor plate for anchoring the wires or stranded wires. The through-passage bores possess at one end a conical recess for receiving the clamping wedges and also have a subsequently merging cylindrical section. Means are provided for applying the clamping wedges, during the mounting of the apparatus at the wires or stranded wires and during the tensioning thereof, against a press-in plate arranged in spaced relation from the anchor plate and which press-in plate is provided with holes or perforations for the throughpassage of the wires or stranded wires. The applying means retains the clamping wedges out of the their effective clamping position. The press-in plate, after tensioning of the wires or stranded wires, is displaceable against the anchor plate for simultaneously and uniformly bringing the wedges into their clamping position.

7 Claims, 4 Drawing Figures



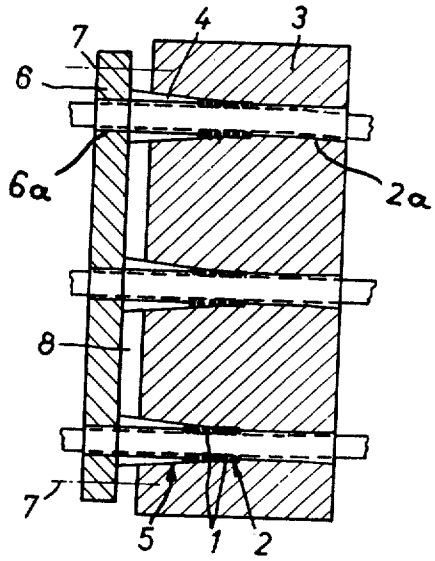
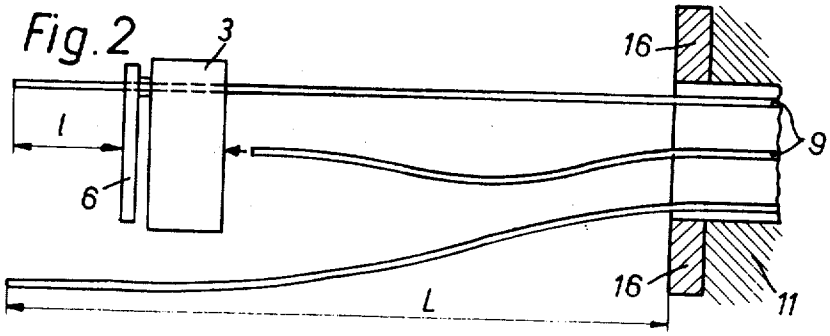


Fig. 1

Fig. 2



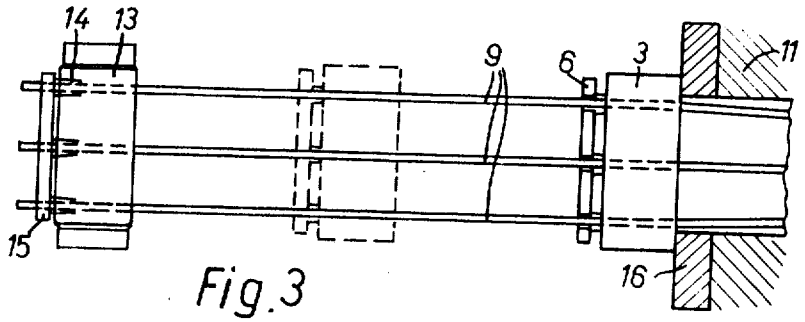


Fig. 3

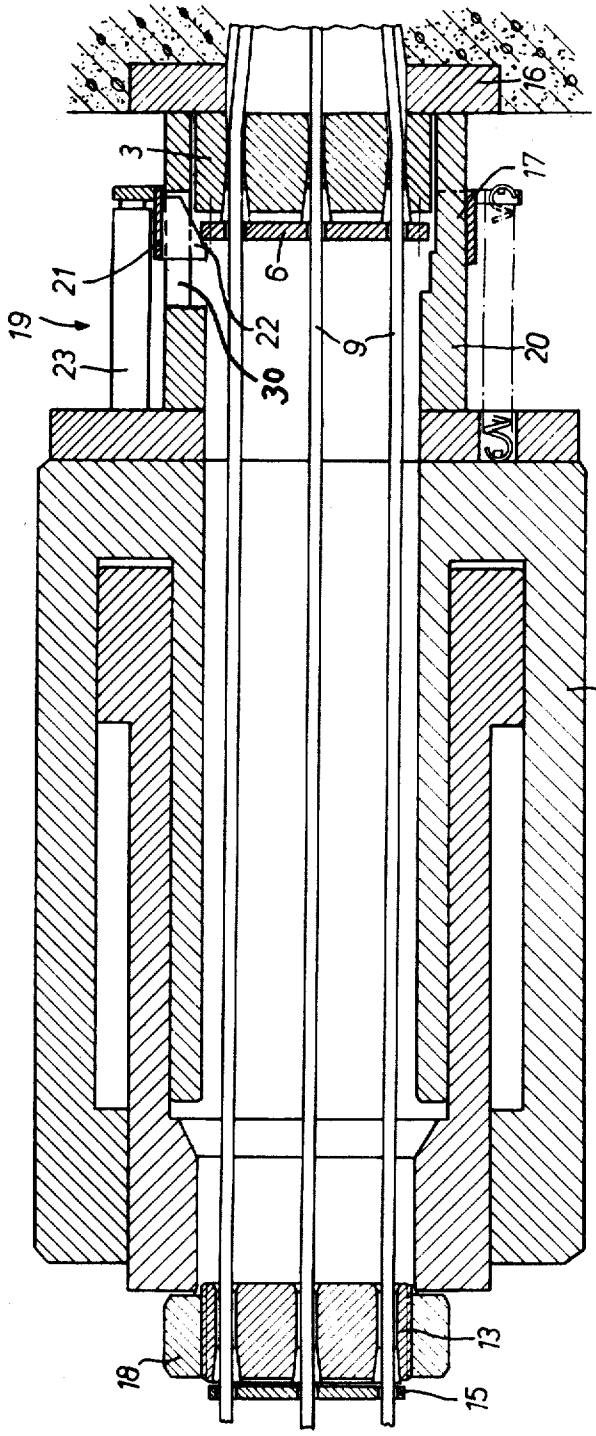


Fig. 4

APPARATUS FOR ANCHORING WIRES OR STRANDED WIRES

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved construction of apparatus for anchoring wires or stranded wires, also referred to as strands, and which apparatus is of the type incorporating an anchor plate equipped with throughpassage bores or holes for the wires or strands and which plate has associated therewith clamping wedges for anchoring the wires or strands, the throughpassage bores being provided at one end with a conical recess for the reception of the clamping wedges and with a subsequently merging cylindrical section.

There are already known to the art a whole series of solutions for the anchoring of wires or stranded wires with the aid of clamping means. The main problem which always again arises with such anchoring techniques concerns the reliability thereof. The following three important conditions should be fulfifilled by such clamping anchoring:

1. As small as possible draw-in of the wedges with respect to the anchor or anchoring plate.

2. As small as possible slip of the wires or strands relative to the clamping means.

3. The clamping means, as a general rule a set of two to three wedges, after anchoring of the wires or strands should not show any relative displacement, that is to say, as nearly as possible all of the wedge ends should be located in the same plane.

Attempts have been made through the use of different means to fulfill these conditions, but either such are cumbersome and unreliable or much too complicated and therefore expensive.

SUMMARY OF THE INVENTION

Hence, it is a primary object of the present invention to provide an improved construction of apparatus for anchoring wires or stranded wires e.g. strands in a manner which overcomes the aforementioned drawbacks and effectively and reliably fulfills the existing need in the art.

Now in order to implement this and still further objects of the invention, which will become more readily apparent as the description proceeds, the above objective, and others which will be apparent from the following disclosure, are fulfilled with an apparatus of the aforementioned type in a most simple and reliable manner in that there are provided means in order to apply the clamping wedges, during application of the apparatus at the wires or strands and during the stressing or tensioning thereof, against a press-in plate arranged at a spacing from the anchor plate and this press-in or pressing plate is provided with perforations or bores, for the throughpassage of the wires or strands, said applying means serving to retain the wedges out of their operable clamping position, and after tensioning of the wires or stranded wires the press-in plate is displaceable towards the anchor plate for simultaneously and uniformly bringing the wedges into their clamping position.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 schematically illustrates a finished prepared anchoring apparatus designed according to the teachings of the present invention incorporating an anchor plate, wedges, springs and press-in plate:

FIG. 2 schematically illustrates the anchoring apparatus in a position during threading-in of the stranded wires or strands;

FIG. 3 again schematically illustrates an anchoring location with the applied tensioning or stressing head and the anchoring apparatus displaced against a building component; and

FIG. 4 illustrates a finished mounted anchoring apparatus after anchoring of the stranded wire or strands.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, it is to be understood that hereinafter there will be described purely by way of example an application of the invention. Initially, the anchoring apparatus of the type depicted in FIG. 1 is assembled together at the workshop or at the building site and if desired packaged, that is to say, initially a spring means 1, in the illustrated exemplary example a respective helical spring formed of metal, is loosely inserted into the widened cylindrical section or portion 2 of the throughpassage bores 2*a* of the anchor or anchoring plate 3. Thereafter the clamping wedges 4, for instance a respective clamping set or unit consisting of two similar wedges is introduced into each conical recess 5 of the anchor plate in such a way that both wedges come to bear at the wall of the conical recesses 5, i.e., in open position. Finally, the press-in plate 6 provided with the holes or perforations 6*a* is mounted in such a way and secured with a number of screws 7, which have only been conveniently schematically represented in the drawing, at the anchor plate 3 that, on the one hand, a space 8 remains between such press-in plate 6 and the anchor plate 3 and, on the other hand, the springs 1 are compressed, so that all of the wedges 4 are pressed against the press-in plate 6. In this way there is achieved the result that initially all of the wedges 4 are retained out of their working or effective clamping position (the stranded wires or strands 9 can move within and along the wedge sets, without the wedges clamping the stranded wires).

The thus prepared apparatus is now ready to be placed upon the bundle or bunch of stranded wires consisting of the individual strands or stranded wires 9. For this purpose the stranded wire bundle must protrude by an amount L out of the building component 11 which is to be pre-tensioned or pre-stressed, as best seen by referring to FIG. 2. The anchoring apparatus is now fixed in suitable manner at the region of the end of the bundle of stranded wires and for instance one strand or stranded wire after the other is introduced through the bores 2*a* of the apparatus, such that the ends of the stranded wires depart by an amount l from the other side of the anchoring apparatus, as best seen by referring to FIG. 2. Since as above-described the clamping wedges 4 are retained out of their effectual or working position, the threading-in of the stranded wires 9 is very easy and can be undertaken quickly, particularly since there is only encountered a minimum of frictional resistance.

When all of the strands or stranded wires **9**, and there can be any number thereof, have thus been introduced and the anchoring apparatus has been mounted at the region of the end of the bundle of strands, then according to the showing of FIG. **3** the tensioning or stressing head **13** can be applied to the outermost end of the bundle of stranded wires and wedges **14** can be force-lockingly secured to the stranded wires, for instance with the aid of the threadably connected plate **15**.

Now the anchoring apparatus can be easily and quickly displaced against the support plate **16** at the building component **11** until it rests at this location, and it is to be observed that at this time all of the wedges **4** are still not in their effectual wire clamping position. Now a tensioning or stressing apparatus **17** is pushed over the tensioning head **13** and the anchoring apparatus and the tensioning nut **18** is screwed on to the tensioning head **13**; the tensioning apparatus is suspended for instance at a suitable lifting tool and can be secured to the support plate **16** (FIG. **4.**).

At this point it is still further mentioned that prior to beginning and during the entire now following tensioning or stressing operation all of the wedges **4** of the anchoring apparatus bear under spring pressure against the press-in plate **6**. As soon as the final tensioning force of the bundle of stranded wires has been reached, then by means of a pressing mechanism **19** at the tensioning apparatus the press-in plate **6** (which according to the invention can be displaced towards the anchor plate **3** and thus against the force of the springs **1**) is pressed against the wedges and such are uniformly pressed into the corresponding conical recesses **5**. During releasing of the tensioning force of the tensioning apparatus the wedge press-in force continues to be effective and ensures that all of the wedge ends will be located in one plane until reaching the final locking position.

In this way the aforementioned three conditions set forth at the outset of this disclosure have been fulfilled, and which conditions are placed upon such wedge anchoring for reasons of security, and in particular there is achieved the result that none of the individual wedges in a wedge set will shift relative to one another.

This will only be attained if, in contrast to other proposed solutions, right from the start all of the wedges positively bear under spring force against the press-in plate **6**, and not as with the prior art solutions more or less reliably bear only during the tensioning operation; in so doing the press-in plate **6** must be able to move against the anchor plate **3** so that such release of the tensioning press or apparatus the press-in plate can be employed for pressing-in the wedges **4** and all wedges **4** uniformly arrive at their final position. It has been intentionally avoided to merely rely on the effects of friction to introduce the wedges, which at the start are still loosely seated, into their conical seats. Such solution appears to be unreliable and can lead to varying great slip of the wedges and stranded wires, something which makes questionable the reliability of the wedge anchoring.

FIG. **4** demonstrates an apparatus **19** for the purpose of pressing the press-in plate **6** and thus the wedges **4** against the anchor plate **3**. This apparatus consists of a ring-shaped body **21** which possesses cams or dogs **22** which extend inwardly through openings **30** in the wall of part of the tensioning apparatus or press. These cams **22** can come to bear against the marginal edge of the press-in plate **6** in order to displace this plate **6** towards the anchor or anchoring plate **3**. The apparatus **19** can be actuated or moved, for instance through the agency of a hydraulic cylinder assembly **23**.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto, but may be otherwise variously embodied and practiced within the scope of the following claims. ACCORDINGLY,

What is claimed is:

1. An apparatus for anchoring wires or stranded wires equipped with an anchor plate having throughppassage bores for said wires or said stranded wires, and which plate has associated therewith clamping wedge means for anchoring the wires or stranded wires, each throughpassage bore possessing at one end a substantially conical recess for receiving the clamping wedge means and subsequently merging substantially cylindrical section, the improvement comprising means for applying the clamping wedge means, during the application of the apparatus to the wires or stranded wires and during the tensioning thereof, against a press-in plate which is located in spaced relation from the anchor plate, said press-in plate being equipped with openings for the throughpassage of the wires or stranded wires, said applying means holding the clamping wedge means out of their effective clamping position, and after tensioning of the wires or stranded wires said press-in plate being displaceable against the anchor plate for simultaneously and uniformly bringing the wedges into their clamping position.

2. The apparatus as defined in claim **1**, wherein said means for applying the clamping wedges against the press-in plate comprises springs arranged in the throughpassage bores of the anchor plate.

3. The apparatus as defined in claim **2**, wherein said springs comprise helical springs and are arranged in widened portions of the cylindrical sections of the throughpassage bores of the anchor plate.

4. The apparatus as defined in claim **1**, wherein means are provided for engaging with the press-in plate in order to displace the press-in plate towards the anchor plate.

5. The apparatus as defined in claim **4**, further including a power source with which there can be connected said press-in plate.

6. The apparatus as defined in claim **5**, wherein the power source is a hydraulically actuated element.

7. The apparatus as defined in claim **1**, wherein the spacing between the anchor plate and the press-in plate and the free throughpassage between the clamping wedge means is so large and the clamping wedge means are retained out of their effective clamping position such that the throughpassing wires or stranded wires do not bring the clamping wedge means by the action of friction into their clamping position and the frictional force first then occurs when, after the tensioning operation, the press-in plate has been pressed against the clamping wedge means.

* * * * *