

July 14, 1931.

H. ROSENBERG

1,814,966

ART OF ANCHORAGE DEVICES

Filed Jan. 27, 1928

2 Sheets-Sheet 1

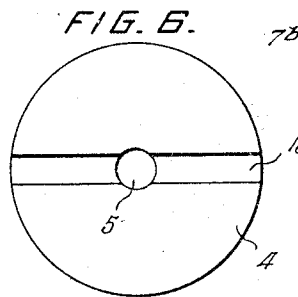
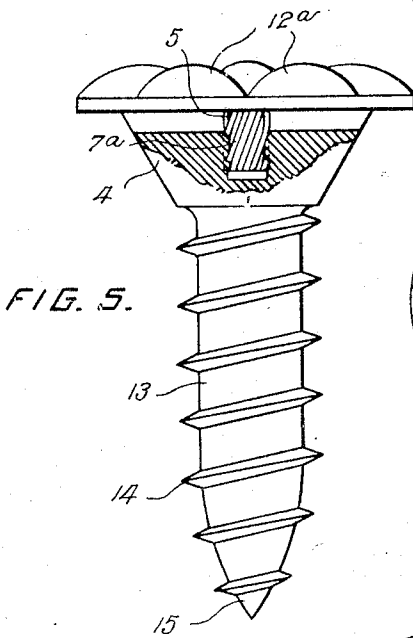
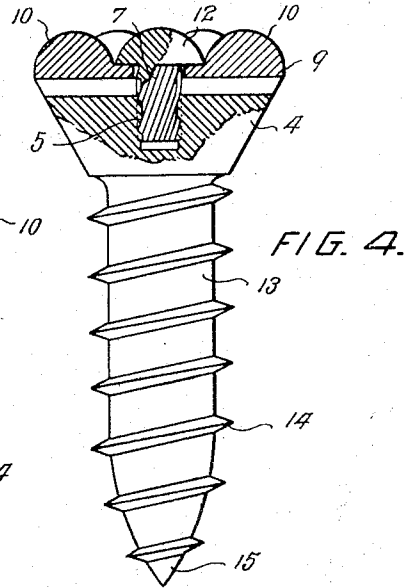
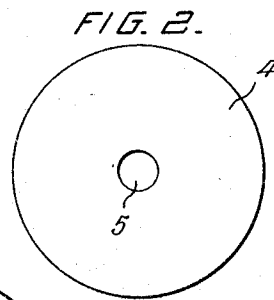
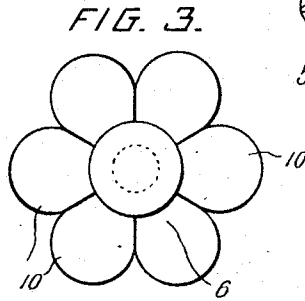
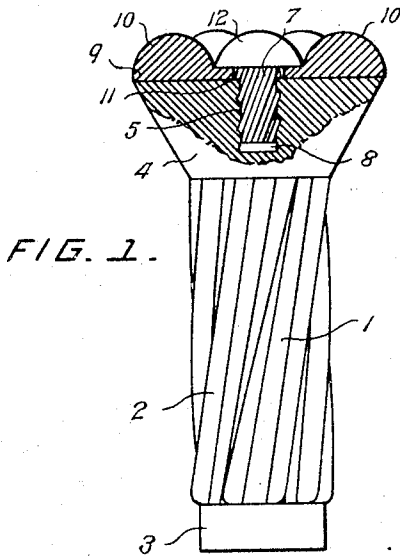


FIG. 7.

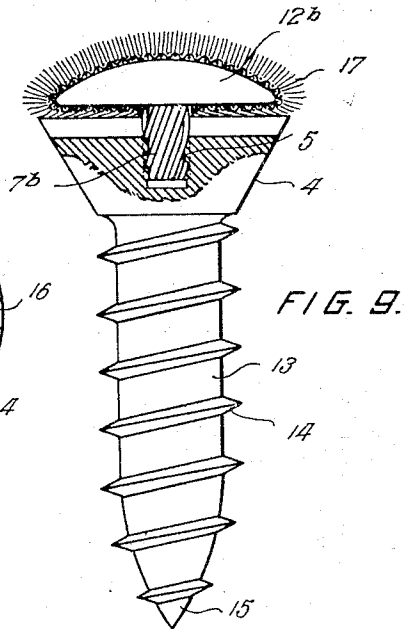
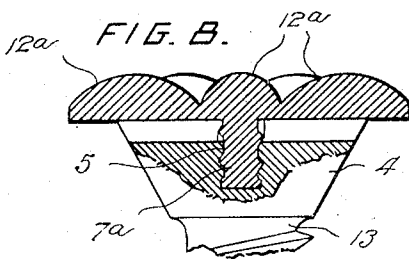
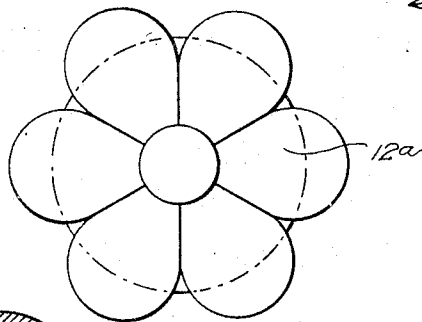


FIG. 9.

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July 14, 1931.

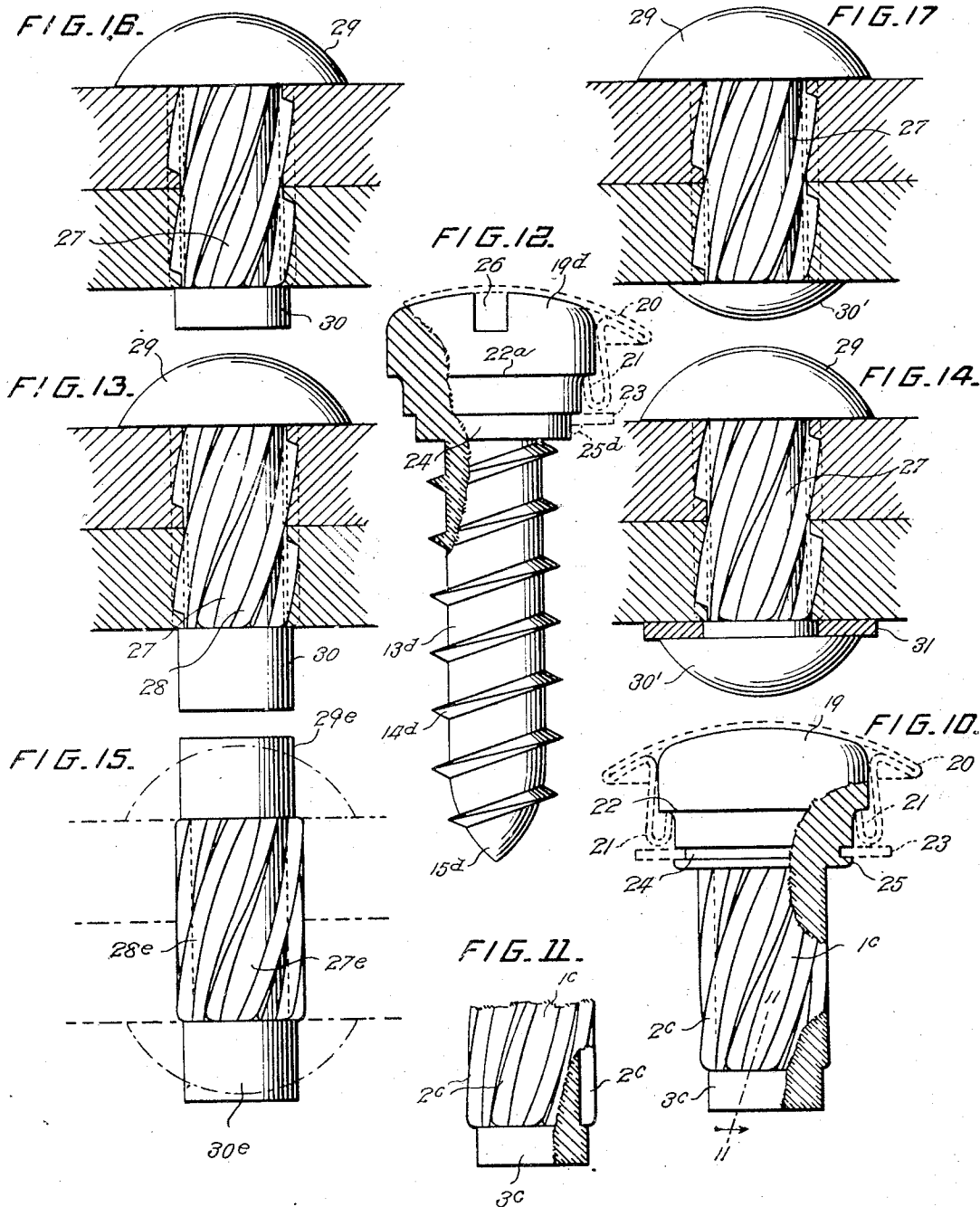
H. ROSENBERG

1,814,966

ART OF ANCHORAGE DEVICES

Filed Jan. 27, 1928

2 Sheets-Sheet 2



Inventor.

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UNITED STATES PATENT OFFICE

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ART OF ANCHORAGE DEVICES

Application filed January 27, 1928. Serial No. 249,900.

This invention relates to improvements in the art of anchorage devices of the character adapted for anchorage in or to metal work and for the securing of separate sheets of metal work together, and more particularly to such devices as are adapted to cause the material of the metal work to flow in a cold condition to a position relative to the anchorage device for resisting withdrawal thereof. For purposes of illustration, but not of restriction, the present invention relates to improvements in that class of anchorage devices under which fall the subjects matter of the following. United States Letters Patents granted to me: No. 1,299,232, dated April 1, 1919; No. 1,411,184, dated March 28, 1922; No. 1,465,148, dated August 14, 1923; No. 1,482,151, dated January 29, 1924; No. 1,485,202, dated February 26, 1924; No. 1,526,182, dated February 10, 1925, and No. 1,545,471, dated July 7, 1925.

The primary object in view is provision for facility in variation of the form, shape, or appearance of a portion or portions of the anchorage device subsequent to the hardening of the work-entering means of such anchorage device.

With this and further objects in view as will in part hereinafter become apparent and in part be stated, the invention comprises the production and product of an anchorage device having a hardened work-entering part and a soft part adapted to be varied in form, shape, or appearance subsequent to the hardening of said entering part.

The invention further comprises the production of an anchorage device having a hardened work-entering part and a soft part adapted for further manipulation subsequent to the hardening.

The invention also comprises an anchorage device of the type and form having a hardened part and a soft part.

The invention further comprises in greater detail an anchorage device having a body provided with a hardened rib and with a relatively soft terminal portion.

The invention still further comprises certain other novel constructions, combinations,

and arrangements of parts, as will be subsequently specified and claimed.

In the accompanying drawings,—

Figure 1 is a view in side elevation of an anchorage device embodying the features of the present invention and produced according to the art thereof.

Figure 2 is an end view of the same before the ornamental cover plate and its anchorage have been applied.

Figure 3 is an end view of the same after the application of said ornamental cover plate and anchorage.

Figure 4 is a view similar to Figure 1 of a modified embodiment of the improved anchorage device.

Figure 5 is a somewhat similar view of a modified form of the anchorage device, the ornamental cover plate being seen in elevation.

Figures 6 and 7 are end views of the structure seen in Figure 5, the former before the ornamental plate has been applied, and the latter afterward.

Figure 8 is a fragmentary view, partly in elevation and partly in vertical central section, through the head portion, ornamental plate, and anchorage pin of the structure seen in Figure 5.

Figure 9 is a view, partly in elevation and partly in longitudinal section, of a further modified embodiment of the invention.

Figure 10 is a view, partly in elevation and partly in section, of a still further modified embodiment of the invention, the section being taken along the cutting edge of a rib.

Figure 11 is a fragmentary, sectional elevation of the entering end portion of the drive screw type of anchorage device as seen in Figures 1 and 10.

Figure 12 is a view similar to Figure 10 of a further modified embodiment.

Figure 13 is a view in side elevation of a modified embodiment of the invention illustrated as applied in work.

Figure 14 is a similar view of the same after the soft terminal has been changed in form.

Figure 15 is a view similar to Figure 13 of

a further modified embodiment, the work being indicated in dotted lines.

Figures 16 and 17 are views of a still further embodiment corresponding to Figures 13 and 14.

A problem has arisen in the use of such anchorage devices as set forth in my above-identified patents especially where a finely finished job is required, such, for example, as the securing of plush, tapestry, and like fine fabrics to the frame and other parts of the interior of closed automobile bodies. To prevent the exposure of what may appear to be either a screw head or a rivet head, it has been proposed to cover the exposed terminus of the anchorage devices securing the fabrics with a snap button or like concealing expedient. My said improved anchorage devices are marketed with ribs or threads hardened so as to enter soft iron or soft steel substantially without injury to the ribs or threads, and as a convenient and inexpensive mode of production, the anchorage devices are customarily case-hardened to provide the requisite hardening of the thread or rib, and this, of course, includes a hardening of the ends of the anchorage device which, accordingly, resist any subsequent manipulation. Attachments applied to either end of any such anchorage device must, therefore, be secured thereto without modification of the respective end portion of the anchorage device. The present invention contemplates providing all of the advantages of the improved hardened thread or hardened rib anchorage device while providing available means forming part of such device susceptible of modification in contour to facilitate subsequent treatment of the anchorage device whether for application of a terminal cover or for other purposes as hereinafter indicated.

One of the important needs is facility of transformation of the appearance of a terminus or termini of such anchorage devices as above discussed. Such transformation may consist of the application of a form of covering or may consist, as hereinafter indicated, of an alteration in the shape of the terminus itself.

The nature of the invention will be better understood by detailed reference to the accompanying drawings, in Figures 1, 2, and 3 of which is illustrated a pin of the type now commonly known as a metallic drive screw (as distinguished from a wood drive screw), the drive screw being of the form and nature set forth in my United States Letters Patent No. 1,482,151, and comprising a body or root diameter 1 having outstanding ribs 2 extending along the body and spirally about the same at a relatively high pitch, the ribs being hardened sufficiently for entering metal, such as soft iron or soft steel, substantially without injury to the ribs, and being proportioned, spaced, and located for causing ma-

terial entered by the ribs to flow into the valleys between the ribs and into intimate contact with the sides of the ribs and with the root diameter 1 when the device is driven into work by having the entering end or pilot 3 inserted into a bore in the work of a size snugly receiving the pilot and then being hammer driven or otherwise forced into the work by axially exerted pressure. The entering end portion 3 is referred to as a pilot because it functions to guide the pin during its advance into work and this guiding action includes maintenance of the pin in a rectilinear path for effecting the required action of the ribs with respect to the work into which they are entering. At the opposite end from the pilot 3, the body or root diameter 1 is provided with a head 4, all constructed in substantial accordance with the details of contour set forth in my last above-identified patent. It is important to note that, by preference, the pilot 3 is of greater diameter than the diameter of the body 1 so as to afford an interlocking shoulder presented upward or toward the head 4 across and closing each of the valleys between ribs 2, as will become apparent by reference to Figure 11 of the accompanying drawings.

In the embodiment illustrated in Figures 1, 2, and 3, the head 4 is drilled or otherwise formed with an axial bore 5. The pin or anchorage device, consisting essentially of the parts 1 and 2 with the parts 3 and 4 preferably also present, is case-hardened by preference for providing the required hardness of the ribs 2. The case-hardening process is preferably carried out in the usual manner of cyanide case-hardening, so that the pilot 3 and head 4 are also hardened when the ribs and surface of the body or root diameter 1 are hardened. Care is exercised to harden the threads to a degree sufficient to enable them to cut or enter metal, such as soft iron or soft steel, substantially without injury to the threads, without hardening to the point of brittleness. It is possible, of course, to harden only the ribs and leave the head 4 soft, or the head 4 and pilot 3 soft, by a quenching process restricted to the ribbed areas of the root diameter 1. That is to say, the head 4 and pilot 3 (if the pilot 3 is to be soft) may be covered with heat insulating material, and the middle area of the ribbed portion of root diameter 1 may be placed in position to intersect the arc of an electrical furnace, and then the quench may be applied only to middle portions of the root diameter 1 until the required tempering and hardening of ribs 2 is effected without appreciably hardening the head 4 or the pilot 3. This is, of course, an involved, delicate and difficult process and will not ordinarily be preferred although well within the intent and scope of the present invention. A better commercial expedient in the matter of producing a hard-

ened rib or hardened thread body consists in case-hardening the entire anchorage device, including the body 1, ribs 2, pilot 3, and head 4, by the cyanide process, or otherwise as preferred in the usual way. Afterward, the head 4 is annealed by dipping into molten metal to "draw" the temper and is then allowed to cool slowly to leave the head 4 soft while the ribs and surface of the root diameter 1 remain hardened. The conditions under which the temper drawing process is carried out may be varied substantially as well known to those skilled in the art, but for illustrative purposes, the dipping of the head 4 into molten metal (such as lead or solder) at a temperature of approximately 600° F. will effect the result desired. If the pilot 3 is desired to be softened, the temper will be drawn in the same manner. Or the temper may be drawn from the head 4 or pilot 3 by introduction into a highly heated bath of tempering oil subsequent to the regular case-hardening process. Annealing in the oil bath may be accomplished at lower temperature than stated for the molten metal bath, but the parts must be held in the bath proportionally longer.

A further and very effective method of obtaining pins or drive screws embodying the present invention comprises first electro-plating the parts to be left soft and then case-hardening as usual, the electro-plated parts resisting entry of the cyanide into the pores of the metal and thereby causing the electro-plated part to remain soft. For example, when the drive screw or pin is completed except for the hardening process, the body or root diameter and ribs of the pin and any other part to be hardened may be coated with shellac or other resisting substance, the balance of the pin being then "pickled" or otherwise thoroughly cleaned. The drive screw is then introduced into the electro-plating bath and plated on that part or those parts not protected by shellac. Other plating resisting means may be used than an added lacquer or coating of course, as, for instance, the oil and other foreign matter accumulated during manufacture under some conditions will adequately resist plating. Copper is preferably employed as the plating metal, but, of course, any other acceptable metal may be used. The drive screw is the ready for the case-hardening operation, which may be carried out without any variation from the regular process of producing drive screws completely case-hardened. But the result will be a hardened-thread product with a soft head or other soft part or parts according to the extent of the electro-plating.

Whatever process or method is employed, when applied to the pilot 3, it is preferable to leave at least the upper surface of the upper end of the pilot (the "upper" referring to the direction toward the head of the drive

screw) hard or sufficiently hard to effectively assist in resisting withdrawal stresses.

Thus the finished anchorage device has the appearance and functional capacity in every detail of the anchorage device disclosed in my said United States Letters Patent No. 1,482,151, except that the head 4 is not hardened and in some instances, hereinafter discussed, the pilot 3 may also be soft. It should be borne in mind that the terms "hard" and "soft" herein employed are intended to have that significance regularly accepted by those skilled in metal working, and particularly in the working of iron and steel wherein hardened iron and hardened steel are well known and distinct from soft iron or soft steel.

When the anchorage device as seen in Figure 1 is applied to the work, so that the end of the head 4 is exposed, as seen in Figure 2, a finished appearance may be given to it in any of various ways, as, for example, by the provision of an ornamental cap 6, which may be secured to the head 4 by various appropriate securing means, one of which is shown in Figure 1, and consists of a drive screw 7 identical in form and function with the anchorage device set forth in my said United States Letters Patent No. 1,482,151. The pilot 8 of the drive screw 7 is dimensioned to be snugly received by the bore 5 of head 4, and the ribs or threads of the drive screw 7 enter the material of the head 4 and cause it to flow to an interlocking position so as to permanently anchor the ornamental cap 6 on the head 4 to give the finished appearance desired. The ornamental cap 6 may assume any of numerous configurations, one of which is illustrated in the drawings as consisting of a plate 9 provided with ornamental bulbous or foliate marginal lobes 10, and provided with a central apertures 11 for the passage of the drive screw 7. The head 12 of drive screw 7 is proportioned to correspond to the bulbous lobes 10 and give a finished floral appearance. Any other desired ornamental configuration may be similarly utilized.

In Figure 4 the anchorage device, so far as the present invention is concerned, is identical with that seen in Figures 1, 2, and 3, and the same reference numerals have, therefore, been applied to the head and its associated parts, the balance of the showing including a body or root diameter 13 being provided with the hardened gimlet screw threads 14 extending to the tip of the tapered entering end 15. Obviously, the difference between the showing in Figure 1 and in Figure 4 is the difference between two of my patented anchorage devices, and illustrates the application of the present invention to the hardened thread gimlet screw type of anchorage device. The description of the present invention above given as applied to Figure 1 is, therefore, equally applicable to Figure 4.

In Figures 5 to 8 inclusive, the same an-

chorage device as seen in Figure 4 is illustrated having the same head 4, the head 4 being of soft metal while the root diameter 13 and thread 14 are hardened. The head 4 is provided with the kerf or slot 16, as seen in Figure 6, for receiving the screw-driver or rotating instrument when the anchorage device is being applied. The head is formed with the central bore 5, the same as in Figures 1 and 4, to receive the shank 7^a of a drive screw identical with the drive screw 7, except that the head of drive screw 7^a is formed up into an ornamental configuration 12^a. In other words, the part 12^a takes the place of the parts 12, 10, and 9 of Figure 1, and the part 12^a has the drive screw body portion 7^a outstanding as an integral projection therefrom, so that there is no need for assemblage of parts when the drive screw 7^a is inserted into place.

In Figure 9 the same form of anchorage device as seen in Figures 4 to 8 inclusive is employed, and the same reference numerals have been applied, and the same description will equally apply. The head 4 of the anchorage device 13 of Figure 9 is provided with the same central bore 5 as the head 4 in the several other figures to receive the drive screw 7^b which is formed integral with or otherwise carries the head 12^b, which is covered with an appropriate fabric 17. The fabric 17 is of the same material as the fabric lining or other fabric finish which is to be secured in place by the anchorage device 13 of Figure 9, so that, when the anchorage device is in position with the head 4 exposed, it is only necessary to insert the pilot of the drive screw 7^b into the exposed end of bore 5 and to strike the head 12^b a hammer blow to drive the drive screw 7^b to its seated position in the bore 5. The blow delivered to the head 12^b must, of course, be received by the fabric 17, but the blow is not of sufficient force or extent to injure the fabric. This will be appreciated from the proportionally relatively small size of the drive screw 7^b with respect to the area of the head 12^b. The fabric 17 will have been drawn to the under side of the head 12^b before application of the drive screw 7^b in aperture 5, and thus, when the drive screw 7^b is seated, as seen in Figure 9, the marginal portions of the fabric 17 will be clamped between the head 12^b and the outer surface of the head 4. Thus quick, easy, and effective anchorage of an ornamental and beautifying finish is permanently secured to the anchorage device and sufficiently modifies the appearance thereof as to destroy the suggestion of a mere head of a screw or rivet head.

In Figures 10 and 11 is shown a slight modification, being practically identical in the matter of the type of anchorage device seen in Figure 1, except that the pilot is indicated as case-hardened, but differing from

Figure 1 in the contour of the head. In these figures the body or root diameter 1^c is provided with the ribs 2^c and the pilot 3^c, which outstands beyond the root diameter to provide the shoulders 18 after the manner seen in Figure 5 of the drawings of my United States Letters Patent No. 1,482,151. The exposed or head end of the root diameter 1^c is formed into a head 19 of substantially conventional contour for receiving the conventional snap button 20, which may have any fanciful or beautifying finish. In the common commercial forms of such devices, the snap button 20 is removably secured by spring arms 21 engaging an overhanging shoulder 22 of the head 19 for retaining the button 20 firmly in place, except when the button is subjected to a very substantial withdrawing stress, under which the springs 21 will give sufficiently to allow the button to be removed. To facilitate accurate seating of the button 20, it is customary to provide an annulus or washer 23 located at the upper or outer extremity of the body or root diameter 1^c, and heretofore customarily held in place merely by radial serrations outstanding from the body of the anchorage device or from the lower reduced portion of the head and biting into the inner perimeter of the washer or annulus 23.

However, with the present invention utilized, the head 19 is sufficiently soft to be altered in contour after the completion of the hardening process for the ribs 2^c, and, therefore, the head is provided with a cylindrical portion 24 proportioned to receive the annulus 23, whereupon material of the head 21 is stamped out into a flange 25 underlying portions of the annulus 23 and securely retaining the same in place to provide the limiting and guiding abutment for the inner extremities of the springs 21. In applying the structure of Figures 10 and 11 to work, the application is made in the usual manner by a hammer blow delivered to the head 19 after the pilot 3^c has been introduced into the aperture formed in the work to receive it. The annulus 23 will have been applied at the factory where the anchorage device was made, and is, therefore, in place at the time the anchorage device is driven into the work. As soon as the anchorage device is seated, or at any time thereafter, the operator may snap one of the buttons 20 over the head 19 and the work is finished.

In Figure 12 is illustrated the gimlet screw type of anchorage device identified as the body or root diameter 13^d having the hardened thread 14^d extending to the tapering tip 15^d to function in the manner of the usual gimlet thread anchoring device. The opposite end from the tip 15^d is provided with a head 19^d similar in all respects to the head 19, except that a kerf or slot 26 is formed in the head 19^d to receive the screw-driver or

other rotating instrument, since the anchorage device is intended to be threaded into place by rotation instead of being driven to place as occurs with the structure seen in Figure 10. The head 19^d is provided with the shoulder 22^a to interlock with the spring catches 21 of the snap button 20, and said head 19^d is also provided with a cylindrical boss 24 to receive the annulus 23. The boss 24 is designed to be stamped up to form a burred-like flange 25^d, indicated in dotted lines, to lock the annulus 23 in place. The operation of the structure seen in Figure 12 will be the same as that described with respect to the structure seen in Figure 10, except that the anchorage device of Figure 12 is rotated to its seated position instead of being hammer driven thereto.

In Figures 13 and 14 is illustrated a further adaptation of the invention to the anchorage devices of the character seen in my United States Letters Patent No. 1,482,151, in which the usual body portion or root diameter 27 is provided with the ribs or threads 28, and at one end formed with a head 29, and at the other with a pilot 30. The structure may be identical with that shown in my last above-identified patent, and, of course, the threads or ribs 28 are hardened, but, by preference, the pilot 30 is slightly elongated and is left or made soft after the manner above described; so that, when the fastener is applied to the work, as seen in Figure 13, it may have the pilot terminus varied in appearance by being swaged into the appearance of a rivet head 30'. Also, an annulus 31 may be applied to the pilot before the swaging is done, so that the final appearance will be that seen in Figure 14. This modification does not materially add to the capacity of the anchorage device, since the anchorage device has already been proved to possess a capacity exceeding that of a rivet, but it does afford a finished appearance acceptable in some work where the projecting pilot is not acceptable, as, for example, in structural ironwork where building regulations require swaging, and such regulations cannot be modified except by legislative consent.

In Figures 16 and 17 is illustrated substantially identically the same structure as seen in Figures 13 and 14, and the same reference numerals have been applied, since the only difference is the fact that the pilot 30 of Figure 16 is not elongated and the annulus 31 is not employed in Figure 17. All other features being identical, the same description as that of the structures seen in Figures 13 and 14 is applicable.

In Figure 15 is illustrated a further slightly modified embodiment in which the root diameter or body 27^e is provided with the usual hardened ribs 28^e and a pilot 30^e at one end and a projecting end portion 29^e at the other

end. The part 29^e is identical with the pilot 30^e and both are made soft or retained soft while the ribs 28^e are hardened. Thus, either end of the anchorage device may be inserted into work first, and the operation of driving the anchorage device into place will swage up the projecting end 29^e (assuming that to be the driven end) and the pilot 30^e may be similarly swaged up after the anchorage device has been seated, so that the parts will take the position indicated in dotted lines and give the appearance of a rivet for the purposes indicated above with respect to Figures 13 and 14.

It should be obvious that in every instance where a portion of the anchorage device is made or left soft and is, therefore, susceptible of modification in appearance or in function or both, that fact in no sense interferes with the regular functioning of the anchorage device for anchorage purposes, and that fact also does not demand the actual modification of which the part is capable. Also, the advantages and utilities indicated and set forth above in the provision of a soft part or parts to an anchorage device having hardened parts indicate some of the desirable reasons for the present invention, others being apparent.

It will, of course, be understood that the drive screw 7, or its equivalent 7^a or 7^b, will be preferably anchored in place by the usual hammer blow, but may be forced axially by any means affording the requisite pressure to seat the drive screw and to cause the ribs thereof to enter the material of the surrounding walls and cause the same to flow to the impinging and interlocking position required. Also, it will be observed that the anchorage devices seen in Figures 4, 5, 9, and 12 are of the form referred to as gimlet thread type, the body of the structure as seen in each of Figures 4, 5, and 9 terminating in an entering tip 15, and, as seen in Figure 12, in a similar entering tip 15^d. The wide angle, low pitched thread employed produces a structure closely simulating in physical appearance that of an ordinary wood screw, except that the body or root diameter in each instance of the structures seen in Figures 4, 5, 9, and 12 is cylindrical for the major portion of its length and tapers only at the entering end portion. Anchorage devices of this general type having a hardened thread have become popularly known on the market as sheet metal screws.

The utility of the soft part of an otherwise hardened anchorage device has in the foregoing discussions been largely assumed to lend adaptability to change in form, function or appearance, but obviously the soft part may be provided for other uses and purposes, such as increasing the bearing on the exposed portions of the work or eliminating a protruding projection.

While several illustrative embodiments of hardened devices for anchorage have been described and others adverted to herein, all for use with metal work, such as soft iron or soft steel, and other hard substances, such as fiber, bakelite, hard rubber, and the like, the present invention is not limited to such illustrative instances but includes any anchorage device wherein a part is hard in order to assist in the anchoring action and a part is soft in order to facilitate further manipulation, whether for increasing the effectiveness of the anchorage or for varying the appearance or character of the anchorage device or any part thereof.

The modification in appearance of the entering end of the anchoring device as seen in Figures 14 and 17 may be further varied by the carrying out of an operation such as conducted with reference to the structures seen in Figures 1, 4, 6 and 9, in regard to the ornamentation of the head; or the soft part or soft parts may be otherwise treated as found desirable incident to their soft condition.

Specific claims on the details of the construction of the head of the fastener seen in Figure 10 are presented in my co-pending, divisional application Serial No. 362,019, filed May 10, 1929.

What is claimed is:—

1. An anchorage device comprising a metal pin having a hardened portion and a soft portion, the hardened portion having an outstanding projection shaped to cause the hardened condition to contribute to the anchorage capacity of the device, and the soft portion being adapted to be manipulated incident to its soft condition.

2. An anchorage device comprising a metal pin having a hardened portion adapted to embed itself in metal work incident to its hardened condition and a soft portion, the soft portion being adapted to be manipulated incident to its soft condition.

3. A driven fastener adapted to be embedded in work comprising a metal pin having a hardened portion adapted to enter the material of work incident to its hardened condition and a soft terminal portion adapted to be manipulated incident to its soft condition.

4. An anchorage device comprising a metal pin having a hardened rib for anchorage in work and having a soft portion adapted to be manipulated incident to its soft condition after such anchorage.

5. An anchorage device comprising a metal pin having a hardened rib for anchorage in work and having a soft portion adapted to be manipulated incident to its soft condition after such anchorage, said rib having a spiral pitch.

6. An anchorage device comprising a metal pin having a hardened rib and a soft pilot,

the pilot being adapted to be manipulated incident to its soft condition after anchorage of the pin in work.

7. An anchorage device comprising a metal pin that having a hardened portion adapted to be anchored in work and a soft pilot for said hardened portion, the pilot being adapted to be manipulated incident to its soft condition after anchorage of the pin in work.

8. An anchorage device comprising a metal pin having a body portion and a hardened rib outstanding from said body portion to enter material of surrounding work, the pin having terminal portions extending beyond the terminal portions of the ribbed body portion, and said terminal portions being soft.

9. An anchorage device comprising a metal pin having a body portion and a hardened rib outstanding from said body portion to enter material of surrounding work, the pin having terminal portions extending beyond the terminal portions of the ribbed body portion, and said terminal portions being soft and being of a diameter greater than the diameter of said body portion, and the rib outstanding laterally beyond the extended lines of said terminal portions.

10. An anchorage device comprising a metal pin having a hardened rib and soft terminal portions, each of the terminal portions being adapted to be manipulated incident to its soft condition.

11. An anchorage device comprising a metal pin having hardened outstanding ribs extending generally in the direction of the length of the pin and adapted to enter material of work incident to their hardened condition for effecting anchorage of the pin in work, the pin having soft terminal portions each of a diameter less than the distance between diametrically opposite outstanding edge portions of the ribs.

12. An anchorage device comprising a pin-like body portion having hardened outstanding ribs extending generally in the direction of the length of the body portion and having soft terminal portions, each of the terminal portions being of greater diameter than the diameter of the body portion at the base of the ribs and of less diameter than the distance between diametrically opposite outstanding edge portions of the ribs.

13. An anchorage device comprising a metal pin having a hardened portion adapted, incident to its hardened condition, to be anchored in work and a soft portion formed with anchorage receiving means.

14. An anchorage device comprising a metal pin having a hardened portion adapted, incident to its hardened condition, to be anchored in work and a soft portion formed with a recess for receiving a hardened anchorage device.

15. An anchorage device comprising a metal pin having a hardened portion adapt-

ed, incident to its hardened condition, to be anchored in work, and a soft head.

16. An anchorage device comprising a metal pin having a hardened portion adapted, incident to its hardened condition, to be anchored in work and a soft head, the head being adapted to have portions of its mass flowed while cold to a position for anchoring an article thereto.

17. An anchorage device comprising a metal pin having a hardened portion adapted, incident to its hardened condition, to be anchored in work and having a soft portion adapted to have a portion of the mass thereof flowed while cold for anchoring an article thereto.

18. An anchorage device comprising a metal pin having a hardened portion adapted, incident to its hardened condition, to be anchored in work and a soft portion at its end opposite its entering end, and said soft portion being formed with anchorage-receiving means.

19. An anchorage device comprising a ribbed shank having a smooth entering end portion, said shank and entering end portion being hardened to such a degree as to enable entry thereby of hard material without bending, and a head portion on the other end of the shank, said head portion being malleable and being formed integral with and of the same material as the shank.

20. A one-piece anchorage device comprising a shank having an entering end portion, the shank and entering end portion being hardened to a degree sufficient to enable entry of relatively hard material without bending, and a head portion on the other end of the shank integral therewith and of the same material as the shank, said head portion being malleable and enabling the shank to be driven by hammer blows delivered to the head portion.

21. A one-piece anchorage device comprising a shank having an entering end portion, and a driving end portion opposite the entering end portion, the said entering end portion being hardened to a degree sufficient to enable the same to enter relatively hard material without bending the shank when driven by blows applied to the driving end portion, the said driving end portion being relatively soft and of the same material and integral with the entering end portion, and the driving end portion being adapted incident to its soft condition to provide anchorage for means to be connected thereto.

22. An anchorage device comprising a metal pin having a hardened portion adapted to be anchored in work incident to the hardened condition, and a soft portion adapted to provide an anchorage base incident to its soft condition, the hardened and soft portions being integral and of the same ma-

terial, and means anchored to said base for varying the apparent character thereof.

23. An anchorage device comprising a metal pin having a hardened portion adapted to be anchored in work and a soft portion, and a hardened anchorage device anchored in said soft portion.

24. An anchorage device comprising a metal pin having a hardened portion adapted to be anchored in work and a soft terminal portion, a cover for said terminal portion, and a hardened anchorage device extending into the material of said soft portion for securing said cover thereto.

25. An anchorage device comprising a metal pin having a hardened portion adapted to be anchored in work and a soft portion, and a ribbed hardened pin anchored in said soft portion.

In testimony whereof I affix my signature.
HEYMAN ROSENBERG.

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