

Nov. 14, 1939.

A. HIRSCHMAN

2,179,852

SKATE AND PROCESS OF MAKING SAME

Filed April 26, 1937

2 Sheets-Sheet 1

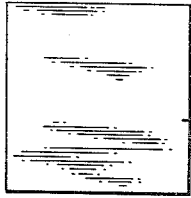


Fig. 1

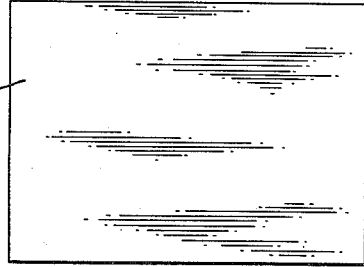


Fig. 2

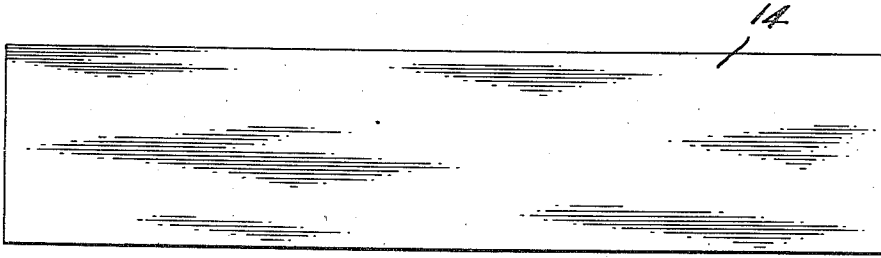


Fig. 3

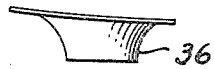


Fig. 13



Fig. 12

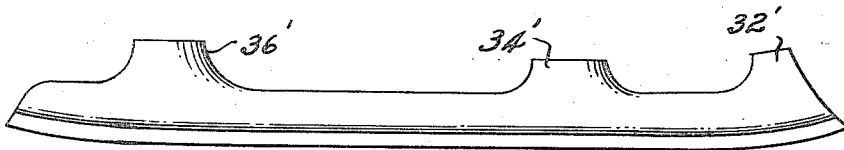


Fig. 14

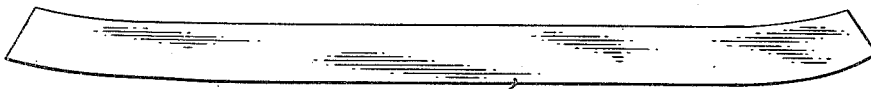


Fig. 15

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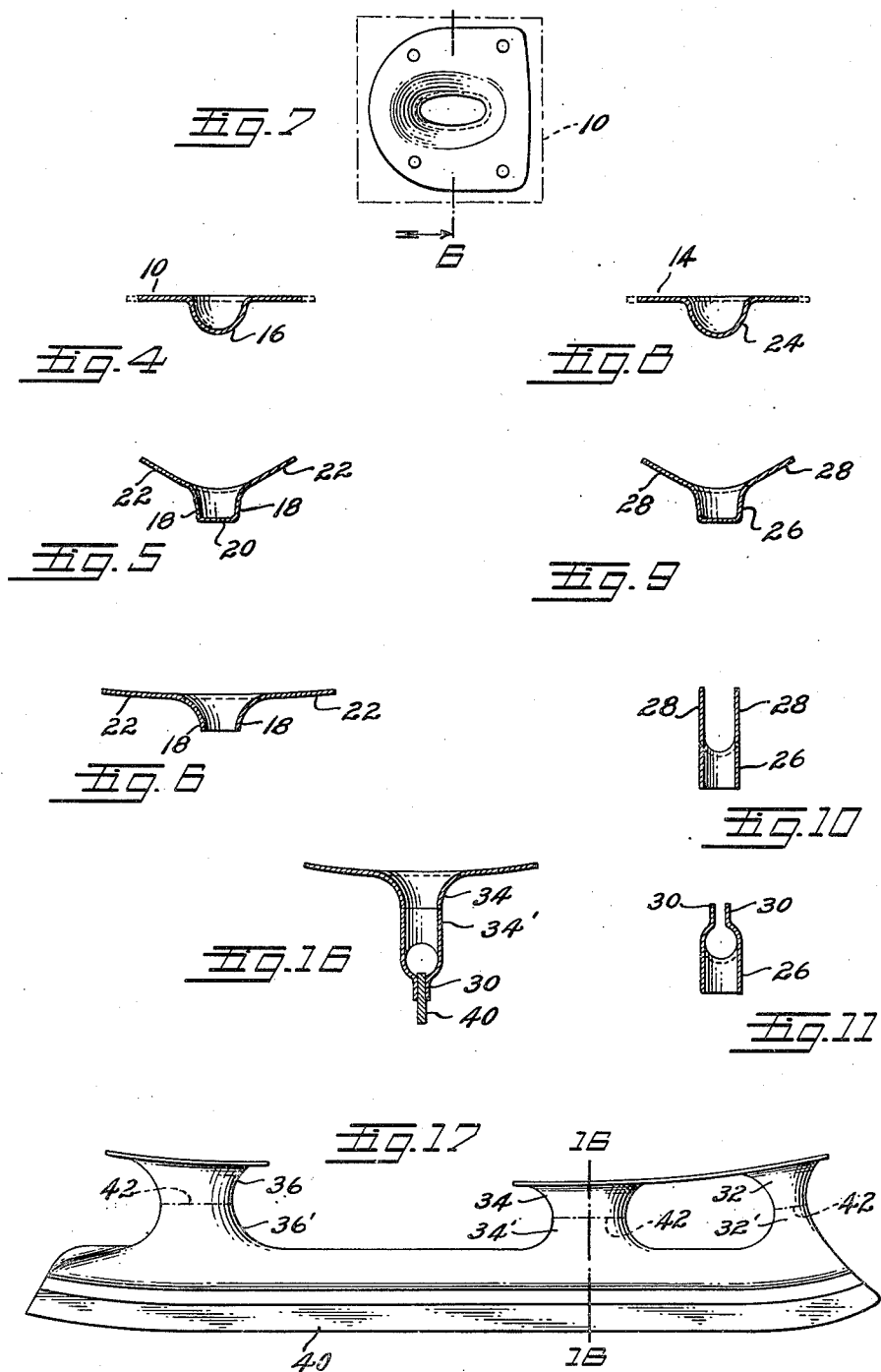
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2 Sheets-Sheet 2



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SKATE AND PROCESS OF MAKING SAME

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11 Claims. (Cl. 29—148)

This invention relates to improvements in the method of making skate structures and to improvements in the structure of skates.

An important object of this invention is to provide a novel process for making skates which is economical in the use of metal and saves in the time and labor expended. Heretofore, considerable number of operations were necessary to form the tubular posts extending between the shoe engaging portions of the skate and the runner support. By the novel process described herein, the metal sheets from which the skate parts are formed are deformed under die pressure to form tubular projections or bosses which when joined to similar shaped bosses on other parts form the supporting tubular posts of the skate. A further advantage of the novel process is realized by the considerable reduction in the amount of welding necessary to join the parts together.

A subsidiary feature of the improved process for making skate structures is the ability to use the same die to perform several of the steps in forming the tubular supporting posts hitherto described. As a result the parts of the skate structure fit together exactly and a much stronger and uniform bond is formed between the parts of the structure.

Another object of this invention is to provide a novel construction for skates, particularly of the type known as tubular ice skates. The skate is composed of three elements, namely, the runner support, sole plate and heel plate. Each of these elements is formed of one piece of metal. Each element is provided with one or more tubular projections or bosses which when joined to similarly shaped bosses on the other elements form the tubular posts for supporting the heel and sole plate in spaced relation to the runner support. The abutting edges of these tubular bosses are welded or otherwise sealed together so that when the skate is completely assembled, the welded joints extend substantially on a horizontal plane intermediate the foot plates and the runner support. The heel and sole plates are preferably formed with both a longitudinal and lateral concave curvature in order to fit the bottom of a shoe with best results.

Various other objects, advantages and meritorious features of this invention will become more apparent from the following specification, appended claims and accompanying drawings wherein,

Figure 1 is a plan view of a sheet or blank of metal for forming the heel plate of the skate,

Fig. 2 is a plan view of a sheet or blank of metal for forming the sole plate of the skate,

Fig. 3 is a plan view of a sheet or blank of metal for forming the tubular runner support of the skate,

Fig. 4 is a cross-sectional view illustrating the condition of the heel or sole plate blank after the first step of drawing the metal to form a tubular boss,

Fig. 5 is a cross-sectional view illustrating the condition of the heel or sole plate blank after the second step of drawing the metal to form the tubular boss,

Fig. 6 is a cross-sectional view illustrating the formation of the completed heel or sole plate element,

Fig. 7 is a top view of the heel plate after the tubular boss has been formed and the margins trimmed to the correct size,

Fig. 8 is a cross-sectional view illustrating the condition of the runner support blank after the first step of drawing the metal to form a tubular boss,

Fig. 9 is a cross-sectional view illustrating the condition of the runner support blank after the second step of drawing the metal to form a tubular boss,

Fig. 10 is a cross-sectional view illustrating the condition of the runner support blank after the third step of drawing and piercing the metal to form the tubular boss and bringing the marginal edge of the blank into close juxtaposition,

Fig. 11 is a cross-sectional view illustrating the formation of the runner support after the fourth step of operation,

Fig. 12 is a side view of the sole plate element,

Fig. 13 is a side view of the heel plate element,

Fig. 14 is a side view of the runner support,

Fig. 15 is a side view of the runner or blade,

Fig. 16 is a cross-sectional view along line 16—16 of Fig. 17 illustrating the manner in which the foot plates are assembled to the runner support,

Fig. 17 is a side view showing the complete assembly of the elements into a tubular skate structure.

Referring in more detail to the drawings, three metal sheets or blanks 10, 12 and 14 are cut to a size to form respectively the heel plate, sole plate and runner support of the tubular skate. Each of these blanks is subjected to a series of die stamping operations to draw the metal of each blank to form one or more tubular projections or bosses. Each die to which the blanks are subjected is shaped to perform its given step. In view of the fact that the formations of the dies are obvious from the result they produce upon the metal blanks, they are not shown in the drawings. The resulting condition, however, of the blanks after each die stamping operation is shown in the drawings. The various steps of deforming the metal blanks to the desired formation is depicted in Figures 4 to 6 inclusive and 8 to 11 inclusive.

Both the blanks 10 and 12 are subjected to

substantially the same operations to form tubular or hollow bosses which later become parts of the supporting tubular posts between the foot plates and the blade support. Accordingly, only the
 5 step of forming a tubular boss in the heel plate blank is shown, but it is understood that exactly similar steps are employed to form two such tubular bosses in the sole plate blank. The first step in forming the tubular boss is illustrated in Fig. 4. In this figure a balloon draw
 10 16 has been made in the blank 10.

The balloon draw 16 is subjected to a second die stamping operation which widens and deepens the boss and forms substantially vertical sides
 15 and a horizontal bottom piece at the end of the boss. Figure 5 illustrates the resulting condition of the blank after the second operation. Vertical side walls 18 have been produced and a bottom piece 20 has been formed. The edges 22 of
 20 the blank have been deformed to an inclined position as shown. As will be more fully discussed hereinafter, these first two steps of drawing the metal of the blanks 10 and 12 may be employed for forming tubular projections or bosses in the
 25 runner support blank 14. One particular advantage in so doing is the ability to employ the same dies for performing the first two operations on all three of the blanks.

The result of the third operation in forming the
 30 heel and sole plates is shown in Fig. 6. A suitable die is employed which removes the bottom 20 and imparts a slight concavity to the upper face of the plate as shown in Fig. 6. After this operation the heel and sole plates are subjected
 35 to suitable dies which produce rivet holes in the plate near the edges and trim the margins down to the desired outline. Figure 7 represents the condition of the heel plate after the last step. The dotted outline indicates its former size before
 40 the marginal trim.

The operations described in connection with the heel plate are likewise employed in forming the sole plate. Instead of forming a single tubular boss, two such bosses are formed as shown in Fig-
 45 ure 12. A slight concavity is likewise formed in the upper face of the sole plate.

As previously mentioned, the first two steps in forming the heel and sole plates may be utilized to form tubular bosses in the runner support.
 50 This is the preferred method of manufacture because it reduces the number of dies required and insures perfect matching when the tubular projections are joined together. As illustrated in Figs. 8 to 11 inclusive, the blank 14 is subjected
 55 to the same dies which form the balloon draws in the heel and sole plates. Two balloon draws are formed adjacent one end of blank 14 corresponding to the two formed in the sole plate blank 12. One balloon draw is formed adjacent the
 60 other end of blank 14 corresponding to the balloon draw 16 formed in the heel plate blank. Suitable provision may be made for varying the distances between the dies which perform the double metal drawing operation at one end of the blank
 65 14 and the dies which perform the single drawing operation at the other end of the blank 14 in order to make skate structures of different sizes.

After the first operation on the blank 14 has been performed, it has three such draws as that
 70 shown at 24 in Fig. 8. These draws are widened and deepened by the same draws which perform the second operation on the heel and sole plates. As a result of this second operation, the blank 14
 75 will have three such projections as that shown at 26 in Fig. 9.

Following such operation the blank is then subjected to a die operation which pierces the bottom ends of the projections 26 and removes this portion to form open ended tubular bosses similar to
 5 that shown in Fig. 6. At the same time the sides 28 of the blank are brought into parallel relationship as shown in Fig. 10. A mandrel is inserted between the side portions 28 and dies are brought
 10 to bear upon the outer surfaces of the side portions 28 to curve the same around the mandrel 10 and bring the side margins 30 of the blank in close parallel relationship as shown in Fig. 11. In final formation, the runner support will be
 15 tubular and will have three spaced open-ended tubular projections as shown in the side view in Fig. 14.

The three die formed elements of the skate structure, namely, the sole plate, heel plate and runner support are shown separately in Figs. 12,
 13 and 14 respectively. Two tubular projections or bosses 32-34 on the sole plate correspond in
 20 size to the two tubular bosses 32'-34' at the right end of the blade support in Fig. 14. The tubular boss 36 on the heel plate corresponds in size to the tubular boss 36' formed at the left
 25 end of the blade support. These tubular bosses are all open-ended as a result of the die piercing operation. The elements of the skate structure are assembled together into a unitary structure by bringing the open ends of the tubular bosses
 30 on each of the sole and heel plates into abutting engagement with the open ends of the tubular bosses formed on the blade support and permanently sealing the same together as by butt-welding.
 35

A runner or blade of the character shown at
 40 40 in Fig. 15 is inserted between the side margins 30 and permanently secured in place as by spot welding. After the blade has been assembled in place, the opening at the rear end of the blade
 45 support through which the mandrel was inserted is closed by pinching the body of the blade support at its rear end. The skate structure is now completely assembled as indicated in Fig. 17.

In Figure 17, the dotted lines 42 represent the
 45 welded joints. These joints, as illustrated, appear at a point intermediate the height of the tubular posts. The metal around these joints may be buffed in any suitable way to conceal the welding operation.
 50

What I claim is:

1. In the process of making a skate structure, the steps of taking three flat metal elements corresponding in size to the heel plate, sole plate and
 55 runner support of a skate structure, subjecting said metal elements to die stamping operations to form tubular bosses which project from one side of each of said elements, bringing the projecting tubular bosses of the heel and toe plate
 60 elements into abutting engagement with corresponding projecting tubular bosses on said runner supporting element, and welding the tubular bosses of the heel and toe plate elements to the tubular bosses of the runner supporting element at their point of juncture.
 65

2. The process of making a skate structure which comprises taking three flat metal elements corresponding in size to the heel plate, sole plate and runner support of a skate structure, subject-
 70 ing said metal elements to die stamping operations to form tubular bosses which project from one side of each of said elements, folding the element corresponding to the runner support lengthwise upon itself to position the opposite marginal edges in close parallel relationship, bringing the 75

projecting tubular bosses of the heel and sole plate elements into abutting engagement with the correspondingly projecting tubular bosses on said runner supporting element, welding the tubular bosses of the heel and sole plate elements to the tubular sections of the runner supporting element at their point of juncture, inserting a blade between the parallel marginal edges of the runner supporting element, and welding the said marginal edges to the opposite sides of the blade.

3. In the process of making a skate structure, the steps of providing a flat metal blank for forming the blade support of the skate and a flat metal blank for forming a shoe engaging portion of the skate, subjecting each of said blanks to pressure to draw a portion of the metal of each blank into a tubular open ended projection extending from one face of each of said blanks, bringing the edges of said tubular projections on each of said elements into abutting engagement, and permanently welding the abutting edges of said tubular projections together to thus attach the shoe engaging portion of the skate to the blade support.

4. In the process of making a skate structure, the steps of providing a flat metal blank for forming the blade support of the skate and a flat metal blank for a shoe engaging portion of the skate, similarly deforming each blank by subjecting each of said blanks to the pressure of the same die to draw the metal of the blank into a tubular open ended projection extending from one face of each of said blanks, bringing the open ends of said similar shaped tubular projections into abutting engagement, and butt-welding the abutting edges of the tubular projections together to secure the shoe engaging portion of the skate to the blade support.

5. In the process of making a skate structure, the steps of providing three flat metal blanks for forming respectively the blade support, heel plate and sole plate of the skate structure, subjecting the blank corresponding to the blade support to the pressure of dies to draw the metal of the blank at three spaced joints therealong and form three spaced tubular open-ended bosses extending from one face of the blank, likewise subjecting the blank corresponding to the sole plate to the pressure of dies to draw the metal of the blank at two spaced points therealong and form two tubular open-ended bosses extending from one face of the blank and corresponding in shape to two of the bosses formed on the blade support blank, likewise subjecting the blank corresponding to the heel plate to the pressure of dies to draw the metal of the blank at one point and form a tubular open-ended boss extending from one face of the blank and corresponding in shape to the third tubular boss formed on the blade support blank, bringing the open ends of the tubular bosses on the heel plate blank and sole plate blank into abutting engagement with the open ends of the tubular bosses on the blade support blank to which they correspond, and butt-welding the abutting edges of the tubular bosses together.

6. A skate comprising a tubular body carrying a blade extending longitudinally thereof, said tubular body provided on the side opposite to said blade with at least two tubular projecting sections forming an integral part of the tubular body, a sole plate having a tubular pro-

jection corresponding to one of those formed on said tubular body, a heel plate likewise having a tubular projection corresponding to the remaining tubular projection formed on said tubular body, the ends of said tubular projections on said sole plate and said heel plate being butt-welded to the corresponding tubular projections formed on said tubular body.

7. A skate structure comprising, in combination, a blade supporting body, a heel plate, a sole plate, tubular posts extending between said body and said plates and supporting the latter from the former, one portion of each of said tubular posts forming an integral part of the blade supporting body while the remaining portion of each of said tubular posts forms an integral part of each of said plates, said separate portions of each post being welded together at their point of connection.

8. A skate structure comprising, in combination, a tubular body formed of a single piece of metal and folded longitudinally to form a blade receiving opening between the opposite side edges thereof, a blade received in said opening between the side edges of said tubular member, a sole plate formed of a single piece of metal, a heel plate formed of a single piece of metal, and tubular posts supporting said heel and sole plates in spaced relationship to said blade supporting tubular body, each of said tubular posts being divided into two superimposed connected sections, the lower section of each post forming an integral part of the blade supporting tubular body, and the upper section of each tubular post forming an integral part of the plate with which it is associated.

9. A skate structure comprising, in combination, a one piece tubular blade support, a blade projecting longitudinally from one side of said support, a one piece sole plate, a one piece heel plate, said blade support having three integral tubular open ended bosses projecting from the side thereof opposite to said blade, said sole plate having two integral tubular open ended bosses projecting from the bottom side thereof, said heel plate likewise having an integral tubular open ended boss projecting from the bottom side thereof, the open ends of the tubular bosses on said sole plate being butt welded to the open ends of two of the tubular bosses on said blade support for permanent securement, and likewise the open end of the tubular boss on said heel plate being butt welded to the remaining tubular boss on said blade support for permanent securement.

10. A skate comprising a tubular member having depending flanges to receive the runner and an integral tubular boss on its upper side, a foot plate having an integral tubular boss on its bottom side, the edges of said tubular bosses abutting one another and being welded together for permanent securement, the welded abutting engagement forming the sole means for connecting the tubular bosses of said foot plate and said tubular member together.

11. A skate structure comprising, in combination, a tubular member carrying a runner, a sole plate, a heel plate, tubular posts supporting said plates from said tubular member, said heel plate and said sole plate having a concave curvature both longitudinally and laterally of the skate structure.

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