

PATENT SPECIFICATION (11)

1526 179

10

- (21) Application No. 24511/77 (22) Filed 13 June 1977 (19)
 (31) Convention Application No. 8512/76 (32) Filed 2 July 1976 in
 (33) Switzerland (CH)
 (44) Complete Specification published 27 Sept. 1978
 (51) INT. CL.³ E04G 21/12
 (52) Index at acceptance

F2G G3 GX
 E2B 6C1A



(54) WEDGE PUSH-IN APPARATUS FOR A WIRE TENSIONING PRESS

(71) We, BUREAU BBR LTD, Riesbachstrasse 57 Zurich, Switzerland, a Swiss Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a construction of a wedge push-in apparatus for a tensioning press or prestressing jack for a bundle of wires, wherein the wires thereof are intended to be anchored by means of wedges in an anchoring head, and for pushing-in the wedges there is provided a wedge push-in plate which can be actuated by means of length-wise displaceable push-in elements which engage the wedge push-in plate.

Wedge push-in apparatuses of the previously mentioned type are usually directly connected with the front end of the hydraulic tensioning press and form a unit with such press.

For the tensioning of the bundle of wires, protruding out of the concrete structure, the anchoring head together with its anchoring parts and the displaceable wedge push-in plate which is provisionally fixed in place by means of the wedges as well as a tensioning head with the tensioning wedges, are attached to the bundle of wires.

The tensioning press together with the wedge push-in apparatus are positioned by means of its anchoring parts onto the ends of the bundle of wires, and the tensioning head passes through the central opening of the tensioning- and push-in apparatus.

It is further to be mentioned that the push-in apparatus is equipped with an impact or stop flange, this stop flange serving to guide the anchoring head and to press such against the anchoring plate.

In order to actuate the wedge push-in plate there are provided push-in elements. Since these elements, on the one hand, must enable pushing through or insertion of the tensioning head, and, on the other hand, must overlap the wedge push-in plate, in order to actuate such plate for the purpose of anchoring the previously stressed or tensioned wires, the anchoring head must possess an undesirably large external diameter.

Hence, with the foregoing in mind it is a primary object of the present invention to provide a construction of wedge push-in apparatus for wire tensioning presses which is not associated with the aforementioned drawbacks and limitations of the prior art constructions.

Yet a further significant object of the present invention aims at the provision of a construction of wedge push-in apparatus for a wire tensioning press, which apparatus is relatively simple in construction and design, relatively easy to use, economical to manufacture, highly reliable in operation, not readily subject to breakdown or malfunction, and requires a minimum of maintenance and servicing.

Another significant object of this invention aims at the provision of a construction of wedge push-in apparatus which is designed such that there are not required undesired large external diameters of the anchoring head, and further affords reliable pushing-in of the wedges into the anchoring head for the purpose of securely anchoring the wires of a bundle of wires therein.

Accordingly, the invention provides a wedge press-in apparatus for a tensioning press for tensioning a bundle of wires, the individual wires of which can be anchored by means of wedges in an anchoring head, a wedge push-in plate serving to push the wedges in, the apparatus comprising: push-in elements for actuating the wedge push-in plate; a common, lengthwise displaceable support movable out of a starting position; means mounting the push-in elements on the common support for movement transversely of the lengthwise axis between an inoperative position and an operative position, the push-in elements being mounted on the common support in such a manner that with the support means in its starting position the push-in elements are in the inoperative position and are unable to actuate the wedge push-in plate; and means for placement of the push-in elements in their operative position for actuating the wedge push-in plate upon lengthwise displacement of the support from its starting position.

Hence, the previously mentioned problem can thus be satisfactorily solved, since the push-in elements are movable transversely with respect to the lengthwise axis of the anchoring head. Upon pushing through the tensioning head the push-in elements are located in their inoperative position. During pushing-in of the wedges the push-in elements advantageously automatically move into their operative position and overlap the wedge push-in plate.

It is advantageous to arrange the aforementioned push-in elements on the support so as to be retractable and extendable, respectively. According to a particularly advantageous constructional embodiment the push-in elements are pivotably arranged on the support, being pivotable about an axis disposed transversely with respect to the displacement direction of the wedge push-in apparatus. According to an extremely advantageous construction in accordance with the invention, where the support, when not actuated, automatically returns to its starting position, stops means are provided which automatically bring the push-in elements out of their operative position or retain them in their inoperative position when the support is located in its starting position. Furthermore, spring elements are beneficially provided in order to automatically rock the push-in elements into their operative position when the support moves out of the starting position, and stop means are provided which limit such pivotal or rocking movement. It is especially preferred to construct the push-in elements in the form of pivotal arms, and the end of each arm neighbouring the pivot axis strikes against a stop when the support moves into the starting position, in order to rock the arms out of the work or operative position.

The aforementioned support for the push-in elements is advantageously constructed as a ring or in the form of a sleeve-like collar, respectively, surrounding the body of the apparatus, and which ring or collar can be shifted by means of hydraulic presses or equivalent structure. The return of the support into its starting position is accomplished advantageously with the aid of springs when the hydraulic presses are not under load.

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 accompanying drawings wherein:

Figure 1 schematically illustrates a press equipped with a wedge push-in apparatus of the prior art;

Figure 2 is a longitudinal sectional view through another type of a tensioning press equipped with a wedge push-in apparatus

and constructed according to the present invention;

Figure 3 is a longitudinal sectional view, taken to one side of the lengthwise axis of a wedge push-in apparatus constructed according to another embodiment of the present invention; and

Figure 4 is a schematic cross-sectional view through the apparatus structure shown in Figure 3.

Describing now the drawings, in Figure 1 there is illustrated a prior art wedge push-in apparatus 1 which is connected by means of a flange 2 with the actual wire tensioning press 3.

The individual wires 4 of the bundle of wires are anchored by means of wedges 5 in an anchoring head 6 which bears against an anchoring plate 7 mounted in the concrete structure 8. This state-of-the-art wedge push-in apparatus 1 is equipped with a wedge push-in plate 9 which can be displaced against the wedges 5, following tensioning or stressing of the wires 4, by means of fixed, lengthwise displaceable push-in or clamping elements 10, in order to simultaneously place the wedges 5 in their clamping position. The push-in or clamping elements 10 are arranged on a ring 11 which can be axially shifted or displaced by means of hydraulic presses 12. The push-in elements 10 can be again returned back into their starting position by means of tension springs 13 which engage at one end at the flange 2 and at the other end at the ring 11. The push-in elements 10 arranged at the ring 11—there being provided at least two such push-in elements 10 at the periphery of such ring 11—extend inwardly to overlap the wedge push-in plate 9 through slots 14 provided at the actual body or body member 15 of the push-in apparatus.

The free inner space 16 of the apparatus and the press must be dimensioned, as regards the diameter thereof, such that the auxiliary anchoring head 17 can be guided through such inner space 16.

Now in Figure 2 of the drawing there is schematically illustrated an embodiment of tensioning press 18 constructed as a spindle press and constructed in accordance with of the present invention. The wires 19 of the bundle of wires which are to be tensioning are stressed in a tensioning head 20 at the end of a spindle 21 which is actuated by the tensioning press 18. This tension press 18 is supported, by means of a supporting frame or stand 22 and a wedge push-in apparatus 23, on the concrete structure 24. The tensioned or prestressed wires 19 are anchored conventionally by means of wedges 25 in an anchoring head 26. In order to push the wedges 25 in at the proper moment in time, i.e. before or during reduction of the tensioning force, there is provided a wedge

push-in or press-in plate 27. This push-in plate 27, in turn, is actuated by means of wedge push-in elements 28 and 29 provided on a common support or carrier, like the sleeve-shaped ring or collar 35 illustrated for the embodiment of Figure 3, and such wedge push-in elements 28 and 29 extend inwardly to overlap the push-in plate 27 and laterally through the body of the wedge push-in apparatus 23. The push-in elements 28 and 29 can be displaced by any suitable means, such as hydraulic presses e.g. piston and cylinder units, which have not been here particularly shown but may be like the hydraulic presses 42, 43 provided for the arrangement of Figures 3 and 4. In order to maintain the inner space of the apparatus free from any superfluous protruding parts, the push-in elements 28 and 29 are mounted to be displaceable, as generally indicated by the double-headed arrow 50 of Figure 2. In particular, the push-in elements 28 and 29 may be mounted to be pivotable or shiftable in any convenient fashion, and specifically, in such a manner that during non-use of the equipment, i.e. with the support located in its starting position, these push-in elements 28 and 29 are in an inoperative position in which they do not protrude into the inner space of the apparatus 23 and therefore do not overlap the plate 27, whereas, when necessary such push-in elements can be displaced into their work or operative position as shown in Figure 2 for the purpose of actuating the wedge push-in plate 27.

Continuing, in Figures 3 and 4 there is illustrated a further embodiment of wedge push-in apparatus constructed according to the present invention and which enables smaller dimensioning of the actual anchoring head. By turning attention specifically to Figure 3 there will be seen a section of a particularly advantageous constructional embodiment of wedge push-in apparatus 30 which here is likewise affixed by means of a flange 31 to a hydraulic tensioning press 32. The actual body 33 of the apparatus 30, also with this arrangement, bears by means of a plate 34 upon the concrete structure. A substantially sleeve-shaped ring or collar 35 equipped with a flange 36 forms the support means for the push-in elements 37 for a wedge push-in plate 38. This sleeve-shaped ring or ring member 35 is normally located in the illustrated starting position, i.e. it is retained in such starting position by means of the springs 39 (Figure 4) or equivalent structure. In this position the push-in elements 37, mounted to be inwardly pivotable about an associated pivot shaft or axis 40, contact an upper stop edge 41 of an opening 42 provided in the apparatus body 33 and retain the push-in elements 37 in the illustrated position. In other

words: these push-in elements 37 do not extend into the inner space 60 of the apparatus 30 and thus do not overlap the wedge push-in plate 38. In the embodiment under discussion each of the push-in elements 37 is constructed as a pivotable or pivotal arm, and as explained above, the end of each arm which neighbours the related pivot shaft 40, with the movable support means 35, 36 located in the illustrated starting position of Figure 3, abuts against a stop, here in the form of the aforementioned stop edge 41, in order to rock each such pivotal arm out of its working or operable position where such push-in elements 37 are located so as to overlap the push-in plate 38. These push-in elements 37, of which only one of two diametrically oppositely situated push-in elements 37 has been shown in Figure 3 to simplify the drawing illustration, can be displaced together with the ring 35 in the direction of the wedge push-in plate 38 by means of hydraulic presses 42 and 43 or equivalent structure which engage between the flanges 31 and 36. As soon as the ring or ring member 35 together with the push-in elements 37 has moved in the direction of the push-in plate 38, then each push-in element 37 is pressed by means of a spring 44 automatically into its working or operable position, i.e. into the interior or inner space 60 of the apparatus. A stop or impact pin 45, guided through a bore 46 of the associated push-in element 37, ensures that each such push-in element 37 will not be rocked to an unnecessary extent. A further stop or impact means is formed by the bevelled portion 47 provided at the rear edge of the associated push-in element 37.

As soon as (during displacement of the push-in elements 37 and the ring 35) the push-in plate 38 has brought the wedges 48 into their clamping position, then the hydraulic presses 42 and 43 can be again relieved of their hydraulic loading or vented and the ring 35 together with the push-in elements 37 is returned by the springs 39 back into the starting position shown in Figure 3. With such movement there simultaneously and automatically occurs a pivoting-back of the push-in elements 37 into their starting or inoperative position. In Figure 3 there is shown in broken or phantom lines the operative position of the illustrated push-in element 37, in which position the element protrudes into the inner space 60 of the body 33 of the apparatus 30 and thus overlaps the wedge push-in plate 38.

Now for a proper depression of the push-in plate 38 it is necessary that there be provided at least two diametrically oppositely situated push-in elements. Of course, it would be possible to provide also a greater number of such push-in elements, for instance, three push-in elements arranged at

a uniform spacing about the periphery of the apparatus body.

Finally, Figure 4 of the drawing illustrates a horizontal section through the push-in apparatus shown in Figure 3, purely schematically, there being predominately illustrated the hydraulic presses 42 and 43, the return springs 39 and also the two diametrically oppositely situated push-in elements 37.

WHAT WE CLAIM IS:—

1. A wedge press-in apparatus for a tensioning press for tensioning a bundle of wires, the individual wires of which can be anchored by means of wedges in an anchoring head, a wedge push-in plate serving to push the wedges in, the apparatus comprising: push-in elements for actuating the wedge push-in plate; a common, lengthwise displaceable support movable out of a starting position; means mounting the push-in elements on the common support for movement transversely of the lengthwise axis between an inoperative position and an operative position, the push-in elements being mounted on the common support in such a manner that with the support means in its starting position the push-in elements are in the inoperative position and are unable to actuate the wedge push-in plate; and means for placement of the push-in elements in their operative position for actuating the wedge push-in plate upon lengthwise displacement of the support from its starting position.

2. Apparatus as claimed in claim 1, wherein the push-in elements are mounted on the common support so as to be retractable and extendable relative thereto.

3. Apparatus as claimed in claim 1, wherein the push-in elements are pivotably mounted on the common support.

4. Apparatus as claimed in claim 3, further including means for automatically returning the common support to its starting position, and stop means for automatically

returning the push-in elements to their inoperative position and for retaining them in that position when the common support is returned to its starting position.

5. Apparatus as claimed in claim 4, further including spring means for automatically pivoting the push-in elements into their operative position when the common support is moved out of its starting position, and stop means for limiting the pivotal movement of the push-in elements.

6. Apparatus as claimed in claim 5, wherein each push-in element is in the form of a pivotal arm, the mounting means for the push-in elements comprises a pivot shaft provided for each pivotal arm, and the first mentioned stop means strikes the end of each arm neighbouring its associated pivot shaft when the common support is moved into its starting position, in order to pivot the arm out of its operative position.

7. Apparatus as claimed in any of claims 1 to 6, wherein the common support comprises a ring member surrounding a body of the wedge push-in apparatus.

8. Apparatus as claimed in any of claims 1 to 7, further including means for hydraulically displacing the common support.

9. Apparatus as claimed in any of claims 1 to 7, further including hydraulic press means for displacing the common support out of its starting position, and spring means for returning the support to its starting position.

10. Apparatus as claimed in any of claims 1 to 9, wherein the push-in elements comprise two diametrically oppositely situated push-in elements.

11. Apparatus as claimed in claim 1, substantially as described herein with reference to, and as shown in, Figure 2 or Figures 3 and 4 of the accompanying drawings.

MARKS & CLERK.

a uniform spacing about the periphery of the apparatus body.

Finally, Figure 4 of the drawing illustrates a horizontal section through the push-in apparatus shown in Figure 3, purely schematically, there being predominately illustrated the hydraulic presses 42 and 43, the return springs 39 and also the two diametrically oppositely situated push-in elements 37.

10

WHAT WE CLAIM IS:—

1. A wedge press-in apparatus for a tensioning press for tensioning a bundle of wires, the individual wires of which can be anchored by means of wedges in an anchoring head, a wedge push-in plate serving to push the wedges in, the apparatus comprising: push-in elements for actuating the wedge push-in plate; a common, lengthwise displaceable support movable out of a starting position; means mounting the push-in elements on the common support for movement transversely of the lengthwise axis between an inoperative position and an operative position, the push-in elements being mounted on the common support in such a manner that with the support means in its starting position the push-in elements are in the inoperative position and are unable to actuate the wedge push-in plate; and means for placement of the push-in elements in their operative position for actuating the wedge push-in plate upon lengthwise displacement of the support from its starting position.

2. Apparatus as claimed in claim 1, wherein the push-in elements are mounted on the common support so as to be retractable and extendable relative thereto.

3. Apparatus as claimed in claim 1, wherein the push-in elements are pivotably mounted on the common support.

4. Apparatus as claimed in claim 3, further including means for automatically returning the common support to its starting position, and stop means for automatically

returning the push-in elements to their inoperative position and for retaining them in that position when the common support is returned to its starting position.

5. Apparatus as claimed in claim 4, further including spring means for automatically pivoting the push-in elements into their operative position when the common support is moved out of its starting position, and stop means for limiting the pivotal movement of the push-in elements.

6. Apparatus as claimed in claim 5, wherein each push-in element is in the form of a pivotal arm, the mounting means for the push-in elements comprises a pivot shaft provided for each pivotal arm, and the first mentioned stop means strikes the end of each arm neighbouring its associated pivot shaft when the common support is moved into its starting position, in order to pivot the arm out of its operative position.

7. Apparatus as claimed in any of claims 1 to 6, wherein the common support comprises a ring member surrounding a body of the wedge push-in apparatus.

8. Apparatus as claimed in any of claims 1 to 7, further including means for hydraulically displacing the common support.

9. Apparatus as claimed in any of claims 1 to 7, further including hydraulic press means for displacing the common support out of its starting position, and spring means for returning the support to its starting position.

10. Apparatus as claimed in any of claims 1 to 9, wherein the push-in elements comprise two diametrically oppositely situated push-in elements.

11. Apparatus as claimed in claim 1, substantially as described herein with reference to, and as shown in, Figure 2 or Figures 3 and 4 of the accompanying drawings.

MARKS & CLERK.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1978
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY
from which copies may be obtained.



* C L M S *