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Martin

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[54] **SKI BRAKE MECHANISM**

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[30] **Foreign Application Priority Data**

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Feb. 13, 1973 Switzerland 2030/73

[52] **U.S. Cl.** ..... **280/11.13 B;** 280/11.13 B
[51] **Int. Cl.** **A63c 7/10**
[58] **Field of Search** ..... 280/11.13 B, 11.13 C, 280/11.13 D, 11.37 G

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Assistant Examiner—David M. Mitchell
Attorney, Agent, or Firm—Werner W. Kleeman

[57] **ABSTRACT**

A brake mechanism adapted to be secured to a ski for braking the ski, wherein the components of a locking element-pawl arrangement of the brake mechanism employed for retaining the braking element in an arresting- and preparatory position are arranged at the bottom or base region of the braking element and in a bearing or mounting body connected with the ski.

5 Claims, 8 Drawing Figures

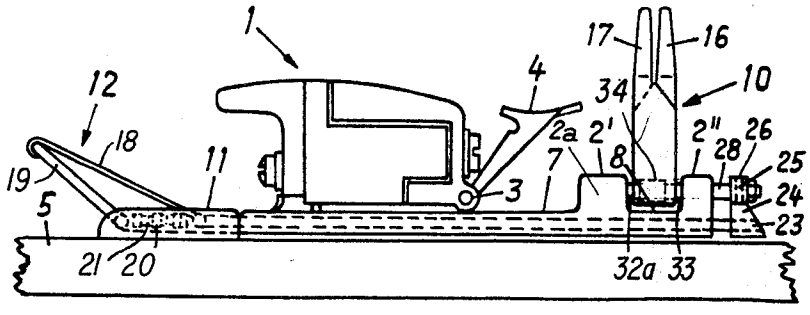


Fig.1

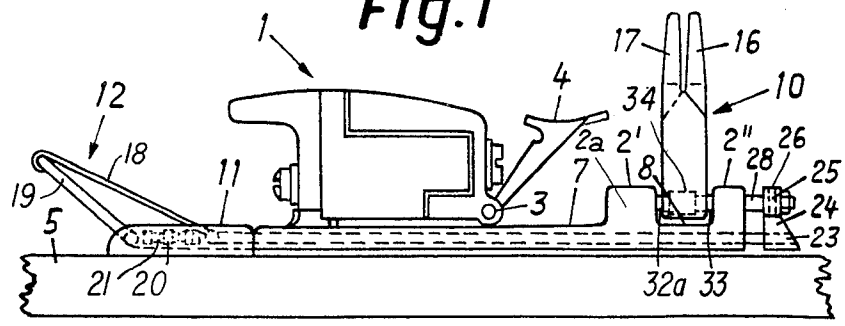


Fig.2

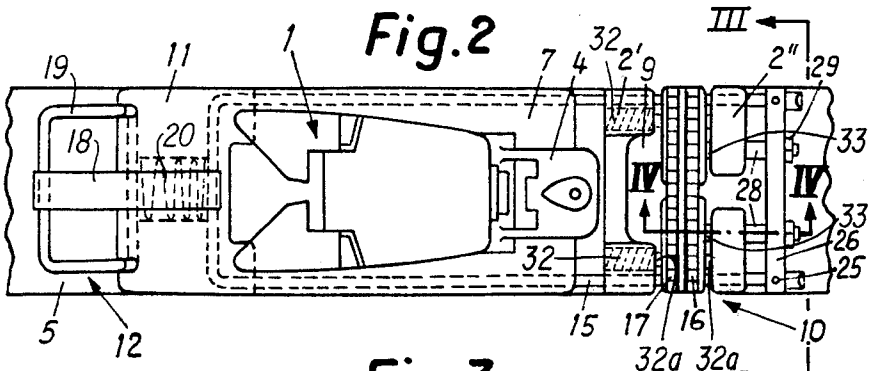


Fig.3

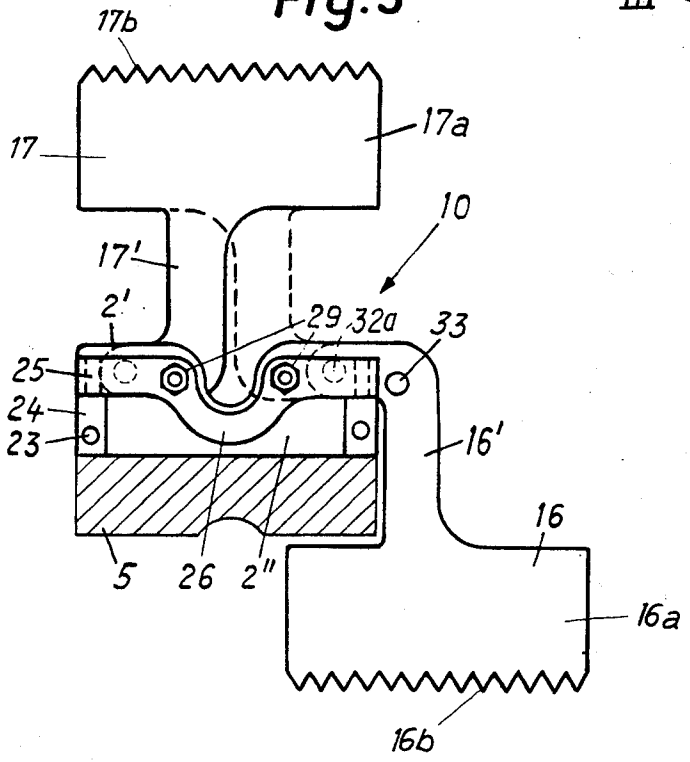


Fig. 4a

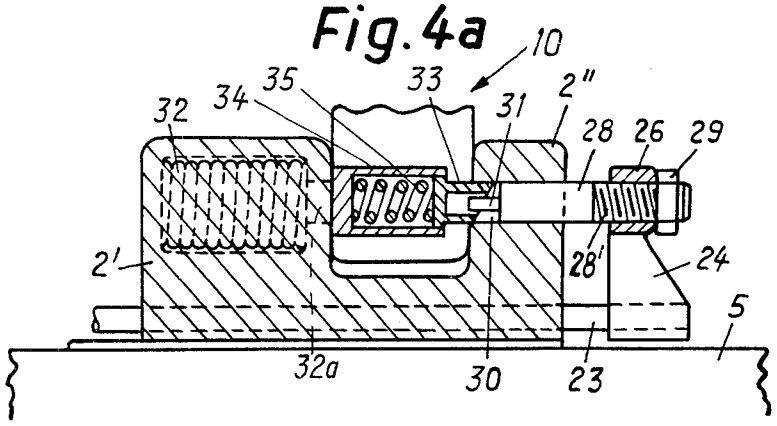


Fig. 4b

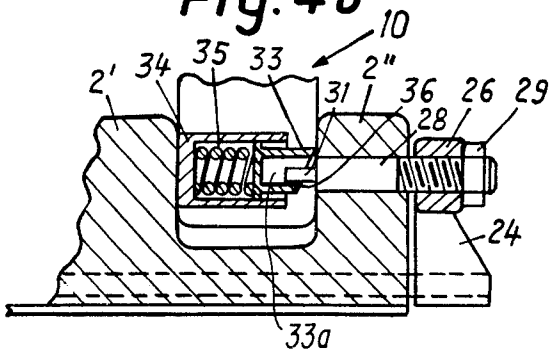


Fig. 5

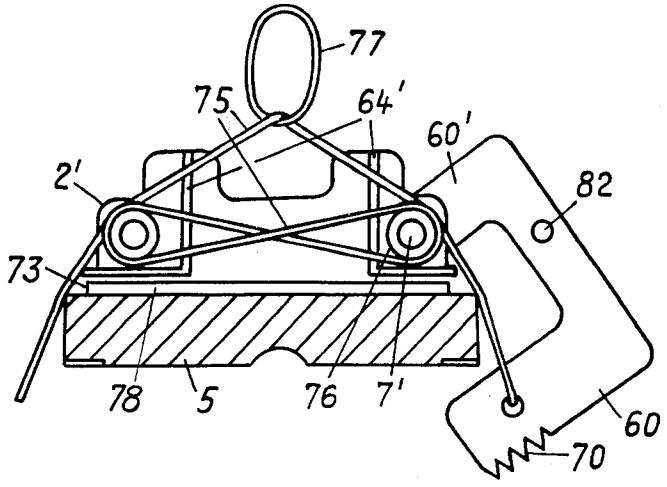


Fig. 6

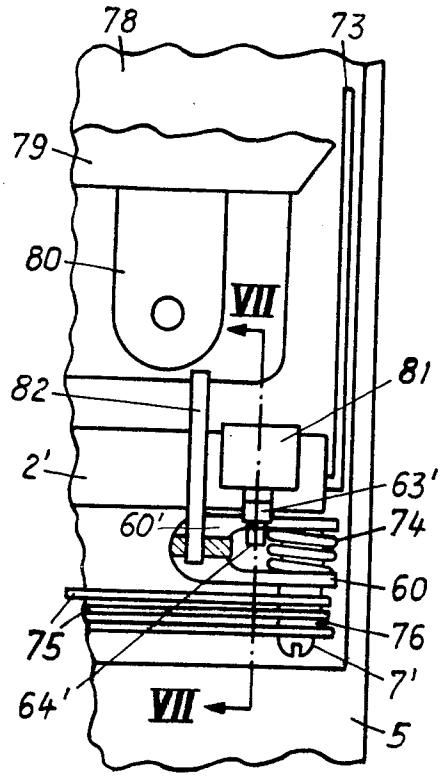
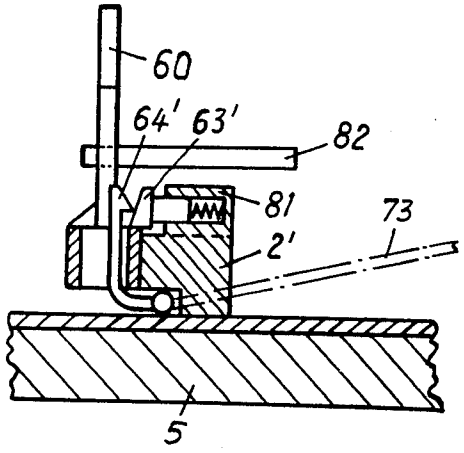


Fig. 7



SKI BRAKE MECHANISM

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved construction of brake mechanism which can be attached to a ski and constitutes an improvement upon the ski brake mechanism disclosed in my U.S. Pat. No. **3,704,024**, granted Nov. **28, 1972**, and entitled: "Brake Mechanism Attached to a Ski."

In particular, the aforementioned brake mechanism which can be secured to a ski is of the type incorporating at least one brake element which upon removal of the ski boot out of the ski binding automatically shifts from a position above the running surface of the ski downwardly into a braking position, and therefore engages or grips into the snow for the purpose of generating a braking force upon the runaway ski. The brake mechanism incorporates a retaining or holding element which can be actuated by the ski boot and serves to retain the braking element in a preparatory position wherein upon release of the retaining element the brake element assumes its braking position. Additionally, the brake mechanism further incorporates a respective arresting- and preparatory locking element connected with the braking element, adjustable pawl members which are operably associated with the retaining or holding element and intended to be brought into engagement with the arresting- and preparatory locking elements as well as at least one spring at the retaining element which works against the pressure of the ski boot, wherein upon actuating the retaining element by the ski boot the pawl releases the arresting locking element and the other pawl engages with the release locking element for the purpose of assuming the preparatory position for release of the brake element.

The improved locking element-pawl arrangement of this development also can be employed in a brake mechanism having two brake elements which when assuming their braking position extend to both sides beneath the running surface of the ski.

With the known brake mechanisms which are secured to a ski there is present the drawback that the components fabricated from metal of the brake mechanism protrude to a relatively great extent above the top surface of the ski. In particular, the braking jaws and the holding elements for such braking jaws generally constitute sharp and pointed components which, upon release of the ski boot from the ski, can be dangerous to the skier.

SUMMARY OF THE INVENTION

Hence, it is a primary object of the present invention to overcome the aforementioned disadvantages which are present with prior art ski brake mechanisms.

It is another and more specific object of the present invention to provide a new and improved construction of ski brake wherein the components required for mounting the brake element or elements extend only to a slight extent over the top surface of the ski and the brake jaws are designed in such a manner that they do not constitute any potential source of danger for the skier.

Now in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the invention contemplates a ski brake mechanism wherein the components of the locking element-pawl arrangement of

the brake mechanism which are employed for holding or retaining the brake element in its arrested and preparatory position are arranged at the base of the brake element or elements and in a mounting or bearing body connected with the ski. In this way, there is realized the result that the components of the locking element-pawl arrangement are arranged directly above the top surface of the ski and additionally the brake element, apart from the loads which occur when carrying out its function, is not subjected to any further loads.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. **1** is a side view of a brake mechanism arranged behind an automatic heel step-in safety binding, wherein the control device of the brake mechanism for the automatic release of the arrested position of the brake element and the transfer thereof into the preparatory position is arranged at the region of the ski boot;

FIG. **2** is a plan view of the arrangement of FIG. **1**;

FIG. **3** is a schematic view taken from behind the brake mechanism of FIG. **1** with a released brake element which is located in its braking position whereas the arrested position has been depicted in broken or phantom lines;

FIGS. **4***a* and **4***b* are respective sectional views through the locking element-pawl arrangement along the line IV — IV in FIG. **2**; FIG. **4***a* depicting the arrested position of the brake element and FIG. **4***b* showing the preparatory position thereof, there also being depicted a part of the control device for the automatic release of the preparatory position and the transfer of the brake mechanism into the braking position;

FIG. **5** is a view looking from the rear of a brake mechanism with a traction cable for displacing the brake element from its ski braking position into its arrested position;

FIG. **6** is a fragmentary plan view of the brake mechanism depicted in FIG. **5**; and

FIG. **7** is a cross-sectional view of the arrangement of FIG. **6**, taken substantially along the line VII—VII thereof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, in FIGS. **1** and **2** reference character **1** generally designates any suitable and therefore not particularly described conventional safety ski binding, such as an automatic heel step-in safety binding which can be opened or released by depressing a release or actuating lever **4** mounted at a pivot shaft or axis **3**. The automatic heel step-in binding **1** is mounted so that it may be either lengthwise adjustable or fixed at a base or mounting plate **7**. The base or mounting plate **7**, in the arrangement of FIG. **1**, carries at its elongated rear portion **8** a ski brake mechanism, generally designated by reference character **10**. In front of the base plate **7** there is secured a ski boot sole receiving ledge or plate **11** for convenient placement of the ski boot thereon.

As best seen by referring to FIG. **2**, the ski brake **10** also can be secured separate from the base or mounting plate **7** by means of a base or bottom plate **9** to the sur-

face of the ski. With the large number of safety ski bindings which are employed at the present time, the separate mounting arrangement constitutes the most generally employed arrangement,

The ski brake or brake mechanism **10** is mounted at a bearing or mounting body 2' which is constructed in the form of a web **2***a* of relatively small height and arranged transversely with respect to the ski **5**. The bearing body 2' has associated therewith an auxiliary web 2''. At the web components 2' and 2'', there is installed an actuation spring for the brake elements **16** and **17** embodying the brake jaws **16***a* and **17***a* respectively, and the locking element-pawl arrangement, as will be described more fully hereinafter in conjunction with FIGS. **4***a* and **4***b*.

In order to actuate the ski brake **10**, in other words for the automatic transfer thereof from the arrested position into the preparatory position, and as soon as the ski boot is placed into the ski binding, there is provided a control device or element, generally designated by reference character **12**, and which establishes a connection between the non-illustrated ski boot and ski brake **10**. The control device **12** incorporates a suitable traction or pressure element **15** which is subjected to spring force and extends to the region of the ski brake **10**, as best seen by referring to FIG. **2**. At both rear ends **23** of such traction- or pressure element **15** there is secured an arm or bracket **24** which engages by means of a pin **25** at a beam **26**. Beam **26** is connected with bolts **28** which can be adjustably secured by means of a threaded element **28'** and a counter nut member **29**. Further, it will be noted that the control device **12** possesses at the region of the ski boot a bracket **19** which is pivotably mounted at the ledge or plate **11**, this bracket **19** being connected by means of a tension band **18** flexed at its ends with the zig zag spring **20**. The spring **20** is arranged in a recess **21** of the ledge or plate **11**. The spring **20** strives to displace the element **15** to the right of FIG. **2**, so that the bracket **19** is raised. Upon stepping down upon the bracket **19** against the action of the spring **20** the transmission element **15** with the members **24, 25, 26** arranged at the ends **23** are displaced towards the left, and the sleeve **33** is shifted out of the bore **30** and thus there is released the arrested position.

From the showing of FIG. **3**, there can be especially recognized the contour or shape of the brake jaws **16***a* and **17***a* of the brake elements **16** and **17** respectively which are journalled to the shafts **32***a* connected with the torsion springs. In the arrested position, the respective serrated teeth or zigzag portions **16***b* and **17***b* are located over one another whereas the arms **16'** and **17'** thereof are located adjacent one another and are designed to be at least twice as wide as the width of the brake jaws **16***a* and **17***a*. In this way it is possible to completely fabricate the brake jaws **16***a* and **17***a* from plastic, thereby considerably minimizing the danger of accidents.

The locking element-pawl arrangement can be best seen by referring to FIG. **4***a* and **4***b*. The bolt **28** which is actuated by the control device **12**, is guided in a locking bore **30** at the auxiliary web 2'' and possesses at its free end a stepped portion **31** which forms the locking portion for establishing the preparatory position of the brake jaws **16** and **17**. The torsion spring **32**, which is accommodated in the web 2', is operatively connected via the shafts **32***a* with the brake elements **16** and **17** and brings such, upon release from the preparatory position, into their braking position as the same has been depicted in FIG. **3**. As best seen by referring to FIGS. **1, 2, 4***a* and **4***b* at the foot or base of the brake jaw arms **16'** and **17'** there is mounted a bevelled bushing or sleeve **33** having the bevel **36** and which is guided so as to be non-rotatable but axially displaceable within a bushing or sleeve **34**. In the bushing **34** there is arranged a pressure or compression spring **35**, the spring force of which acts upon the sleeve or bushing **33** and presses such towards the auxiliary web 2''. During the transition from the arrested to the the preparatory position the brake element moves slightly to raise the sleeve **33** out of alignment with the bushing **34**. As shown in FIG. **4***b* the bevel **36** of the sleeve then bears against the wall of the web 2''.

In the arrested position, which has been depicted in FIG. **4***a*, the sleeve **33** engages in the bore **30**, whereas in the preparatory position in which the axis of the sleeve **33** is located somewhat higher than the axis of the bolt **28**, the preparatory pawl of the bolt **28** engages in the bore of the sleeve **33** and thus retains the brake jaws in their preparatory position.

Since the arrangement of the components as depicted in FIG. **4***b* occurs upon depressing the control device **12**, when the ski boot leaves the ski binding the bolt **28** can thus assume the position depicted in FIG. **4***a*, whereby the sleeve **33** with its bevelled portion **36** is released, with the result that the brake jaws are rocked owing to the force of the torsion springs **32** into their braking position.

Now in FIGS. **5** to **7** there is depicted a further exemplary embodiment of brake mechanism designed according to the teachings of this development.

Here the bearing body 2' is secured in any suitable and therefore not particularly illustrated manner to the top surface of the ski **5**, for instance by means of screws. At the bearing body 2' there are rotatably mounted upon bolts 7' two brake elements, of which for convenience in illustration only the one brake element **60** has been illustrated.

In FIGS. **5** and **6** there are depicted the means rendering it possible to simultaneously bring the brake elements **60** out of their brake position into their arrested position. To this end, there is employed a tension or traction cable **75** which is entrained by means of both of its ends about a respective pin **76** which is fixedly connected with the associated brake element **60**, and which together with the brake element **60** is rotatably mounted upon the bolts 7', so that upon drawing up the cable **75** by means of a pull ring **77** or the like both of the brake elements are simultaneously brought from the braking position, against the action of a torsion spring **74** acting as a pivot spring for the corresponding brake element **60**, into the arrested position.

The bearing body 2' advantageously can be a part of an attachment plate **78** secured to the ski **5**, this attachment plate **78** also carrying the heel portion **79** of a ski binding provided with a release lever **80**.

Continuing, it is to be understood that reference characters **63'** and **64'** respectively constitute the arresting pawl **63'** and the preparatory pawl **64'** which cooperate with a portion **60'** of the braking element **60**, and the function of which has been described in detail in my aforementioned U.S. Pat. No. **3,704,024**. The pawl **63'** is resiliently mounted in horizontal position in a body **81** connected with the bearing body 2' and upon

depressing the retaining or holding bracket **73** is displaced back by the preparatory pawl **64** which is coupled with the holding or retaining bracket **73**, so that the brake element **60** can engage with the preparatory pawl **64'**. Since the preparatory pawl **64'** is arranged at a greater height than the arresting pawl **63'** upon transfer of the portion **60'** of the brake element from the arresting position into the preparatory position, it is no longer possible to return back into the arresting position, unless of course the braking element **60** is again depressed. To this end, there is provided a holddown bolt **82** which is secured to the braking element **60**, wherein however it is necessary to release the holding or retaining bracket **73** in order that the preparatory pawl **64'** can be displaced back by the spring loaded arresting pawl **63'**.

The holddown bolt **82** is advantageously actuated by the release lever **80** of the heel portion of the ski binding. If for the purpose of climbing out of the ski binding, the release lever **80** is depressed, then the holddown bolt **82** and therefore the brake element **60** are depressed, so that is can engage with the arresting pawl **63'**. As soon as the brake element **60** has engaged with the arresting pawl **63'**, then the release lever **80** can be released. In this manner there is attained the result that upon climbing out of the ski there is avoided release of the brake mechanism.

The holddown bolt **82** also could be secured to the release lever **80** and upon depression thereof pushes down the brake element **60.**

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto, but may be otherwise variously embodied and practiced within the scope of the following claims. Accordingly,

What is claimed is:

1. A brake mechanism adapted to be secured to a ski having a safety ski binding for braking the ski, comprising at least one braking element which upon release of the ski boot from the ski binding is automatically movable from a preparatory braking position, disposed above the running surface of the ski, downwardly into a ski braking position, to thereby engage the snow for the purpose of exerting a braking force upon the ski, a control element actuable upon inserting the ski boot into the ski binding for retaining said braking element in a preparatory braking position constituting a non-braking position, so that upon release of said control element said braking element moves from said preparatory braking position into said ski braking position, said braking element assuming an arrested position for convenient transport and storage during non-use of the ski, a locking element-pawl arrangement having components for holding said braking element in the arrested and preparatory braking positions, the improvement comprising; a bearing body including transverse web means extending upwardly from the ski for mounting said braking element, said braking element having an arm including a transversely extending base region,

means for pivotally mounting the braking element about a longitudinal axis on said web means such that said base region of said arm extends adjacent the web means, said means for pivotally mounting including torsion spring means for biasing said braking element to pivot outwardly of the ski;

said components comprising a bolt mounted for longitudinal movement along its axis within a bore in said web means,

means interconnecting said control element and said bolt for simultaneous movement,

said bolt including a stepped end of reduced diameter,

said components further comprising a sleeve mounted for axial and non-rotatable longitudinal movement within said base region of said braking element, a compressed spring within said base region biasing the sleeve to extend from the brake element into said bore in the web means, a second bore in said sleeve sized to receive only said steped end of the bolt, said stepped bolt end having a diameter less than the diameter of said second bore, said sleeve further having a beveled end sloping downwardly away from the web means;

said sleeve when engaging with the first said bore holding the braking element in the arrested position, said control element upon insertion of the ski boot into the ski binding moving said bolt so as to displace the sleeve out of said bore to release the brake from the arrested position of the braking element and to permit the braking element to assume the preparatory position, said sleeve bore in cooperative action with the stepped end of said bolt holding the braking element in the preparatory position, the braking element being pivoted into the braking position upon release of the control element upon departure of the ski boot from the binding and corresponding movement of the stepped end out of said second bore.

2. The brake mechanism as defined in claim **1**, wherein said web means is of low height in relation to the ski binding and arranged transversely with respect to the ski and having an auxiliary web and the components of the locking element-pawl arrangement actuated by the control element being mounted substantially in parallel with respect to the lengthwise axis of the ski.

3. The brake mechanism as defined in claim **1**, wherein the braking element incorporates both said arm and a brake jaw connected therewith said brake jaw possesses a width which does not exceed the width of the ski and in its ski braking position said brake jaw extends beneath the ski as well as laterally therefrom.

4. The brake mechanism as defined in claim **3**, wherein the arm has at least double the longitudinal thickness of the brake jaw.

5. The brake mechanism as defined in claim **1**, having two braking elements, said components of the locking element-pawl arrangement including a pair of said bolts connected by a common beam, and said control element incorporating means engaging with the beam for displacing said bolts.

* * * * *