Nov. 9, 1971 F. G. SKELTON 3,618,220

SKI-MOUNTING BENCH

Filed Nov. 20, 1969

Fig. 1.

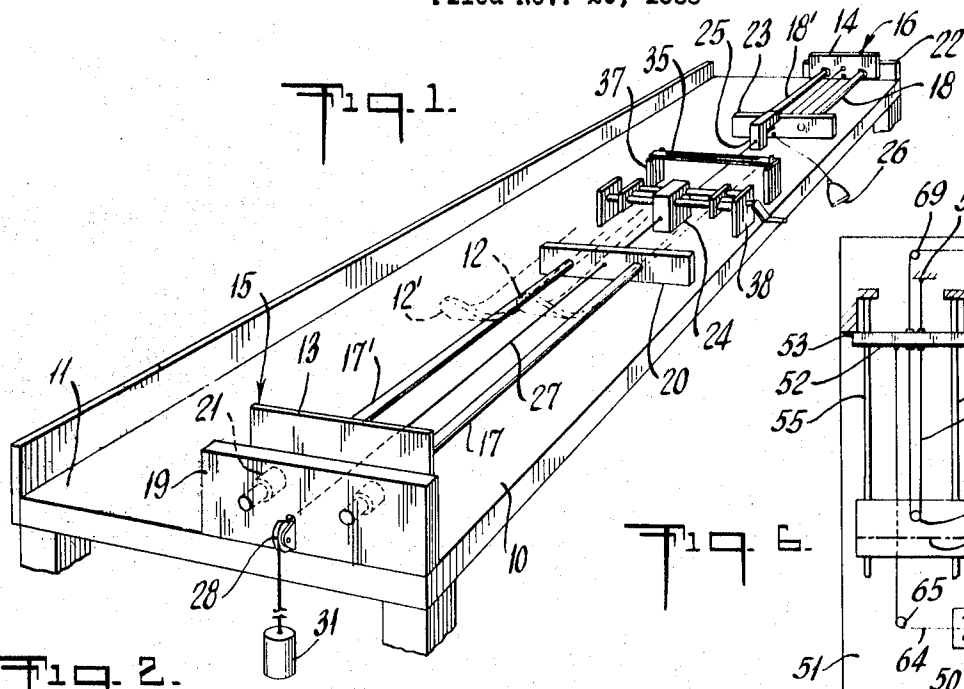


Fig. 6.

Fig. 2.

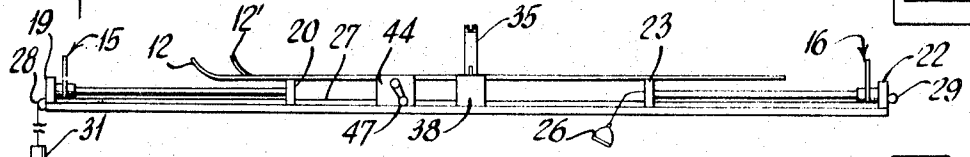


Fig. 3.

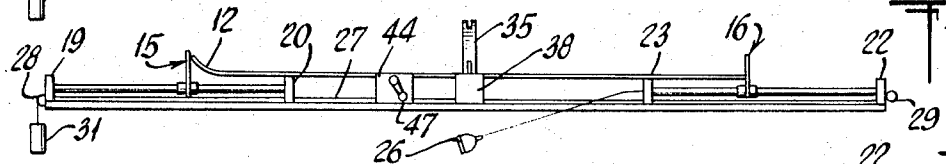
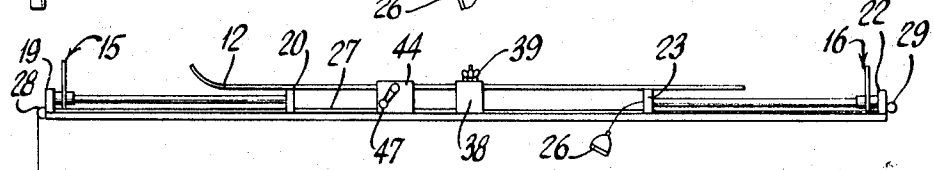


Fig. 4.



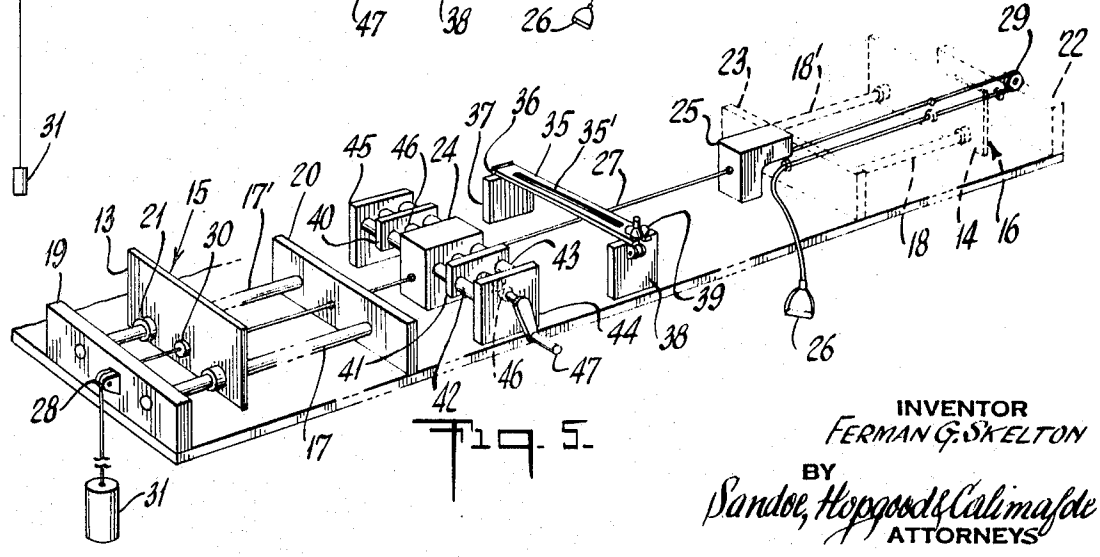


Fig. 5.

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SKI-MOUNTING BENCH

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ABSTRACT OF THE DISCLOSURE

The invention contemplates ski-mounting bench or the like structure which incorporates mechanism whereby, for each ski or pair of skis placed on the device, a simple initial action responds to the probed overall length of the ski or skis to automatically determine the longitudinal center of the ski or skis. The apparatus includes means for thereafter clamping the skis with reference to the bench and to a center-identifying structure, so that all basic binding layout and mounting operations can proceed with the skis in centered array.

This invention relates to means for automatically determining the longitudinal center of skis of different length, for establishing quick and accurate reference for the mounting of a boot-binding or clamping device to the ski.

The correct mounting of ski-binding structure varies in accordance with several factors which are unique to the intended use of the ski, and to the height and boot size of the skier, so that the correct fitting of such structures is a custom operation. However, all such mountings require an initial determination of the longitudinal center of the ski, for use as a reference in establishing the mounting location. As a practical matter, the establishment of the longitudinal center is a time-consuming operation, requiring care in measurement, in mathematical computation, and in lay-out of the calculated location; and human error and carelessness are factors which today are almost impossible to contend with.

Accordingly, it is an object to provide apparatus for automatically establishing the longitudinal center of a ski.

Another object is to achieve the foregoing object with a structure which can simultaneously establish the longitudinal center of plural skis, such as a pair of skis, more or less regardless of the degree of care with which the skis are initially positioned on the apparatus.

A further object is to incorporate structure of the character indicated into a bench or other fixture suitable to the continued firm support of the skis immediately after their center references have been correctly established.

A general object is to achieve the foregoing objects with structure that is basically simple, easy to operate, and unfailing in accuracy, over the full range of ski lengths in use today.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, preferred forms of the invention:

FIG. 1 is a simplified overall view in perspective showing a ski-centering device of the invention, mounted on a work bench;

FIGS. 2, 3 and 4 are simplified views in elevation, on a reduced scale, to illustrate successive steps in the normal use of the device of FIG. 1;

FIG. 5 is an enlarged, fragmentary, perspective view of parts of the device of FIG. 1; and

FIG. 6 is a schematic diagram of a modification.

Briefly stated, the invention contemplates ski-mounting bench or the like structure which incorporates mechanism whereby, for each ski or pair of skis placed on the device, a simple initial action responds to the probed overall length of the ski or skis to automatically determine the longitudinal center of the ski or skis. The apparatus includes means for thereafter clamping the skis with reference to the bench and to a center-identifying structure, so that all basic binding layout and mounting operations can proceed with the skis in centered array.

Referring to FIG. 1 of the drawings, the invention is shown in application to an elongated flat horizontal arrangement, on a bed or frame plate **10** mounted on a table or bench **11**. One or more skis, such as the pair **12–12′** (shown in phantom outline in FIG. 1), are placed in transversely spaced longitudinal relation on the apparatus, between opposed upstanding abutments **13–14** on two slides **15–16**. The slides **15–16** are longitudinally movable on fixed elongated guide means **17–18** over a range which comprehends all possible ski lengths, between abutments **13–14**. The guide means **17–18** may extend the full length of the machine, but in the form shown, aligned but separate guide systems are provided in the end regions, thereby leaving a more open central space for other structure and functions, to be described.

The left-end guide means is shown as two laterally spaced parallel elongated rods **17–17′**, fixed to the frame **10** at a first upstanding end plate or bracket **19**, and held at their other ends by a similar plate or bracket **20**. The slide **15** comprises an upstanding transversely extending flat plate which constitutes the abutment **13**, and guide bushings **21** are united to plate **13** to establish a firmly positioned but smoothly guided reference to the guide bars **17–17′**. At the right-end of the apparatus, similar brackets **22–23** provide outer and inner end support for the guide bars **18–18′**, and the slide **16** is similarly bushed for firm and smoothly guided erect positioning of the abutment **14**.

The upper edges or surfaces of the bracket members **20–23** extend transversely and establish a single plane of support for spaced locations on each of the two skis **12–12′**. And to assure ultimate abutment of the ski ends, regardless of their end-for-end orientation, the abutment members rise substantially above the ski-support plane established at **20–23**. Desirably, one or more spacers, such as the prismatic blocks **24–25** are provided in the region between the guide systems **17–18**. Blocks **24–25** are preferably of wood and are secured to the bed **10**. They rise above the plane of ski support to enable lateral locating abutment of skis **12–12′**, as will be understood.

The slides **15–16** have frame-referenced interconnection, for their coordinated equal and opposed displacement, such displacement being symmetrical with respect to the longitudinal center which is to provide the basic ski-mounting reference. Such interconnection may be established by an endless cable, sprocket chain or the like, spanning frame-referenced idlers at the longitudinal ends of the apparatus, with one slide **15** secured to one of the courses of the cable or chain, and with the other slide **16** secured to the other course of the cable or chain; in which event, centering movement of one of the slides would compel equal centering movement of the other slide, until blocking interference is encountered by abutment at **13–14** with both ends of both skis. In the form shown, however, I illustrate a system of slide connection in which the slides are normally urged to fully retracted position, as in FIGS. 1 and 2, and in which manual slide-centering actuation is accomplished at a hand-pull member **26**, readily accessible to the operator at the front-

central working region of the bench. For this purpose, cable means **27** comprises a first elongated course spanning the length of the machine, between end sheaves **28–29** carried by the end brackets **19–22**. This cable course runs freely through aligned openings in all intervening parts of the machine and is positioned on an alignment between the guide bars **17–17′** and **18–18′**; the slide **15** is clamped at **30** to this first cable course, and biased loading of slide **15** to its retracted position is accomplished by a counterweight **31** carried by the cable end payed over sheave **28**. At the other end of the machine, the sheave **29** folds the cable **27** to establish a second elongated or double-back course which freely passes through aligned openings in intervening structure to and including the central bracket member **23**; beyond this point a freely manipulable length of cable is connected to the hand-pull **26**. This second course of the cable **27** is secured to slide **16**, at its passage therethrough, by suitable means **32**.

The counterweight **31** serves constantly to urge both slides **15–16** to their retracted position, and the element **26** must be manually drawn, to engage and centrally position the skis **12–12′**. Such action is illustrated in FIGS. 2, 3 and 4, beginning with the normal fully retracted position of FIG. 2, wherein the skis **12–12′** happen to have been placed on supports **20–23** in longitudinally offset relation. Upon pulling the element **26**, slides **15–16** are drawn together, intercepting first one and then the other of the skis, and then displacing the skis to a firmly abutting central positioning, as shown in FIG. 3. The element **26** is then releasable, leaving slides **15–16** to retract by counterweight action, with the skis correctly positioned (FIG. 4).

If the operator has taken the trouble to urge the skis against the spacer blocks as part of the ski-positioning operation, then the skis are now correctly placed for center-reference marking. For this purpose, a hinged center-indicating bar or guide **35** is brought down from its rearwardly retracted position (FIGS. 2 and 3), to its marking position (FIGS. 1, 4 and 5), where it straddles the skis **12–12′**. Bar **35** is shown pivoted at **36** to a fixed upstanding rear standard or bracket **37**, the hinge axis being longitudinal and parallel to the guide axis, to assure a perpendicular marking of the skis at their longitudinal centers. At the front, a similar standard **38** positions the bar in its lowered position, where a releasable clamp, such as a bolt **39**, hinged to standard **38**, may enter and be clamped in the locally slotted end of bar **35**. For purposes discussed later, the bar **35** is preferably flat and horizontal in its down position. It has a central elongated slot **35′** of length to straddle both skis **12–12′**, for use in guided marking of the longitudinal centerline on the ski. It also has straight parallel sides, on opposite sides of the marking-guide means **35′**, for further marking-guide purposes, the latter representing measured offsets from the longitudinal centerline of the skis.

Although the device thus far described is perfectly useful for the intended purposes, it becomes even more useful when clamp mechanism is incorporated, as at one of the spacing blocks **24–25**, to hold the skis in their longitudinally centered positions. Such clamping means is shown, at location **24**, to employ two floating jaw members **40–41** which are guided by fixed parallel transverse bars **42–43**. As shown, bars **42–43** pass through block **24** and are supported by and between front and rear standards or brackets **44–45**. A single jack screw or rod **46** clears aligned bores in block **24** and standards **44–45**; screw **46** has a first direction of threaded engagement with the rear jaw **40** and the opposite direction of threaded engagement with the front jaw **41**. Thus, one direction of manipulating a hand crank **47** at the front end of rod is operative to establish equalized side clamping of both skis to the opposite ski-locating sides of block **24**, and both skis are unclamped by the opposite direction of crank manipulation.

The described device will be seen to achieve all the stated objects and to be flexibly and accurately adaptable to a wide range of ski lengths and styles. The longitudinal centerline marking will be understood to apply for reference purposes only, in that different bindings, boot sizes, and ski styles and uses may dictate reliance upon different offsets from the marked centerline. For example, the marked centerline (guide **35′**) may be the normal reference for the average skier. But for the slalom expert who must have more sensitive steering control, a predetermined offset is desired, forward of the alignment of guide **35′**. By correct selection of the width of bar **35**, such forward offset may be determined and marked, against the bar edge which faces the forward end of the skis. By the same token, the downhill-racing expert will want his boots located in accordance with a predetermined opposite offset from the guide **35′** alignment, and a correct selection of the width of bar **35** will provide the further guide means for marking such an offset, along the bar edge which faces the rear ends of the skis. The stated centerline reference conditions apply for persons of normal size, as for example those who wear a size 8 or 9 boot. But, for larger shoe sizes, further offsetting allowances must be made; for example, a size 14 boot dictates a forwardly offsetting correction of the reference line, to the extent of one centimeter, and a size 6 boot dictates a similar rearwardly offsetting correction of the reference line. However, the fact remains that, regardless of the extent of correcting offset necessary, the invention has provided, in all cases, a basic centering reference which can be relied upon to achieve accurate mounting. And the mounting may be completed while the skis are in the same location.

While the invention has been described in detail for the preferred form, shown, it will be understood that modifications may be made without departure from the invention. For example, the frame or bed may extend vertically, or be canted slightly from the vertical, to permit skis to be laid upwardly and thus to be mounted within less shop space. In such an arrangement, it may be convenient to provide a fixed lower abutment **16** and to make both the other end abutment **15** and the guide-bar **35** (and its mount) independently vertically movable, with cable, chain or the like connection to achieve the described overall length division.

Such a modified arrangement is schematically indicated in FIG. 6, wherein the lower abutment member **50** is fixed to the vertically elongated frame **51**. The upper abutment member **52** and the center-indicating bar **35** (suggested by heavy phantom line) are slidable, on sides **53–54**, traveling fixed vertically elongated guide means **55–56**. An interconnecting divide-by-two cable **57** is anchored at **58**, from which it extends on a first elongated course to a sheave **59** carried by slide **54**; sheave **59** enables the cable to double back on a second elongated course to upper sheaves **60–61**, and the free end carries a suitable counterweight **62**. If the mass of counterweight **62** exceeds that of slides **53–54**, the mechanism will automatically normally urge the upper abutment **52** to its fully retracted position. To develop a ski centerline location of bar **35**, a ski is stood upright on the abutment **50**, and the hand-pull element **63** with its cable **64** is drawn horizontally outwardly via sheave **65** and a jam-cleat **66** until the upper abutment is stopped by contact with the upper extended end of the ski. The jam-cleat will hold the position, with bar **35** properly centered over the ski, for establishing clamp and marking functions as previously described. Release of the jam-cleat allows the parts to resume their retracted positions.

What is claimed is:

1. Ski-centering means, comprising an elongated frame, elongated guide means on said frame, a first slide with ski-abutment means guided over a first span of said guide means in the vicinity of one end of said guide means, a second slide with ski-abutment means guided over a second span of said guide means in the vicinity of the other

end of said guide means, frame-referenced means connecting said slides for matched approaching movement along said guide means, and frame referenced center-identifying means symmetrically located between and with reference to the connected opposed movements of said ski-abutment means; whereby upon placing a ski longitudinally between said abutments and moving one of said guides into displacing abutment with an end of the ski, the other of said abutments and the ski itself will be displaced to the point of contact at the other end of the ski, whereupon the ski is longitudinally centered with reference to said center-identifying means.

2. Ski-centering means according to claim 1, and including releasable clamp means to retain the centered position of the ski.

3. Ski-centering means according to claim 2, in which said clamp means is frame-referenced near the location of said center-identifying means.

4. Ski-centering means according to claim 3, in which said clamp means includes opposed elongated ski-gripping faces for engaging corresponding generally centrally located regions of the sides of the ski.

5. Ski-centering means according to claim 1, in which said abutment means are each of width, transverse to the guide axis, sufficient to abut the ends of two like skis longitudinally positioned between said abutment means in side-by-side relation.

6. Ski-centering means according to claim 5, and including releasable clamp means for holding the centered position of both skis.

7. Ski-centering means according to claim 6, in which said clamp means includes a fixed frame-referenced central abutment for engaging adjacent sides of said skis, separate jaw members in transverse alignment with said central abutment and operable to engage opposite outer sides of said skis, and means for drawing said jaws in approach to each other.

8. Ski-centering means according to claim 1, in which said center-identifying means comprises an elongated bar hingedly referenced to the frame on a longitudinal axis and movable from a raised position out of the way of ski-positioning to a position straddling the ski for center-identifying purposes.

9. Ski-centering means according to claim 8, in which said bar includes guide means for guiding ski-marking means transverse to the centered region of the ski when said bar is in position straddling a centered ski.

10. Ski-centering means according to claim 9, in which said guide means establishes plural selectively available ski-marking transverse alignments in longitudinally offset relation to each other.

11. Ski-centering means comprising an elongated frame including means for supporting two like skis in longitudinally oriented side-by-side relation and in a common plane of support, first elongated guide means on said frame in the vicinity of a first limit of ski-end positioning, second elongated guide means on said frame in the vicinity of a second limit of ski-end positioning, first and second slides with opposed ski-end abutments and guided by said respective guide means, frame-referenced means connecting said slides for matched approaching movement along said guide means, and frame-referenced center-identifying means symmetrically located between and with reference to the connected opposed movements of said ski-end abutments.

12. Ski-centering means according to claim 11, in which said supporting means comprises two upstanding transversely extending members establishing said plane of support and respectively located on said frame at corresponding positions that are longitudinally spaced on opposite sides of said center-identifying means, the span between said transversely extending members being less than the minimum length of a ski to be accommodated.

13. Ski-centering means according to claim 12, in which said first and said second guide means each includes two laterally spaced elongated bars referenced at one end to one of said members and extending therefrom in the longitudinally outward direction.

14. Ski-centering means according to claim 11, and including a frame-referenced upstanding ski-separating member located between the transversely extending ski-supporting members.

15. Ski-centering means according to claim 11, and including first and second frame-referenced upstanding ski-separating members which are longitudinally aligned with each other and which are respectively located on opposite longitudinally sides of said center-identifying means and between said transversely extending ski-support members.

16. Ski-centering means according to claim 14, in which clamp means is provided at said ski-separating member for selectively clamping skis to opposite sides thereof.

17. Ski-centering means according to claim 16, in which said clamp means comprises floating outer jaw members, a single threaded rod extending through said ski-separating member, said rod having a first direction of threaded engagement with one of said jaws and a second direction of threaded engagement with the other of said jaws.

18. Ski-centering means according to claim 11, in which said connecting means comprises aligned frame-referenced sheaves at the outer longitudinal ends of said guide means, cable means having a first elongated course extending from one to the other of said sheaves and secured to one of said slides, said cable means extending around one of said sheaves to a doubled-back elongated course in which said cable means is connected to the other of said slides.

19. Ski-centering means according to claim 18, in which loading means is connected to said cable means outside the other of said sheaves.

20. Ski-centering means according to claim 19, in which said loading means includes a free-hanging counterweight.

21. Ski-centering means according to claim 19, in which the doubled-back course of said cable means includes a manually actuatable draw length connected to said other side via a frame-referenced cable guide located between adjacent close limits of slide movement.

22. Ski-centering means, comprising an elongated frame, elongated guide means on said frame, separate longitudinally spaced supports for a first ski-end abutment and for center-identifying means and for a second ski-end abutment respectively, one of said supports being fixed to said frame and each of the other two of said supports including a slide independently guided by said guide means, frame-referenced means connecting said slides for coordinated relative movement with respect to each other and with respect to said fixed support, the coordinated connection establishing a relationship such that slidably guided movement of one abutment in approach to the other abutment maintains equal spacings of said abutments from said center support but in opposite directions from said center support.

23. Ski-centering means according to claim 22, in which the support for said center-identifying means is fixed and the two ski-end abutments are respectively carried by said slides.

24. Ski-centering means according to claim 22, in which the support for one of said ski-end abutments is fixed and the other ski-end abutment and said center-identifying means are respectively carried by said slides.

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WILLIAM D. MARTIN, JR., Primary Examiner