This invention relates to an improvement in convertible shaver or massage devices, and, more particularly, to an improvement in massage attachments for electric dry shavers to provide an improved convertible electric dry shaver and massage device.

Electric dry shavers which can be held in the palm of one hand are well known and so also are small hand-held electric massage devices which can be used to massage parts of the body such as the face, neck, scalp and the like. Electric dry shavers have received a wide acceptance, whereas this is less true of hand-held massage devices. This is partly so because the massage devices are high cost and are used less frequently than shavers. Therefore, there have been attempts in the past to provide massage attachments for electric dry shavers. These attachments for convertible electric dry shavers and massage devices have not been successful because of their several disadvantages.

Examples of such disadvantages are their high cost and complexity. For instance, the massage attachment may require a change in or addition to the existing shaver, or it may be fairly complex so that the dry shaver can't be quickly converted into a massage device and then back into a dry shaver. Often there are numerous parts which must be taken into consideration in making the change-over. Additionally, there may be loose parts which may fall to the floor or become accidentally misplaced or lost, and tools may be required to make the change-over.

Accordingly, it is an object of this invention to provide an improved massage attachment for electric dry shavers to provide an improved convertible electric dry shaver and massage device which will overcome the disadvantages of the prior art.

It is a further object of this invention to provide a low-cost and uncomplicated unifying massage attachment for an electric dry shaver which can be installed without the use of tools.

It is a further object of the invention to provide massage attachments for electric dry shavers which require no change in or addition to the dry shavers.

A still further object of the invention is to provide an improved massage attachment for an electric dry shaver which has no loose or falling parts and which can be quickly installed in and removed from the dry shaver.

In the preferred form of the invention a low-cost and uncomplicated unifying massage attachment is provided for substitution of a cutting head of an electric dry shaver. By the term unitary attachment, it is meant an assembly which has no loose parts which are likely to fall out of the assembly. The substitution requires no tools and is quickly accomplished in snap-action fashion by using the cutting head retaining means of the shaver as the massage attachment retaining means. The features of the invention which are believed to be novel are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings.

In the drawings, FIGURE 1 is a perspective view of one form of the invention; FIGURE 2 is a top view of the device of FIGURE 1; FIGURE 3 is an enlarged sectional view taken along the line 3-3 of FIGURES 2 and 4; FIGURE 4 is a sectional view taken along the line 4-4 of FIGURE 3; FIGURE 5 is an enlarged top view of the device with the hair retainers in open position and the massage attachment removed; FIGURE 6 is a sectional view similar to that of FIGURE 5 showing a second form of the invention; FIGURE 7 is a sectional view taken along the line 7-7 of FIGURE 6; FIGURE 8 is a sectional view taken along the line 8-8 of FIGURE 6; FIGURE 9 is a sectional view taken along the line 9-9 of FIGURE 6 when the hair retainers are in open position; FIGURE 10 is a sectional view similar to that of FIGURES 3 and 6 showing the shaver with its cutting head; and FIGURE 11 is a sectional view taken along the line 11-11 of FIGURE 10.

Identical reference numerals will be used throughout the various figures of the drawings to indicate identical parts.

The electric dry shaver illustrated in the drawings is currently available on the market and the structural parts thereof are described in detail in copending Jeppson patent application Serial No. 846,012, filed October 22, 1959, and assigned to the same assignee as the instant patent application. The instant patent application is concerned with improved massage attachments for the shaver and their cooperative relationship therewith. Only those parts of the shaver will be described herein which are necessary for a full understanding of the invention. Although the invention is illustrated in connection with a particular form of commercial electric dry shaver it will be obvious to those skilled in the art that the invention is not necessarily restricted thereto.

Referring now particularly to FIGURES 1 to 5 of the drawings, illustrated therein is one form of the invention comprising an electric dry shaver which has been converted into a massaging device. The device comprises a casing 1 which can be conveniently cupped in the palm of one hand. The casing 1 is partitioned into a motor chamber 2 and a cutting head or massage attachment receiving chamber 3. The casing 1 is partitioned into chambers 2 and 3 by integral portions 4 thereof which comprise the top of the motor chamber 2 and the bottom of the cutting head or massage attachment receiving chamber 3.

The upper end of motor chamber 2 has an opening 5 formed therein which is sealed closed by a compressible seal 6 and a superposed pressure plate 7. The opening 5 is for the purpose of obtaining a drive connection between the motor in motor chamber 2 and the cutting head or massage attachment which is to be positioned in the chamber 3. The motor in chamber 2 is indicated generally by the reference numeral 8, and the massaging attachment in chamber 3 is indicated generally by the reference numeral 9. The massaging attachment drive connection comprises a bell crank lever 10 which has a plurality of arms 11, 12 and 13 which extend through apertures formed in the seal 6 and the pressure plate 7 for engagement with the massaging attachment 9. The compressible seal 6 can be constructed from material such as sponge rubber and snugly surrounds the arms 11, 12 and 13 and closes the opening 5 so as to prohibit hairs or beard particles in chamber 3 from entering the motor.
The compressible seal 6 is disposed on a shoulder or ledge 14 which extends around the opening 5.

Pressure for the pressure plate 7 is provided by a pair of leaf-type springs 15. The chamber 3 is generally rectangular in shape and has a closed bottom and an open top and four side walls. The closed bottom is provided by the members 4, 6 and 7. The end walls of the rectangular-shaped chamber 3 in reality are a pair of hinged hair retainers 16. The hinged hair retainers 16 pivot about an upper surface 17 of parts 4, and they are resiliently hinged about said surfaces for snap-action opening and closing movement by the springs 15. The hair retainers 16 are resiliently hinged to the springs 15 by virtue of trunnion portions 18 formed on the outer ends of the springs 15 which are received in bearing grooves 19 formed in the bottom portion of hair retainers 16 and adjacent opposite sides thereof.

The springs 15 extend from the hair retainers 16 toward the sealed opening 5 and the inner ends thereof are superposed with respect to the pressure plate 7. The springs 15 are stressed and in this manner the inner ends thereof apply pressure to the pressure plate 7. The springs 15 are stressed by integral portions 20 formed on opposite sides and ends of the chamber 3. Portions 20 are separated from the portions 4 by spaces 21. The springs 15 extend through the spaces 21 and the portions 20 engage the upper side of springs 15 approximately midway thereof to provide the resilient snap-action movement of the hair retainers 16 as well as the pressure for compressing seal 6. Springs 15 are retained in position by pins or the like 22 which are formed on the portions 20 and which enter notches 23 formed in the opposite sides of seal 6.

The two opposite side walls for chamber 3 are provided by integral extensions 24 of casing 1 above the motor chamber 2. The portions 24 are the lengthwise extending side walls of the rectangular-shaped chamber 3. The upper edges of the side walls 24 have a pair of lengthwise extending rollers 25 mounted thereon. If so desired, the rollers 25 can be mounted so as be automatically adjustable in an up and down direction in the manner disclosed in the copending Jepson patent application. Also, will be obvious from said copending patent application, the casing 1 in reality is a split casing and there are four parts 20 and the portions 4. Portions 20 are divided into four parts which meet with each other to define the partition for the chambers 2 and 3. In order to remove the springs 15, they must be depressed adjacent their central portions so as to disengage the notches 23 from the pins 22.

Formed adjacent each of the parts 20 and slightly thereabove are ledges 26 on which a base or bottom plate member 27 or the like of attachment 9 rests. The parts 20 have integral upturned portions 28 formed at the outer ends thereof which serve as stops for the hinged hair retainers 16. These portions 28 also assist in properly positioning the attachment 9 in the chamber 3 inasmuch as they are disposed adjacent the corners of base plate member 27. One of the ledges 26 has a lug 29 or the like formed thereon which cooperates with a notch 30 formed in one side of the base plate member 27. By virtue of the elements 26, 28, and 29 and 30, there is adequate assurance that the massaging attachment or the cutting head for the dry shaver is properly aligned in the chamber 3.

The base plate member 27 has a plurality of apertures 31 to 33 formed therein which are aligned with the bell crank arms 11 to 13, respectively. The upper ends of these arms extend into a transverse groove 34 formed in the bottom of a massaging pad 35. When the motor 8 is energized, the bell crank 10 is caused to oscillate which, in turn, causes oscillatory or vibratory movement of the pad 35 in a lengthwise direction. The pad 35 may be constructed from material such as rubber having a hardness of about 50 to 60 durometer.

The opposite ends of the base plate member 27 have end flanges formed thereon such as by welding generally L-shaped members 36 thereto. The upper ends of members 36 have a plurality of lengthwise extending rollers 37 mounted thereon. The rollers 37 are generally aligned with the rollers 25 along a transversely extending plane which has a large radius so as to provide a slight transverse curvature to the massaging portion of the massage attachment 9. This is best seen by viewing FIGURE 4. The rollers 37 are separated from each other by spaces 38. The upper surface of the pad 35 has several rows of spaced elongated projections or the like 39 formed thereon which extend into the spaces 38 and slightly beyond the rollers 37. When the shaver is energized, the projections 39 vibrate back and forth. When these vibrating projections are placed in contact with a surface such as the facial skin, the neck, or a scalp, they provide a stimulating effect which is also healthcare.

The opposite ends of the base plate member 27 have a catch, latch or the like 40 formed thereon which may comprise integral extensions of the base plate member 27. These catches or latches 40 are engaged by lugs or the like 41 formed on the hair retainers 16. The latching cooperation between the elements 40 and 41 provides further assurance for retention of the massage attachment in the chamber 3 and its drive connection with the bell crank lever arms 11 through 13. However, other means is provided as the main means for retaining the massaging attachment in the chamber 3 and its drive relationship with the bell crank lever arms. This is to say, this other means which will now be described is effective even though the hair retainers 16 are moved to open position.

The main massaging attachment retaining means comprises a pair of resilient elements 42 which are disposed on opposite sides of the chamber 3.

In the preferred form of the invention, the resilient retaining means 42 comprise integral side fingers of the pressure plate 7. The material of the pressure plate 7 is selected so that the fingers 42 will have the required degree of resiliency and operate as retaining springs or catches. Thus, the pressure plate 7 performs the dual function of keeping the opening 5 sealed closed and prohibiting the massaging attachment 9 from falling out of the shaver. The latching fingers 42 are suitably bent, such as illustrated in FIGURE 4, to make latching engagement with the opposite side edges of the base plate 27.

The latching fingers 42 are disposed in grooves 43 formed in the internal surfaces of the opposite side walls 24 so as to reduce the width of the upper end of casing 1. The notches 43 perform the additional function of retaining the pressure plate 7 and its fingers 42 in position. Furthermore, the latching fingers 42 will retain the massaging attachment in the chamber 3 even in the event of leaf-type springs 15. This is because the upper ends of the fingers 42 will catch on the upper ends of the grooves 43. Of course, if it is desired to remove the pressure plate 7, this can be accomplished by bending the fingers 42 toward each other slightly so as to free them from the upper ends of the grooves 43.

By comparing FIGURES 10 and 11 with FIGURES 3 and 4, it will be obvious that in the invention no change in or addition to the dry shaver is necessitated by the massage attachment. The retaining means 42 is used for retaining either the cutting head 9 of the dry shaver or the massage attachment. Additionally, similar to the cutting head, the massage attachment can be quickly inserted or removed into the chamber 3 in snap-action fashion without requiring any tools, and the change from the cutting head to the massage attachment, or the reverse, does not introduce any additional parts into the shaver assembly.

As will be described in greater detail hereinafter, the cutting head 9 of the dry shaver is a unitary assembly in that there are no parts which are apt to fall loose from the assembly when it is being installed or removed from the chamber 3. The same applies to the attach-
The pad 35 is a loose part but it will not accidentally fall out of the assembly inasmuch as the maximum height of the pad 35 is such that when the extreme lower portion thereof bottoms on the base plate 27 the protrusions 39 will still be disposed between the rollers 37. Accordingly, pad 35 cannot accidentally fall out from in between the elements 27 and 37. Thus, the movable pad 35 is self-retaining or captive in the removable cage or frame provided by the elements 27, 36 and 37. Of course, the pad 35 can be intentionally removed from in between the elements 27 and 37 by applying a slight sidewise pressure thereto to cause the protrusions 35 to bend 5, 6 and slide out 6.

Referring now to FIGURES 6 to 9, illustrated therein is a second form of the invention which is identical to the first form of the invention insofar as the parts of the dry shaver are concerned, but a slightly different type of massaging attachment is used. Nevertheless, the cooperative relationship between the massage attachment and the electric dry shaver parts is identical to that explained in connection with the first form of the invention. In the second form of the invention, a base plate member 27' is provided which is quite similar to the base plate member 27 previously described. Base plate member 27' has a pair of strengthening ribs 50 integrally formed therein which traverse a central opening 51. These openings 52 receive guide retaining means of a massage pad 35'. The guide retaining means comprise guide extensions 53 which pass through the openings 52 and have retaining enlargements 54 formed thereon.

The massage pad 35' has several rows of aligned massage fingers 39' formed thereon. The fingers 39' are considerably longer than the protrusions 39 of FIGURE 3. Therefore, the second form of the invention may be more suitable for massaging the scalp under thick growths of hair.

Instead of having rollers such as the elements 37 of the first form of the invention, in the second form of the invention lengthwise extending curved but stationary members 37' are provided between the rows of fingers 39'. The elements 37' comprise integral portions of a generally U-shaped frame element or cage designated by the reference numeral 36'. The same element 36' is supported from the base plate 27'. The base plate 27' has pairs of notches 55 formed in the opposite end edges thereof so as to define pairs of tabs 56 or the like. These notches 55 and tabs 56 cooperate with notched tabs 57 formed on the lower ends of the frame 36'. The connection of the frame 36' to the base plate 27' is completed by the integral latching fingers 40 of the base plate 27'. That is to say, inasmuch as the latching fingers 40 are turned in an upward direction, they will keep the notched tabs 57 locked with respect to the tabs 56.

At the first form of the invention, the integral latching fingers 42 of the pressure plate 7 make latching engagement with the side edges of the base plate portion 27' to serve as the main retaining means for the massage attachment of the second form of the invention indicated generally by the reference numeral 9'. In the first form of the invention, it was stated that the casing is a split casing. This is indicated by the interfacial mating surface 58 shown in FIGURE 7. The frame 36' as well as the pad 35' may be constructed from a suitable molded plastic such as polyethylene. The fingers 39' can be molded integrally with the pad 35' as well as the extensions 53 and the enlargements 54. The enlargements 54 can be inserted through the openings 52 by first passing one side of enlargements 54 through openings 52 and then force bending the opposite side of enlargements 54 through openings 52. Thereafter the frame or cage 36' can be passed over the fingers 39' and joined to the ends of plate 27' to complete the assembly. The massage attachment 9' is a unitary assembly in the sense that pad 35' will not fall loose from the assembly by virtue of the enlargements 54. However, if the guide retaining means 53, 54 is omitted the pad 35' will still be self-retaining or captive in the frame or cage provided by parts 27', 36' and 37' by virtue of the height of the fingers 39'. When the motor of the shaver is energized, the fingers 39' will be caused to oscillate or vibrate back and forth, and the second form of the invention provides similar advantages to those set forth with respect to the first form of the invention.

Referring now to FIGURES 10 and 11, the electric dry shaver is illustrated with its cutting head 9' assembled in the chamber 3 and retained therein by the latching fingers 42. The cutting head has a base plate 27" which is very similar to the base plate 27 and 27'. Mounted on the base plate 27" are a plurality of combs 60. The combs 60 are generally U-shaped and have a crossbar 61 connected thereto. The combs are mounted on the base plate 27" by studs 62 which extend through aligned apertures in the base plate 27" and the crossbars 61 which is provided with the operating arms 11 to 13 of the bell crank lever 10.

The upper ends of the operating arms 11 to 13 have plastic rounded sleeves or plugs 66 thereon which enter the corrugations 34' and also the grooves 34 of the massage pads 35 and 35'. The upper surfaces of the combs 60 and the cutting elements 63 are slotted, and when the electric shaver is energized, the operating arms 11 to 13 cause the cutting elements 63 to oscillate back and forth to cut whiskers and the like.

The cutting head 9" is a unitary assembly inasmuch as the cutting elements 63 will not fall out from within the combs 60 when the cutting head 9" is removed from the chamber 3. This is so because after the cutting head 9" is removed, the plugs 66 no longer stress the resilient elements 65. Accordingly, the elements 65 will relax slightly and bottom against the crossbars 61 to frictionally retain the cutting elements 63 within the combs 60. The previously described U-shaped element 63 operatively engaged with a not shown notch formed in the side of base portion 27" similar to that described in connection with the base portions for the massage attachment 9 and 9'. Similarly, the previously described casing portions 26 and 28 cooperate with the base portion 27" to accurately position the same in the chamber 3 in driving relationship with the operating arms 11 to 13. Also, as in the massage attachments, the base portion 27" has integral latching extensions 40 formed on the opposite ends thereof which co-operate with integral portions 41 formed on the inside of the resiliently hinged hair retainer 16.

Also, the opening 5 in the partition 4 which separates the two chambers 2 and 3 is sealed closed by the previously described compressible seal 6 and pressure plate 7. The operating arms extend snugly through the seal 6 and aligned apertures formed in the pressure plate 7 and base portion 27" and crossbars 61. Thus, the same sealing means and main massage attachment retaining means previously described is also used when the device is operated as an electric dry shaver. Accordingly, the invention provides an improved low-cost and uncomplicated convertible electric dry shaver and massage device which is quick and easy to operate without any tools or loose parts which may fall or become accidentally misplaced or lost.

While there have been shown and described particular
embodiments of the invention, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention, and that it is intended by the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A convertible electric dry shaver and massage device comprising, a casing which is partitioned into an attachment chamber and a motor chamber, said chamber having a motor therein, said attachment chamber having a closed bottom and side walls and an open top, unitary shaver and massage attachments alternately receivable in said attachment chamber, a sealed opening in said closed bottom, a motor-to-attachment drive connection extending through said sealed opening, and retaining means in said attachment chamber for quick snap-in installation and snap-out removal of said attachments with respect to said attachment chamber and drive connection.

2. In a convertible electric dry shaver and massage device as in claim 1, a pressure plate for said sealed opening, and said retaining means comprising resilient extensions on said plate which are alternately engageable and disengageable with said attachments.

3. In a convertible electric dry shaver and massage device as in claim 2, said unitary shaver and massage attachments having a base plate member, members formed in said attachment chamber for supporting and positioning said base plate member, and said resilient extensions making resilient snap-action retaining engagement with said base plate member.

4. In a convertible electric dry shaver and massage device as in claim 1, said sealed opening having a compressible seal, a pressure plate for compressing said seal, said retaining means comprising resilient fingers which are formed integral with said plate and extend therefrom adjacent two opposite sides of said attachment chamber for retaining engagement with said base plate member.

5. In a convertible electric dry shaver and massage device as in claim 4, said attachment chamber being generally rectangular in shape, the opposite side walls of said attachment chamber which correspond to the opposite ends of said rectangular shape being resiliently hinged for snap-action open and close movement, and a pair of springs extending from said hinged side walls to said plate for providing said hinged snap-action movement and pressure on said pressure plate for compressing said seal.

6. In a convertible electric dry shaver and massage device as in claim 5, said unitary shaver and massage attachments having a base plate, said resilient fingers making engagement with opposite side edges of said base plate which extend lengthwise of said rectangular attachment chamber, and the opposite ends of said base plate having integral extensions thereon which make resilient-catch engagement with portions of said hinged side walls when in their close position.

7. A convertible electric dry shaver and massage device comprising, a casing which is partitioned into an attachment chamber and a motor chamber, said motor chamber having a motor therein, said attachment chamber being generally rectangular in shape and having a closed bottom, four side walls, and an open top, unitary shaver and massage attachments being alternately receivable in said attachment chamber through said open top, the two opposite side walls of said rectangular attachment chamber being resiliently hinged for snap-action open and closing movement and comprising hair retainers for said attachment chamber, an opening in said closed bottom and a motor-to-attachment drive connection extending therethrough, said opening being closed by a compressible seal and a superposed pressure plate, and means whereby said attachments are retained in said attachment chamber and in drive relationship to said motor-to-attachment connection by resilient interengagement between members of said pressure plate, hinged side walls of said attachment chamber, and a superposed pressure plate.

8. In a convertible electric dry shaver and massage device as in claim 7, wherein said pressure plate sealed closed opening is disposed in spaced relationship between said hinged side walls, a pair of leaf-type springs connected to the bottom of said hinged side walls and extending from a motor-to-attachment relationship with said pressure plate, and integral projections of said casing bearing on said springs to stress the same to provide said hinged snap-action movement and sealing pressure on said pressure plate.

9. A convertible electric dry shaving and massage device comprising a casing defining a motor chamber thereinafter said casing comprising walls extending above said motor chamber and defining a space therebetween, a cutting head and alternately a massaging attachment head receivable between said walls within said space, means extending through an opening in said motor chamber and operatively relating said motor and said heads, sealing means for said opening, a head retainer spring maintaining said sealing means in position, said head retainer spring removable holding said heads in position, and spring means maintaining said head retainer spring and said said means in position regardless of the positioning or removal of said heads.

10. An electric dry shaving device as set forth in claim 9 and additionally including hair retainers pivotally supported by said spring means and closing the ends of the space between said walls.

11. A unitary massage attachment for use in electric dry shavers, comprising, a base member, a stationary frame supported on said base member, a movable member in said frame, openings formed in said frame, massaging protrusions formed on said movable member, said protrusions extending through said openings, and means for retaining said movable member in assembled position with respect to said base member and frame.

12. In a unitary massage attachment as in claim 11, wherein said protrusions have a length to extend into said openings even when said movable member bottoms on said base member whereby said movable member is self-retaining in assembled position in said unitary massage attachment.

13. In a unitary massage attachment as in claim 11, wherein said base member comprises a plate, said frame comprising rollers and end supports, said end supports being mounted on said plate, said said rollers in spaced relationship with respect to said plate, said rollers being spaced with respect to each other to define said openings therebetween, and said movable member being positioned between said rollers and plate.

14. In a unitary massage attachment as in claim 13, wherein said movable member and massaging protrusions are formed integrally with each other and are constructed from rubber, and said protrusions extending through said openings even when said movable member bottoms on said plate whereby said movable member is self-retaining in assembled position in said unitary massage attachment.

15. In a unitary massage attachment as in claim 11, wherein said base member comprises a plate, said frame comprising a generally U-shaped member which is mounted on said plate in inverted position, the top of said inverted member being slotted to define said openings therein, and said movable member being positioned between said top and said plate.

16. In a unitary massage attachment as in claim 15, wherein said movable member and massaging protrusions are formed integrally with each other and are constructed from polyethylene, and said protrusions extending through said openings even when said movable member bottoms on said plate whereby said movable member is self-
retaining in assembled position in said unitary massage attachment.

17. In a convertible electric dry shaver and massage device as in claim 3, wherein the base plate member of said massage attachment has a stationary cage mounted thereon, a movable member in said cage, said cage having openings formed therein, said movable member having massaging protrusions formed thereon, said massaging protrusions extending through said openings, and means for retaining said movable member captive in said cage.

18. A massaging device comprising a casing defining a motor chamber therein, said casing comprising walls extending above said motor chamber and defining a space therebetween, a massaging head receivable between said walls within said space, an opening between said chamber and said space, means extending through said opening for operatively relating said motor and said head, sealing means for said opening, a head retainer spring maintaining said sealing means in position, said head comprising a unitary assembly of a frame and a movable massaging member captive therein, and said head retaining spring removably holding said head in position.

19. A massaging device comprising a casing defining a motor chamber and a massaging head receiving chamber, a massaging head disposed in said head receiving chamber, said head comprising a removable stationary frame and a movable massaging member captive therein, an opening between said chambers, a motor in said motor chamber, means extending through said opening operatively relating said motor and movable massaging member, sealing means for said opening, a head retaining spring maintaining said sealing means in position, and said head retaining spring removably holding said frame in position.

20. A massaging device comprising a casing defining a motor chamber and an open massaging head receiving chamber, a motor in said motor chamber and a massaging head in said head receiving chamber, said head comprising a removable stationary frame and a movable massaging member captive therein, an opening between said chambers, means extending through said opening operatively relating said motor and movable massaging member, a head retainer spring in said head receiving chamber, said head receiving chamber having means for positioning said frame, said head retainer spring removably holding said frame in position in said head receiving chamber, and massaging protrusions on said captive member protruding from said frame out of said head receiving chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

2,437,402 Palmer Mar. 9, 1948
2,859,513 Bylund Nov. 11, 1958