Claims

1. A thermochromic writing instrument, comprising: a writing body storing a thermochromic ink therein, stored in a barrel; an operation body provided at the barrel and configured to be operated to longitudinally move the writing body; a nib of the writing body configured to be capable of appearing from a front end of the writing instrument, wherein

the writing instrument further includes a friction unit, configured for rubbing handwriting in the thermochromic ink and capable of thermally changing the color of the handwriting by frictional heat generated ~~at that time~~ by the rubbing operation, and

the barrel includes a front barrel, an intermediate barrel coupled to a rear end of the front barrel, and a rear barrel coupled to a rear end of the intermediate barrel, a longitudinally extending slide hole is provided in a side wall of the intermediate barrel, the operation body is ~~placed~~ disposed in the slide hole and the friction unit is provided at a rear end of the rear barrel independently of the operation body, and the front barrel and the intermediate barrel are screwed together to be detachably coupled ~~by screwing~~, and ~~thus~~ the writing body ~~can be~~is replaceable.

2. A thermochromic writing instrument, comprising: a writing body storing a thermochromic ink therein, stored in a barrel; an operation body provided at the barrel and configured to be operated to longitudinally move the writing body; a nib of the writing body configured to be capable of appearing from a front end of the writing instrument, wherein

the writing instrument further includes a friction unit, configured for rubbing handwriting in the thermochromic ink and capable of thermally changing the color of the handwriting by frictional heat generated ~~at that time,~~ by the rubbing operation and

the barrel includes a front barrel, an intermediate barrel coupled to a rear end of the front barrel, and a rear barrel coupled to a rear end of the intermediate barrel, a longitudinally extending slide hole is provided in a side wall of the rear barrel, the operation body is ~~placed~~ disposed in the slide hole and the friction unit is provided at a rear end of the rear barrel independently of the operation body, and the front barrel and the intermediate barrel are screwed together to be detachably coupled ~~by screwing~~, and ~~thus~~ the writing body ~~can be~~ is replaceable.

3. The thermochromic writing instrument of claim 1 or 2, wherein the front barrel is provided with a grip unit made from an elastic material.

4. The thermochromic writing instrument of any one of claims 1 through 3, wherein a first or second long hole longitudinally extending and opened at a front or rear end is provided respectively on respective side walls of the intermediate barrel and the rear barrel are coupled

together, and ~~when coupling the intermediate barrel and the rear barrel,~~ the longitudinally extending slide hole is formed by the first long hole and the second long ~~holes form the slide~~ hole in communication with each other.

5. The thermochromic writing instrument of claim 4, wherein respective side walls of the intermediate barrel and the rear barrel are coupled to radially overlap with each other, and the first and second long holes form the slide hole in communication with each other in a condition radially overlapping with each other.

~~6. The thermochromic writing instrument of claim 4 or 5, wherein the operation body is assembled with the slide hole obtained by:~~
~~inserting a base portion of the operation body into the first long hole provided in the intermediate barrel; and~~
~~forming the slide hole by coupling the rear barrel to the intermediate barrel to communicate the second long hole with the first long hole.~~

~~7~~6. The thermochromic writing instrument of any one of claims 1 through ~~6~~5, wherein the thermochromic writing instrument includes a cam mechanism in the intermediate barrel as an appearance mechanism putting the nib of the writing body from a retraction condition into a projection condition, the cam mechanism includes a cam and a projection capable of alternately engaging with each other at longitudinally different positions, and by slide operating the operation body forward, the cam and the projection are alternately engaged with each other at longitudinally different positions to alternately put the nib of the writing body in the projection condition or the retraction condition.

~~8~~7. The thermochromic writing instrument of claim ~~7~~6, wherein the intermediate barrel includes therein, as the appearance mechanism, a plurality of longitudinally extending cam teeth and cam grooves alternately placed along a circumferential direction, a rotary member having a plurality of projected ribs rotatably placed in the rear of the writing body and capable of alternately engaging with the cam teeth or the cam grooves, another plurality of cam teeth provided in the operation body and turning the rotary member, and the front barrel includes a biasing member biasing the writing body backward,

by slide operating the operation body forward against a biasing force of the biasing member, the projected ribs being alternately engaged with the cam teeth or the cam grooves to alternately put the nib of the writing body in the projection condition or the retraction condition.

~~9~~8. The thermochromic writing instrument of claim ~~8~~7, wherein the operation body has a stem stored in the intermediate barrel and extending longitudinally, and the stem and the rotary member are locked to each other in a condition having longitudinal allowance.

~~10~~9. The thermochromic writing instrument of any one of claims 1 through ~~9~~8, wherein the thermochromic writing instrument includes only a single clip body as the operation body, and by operating the single clip body, the nib of the writing body is enabled to be put in a projection condition and a retraction condition.

~~11~~10. The thermochromic writing instrument of claim ~~10~~9, wherein a longitudinally extending guide groove is formed on an outer surface of the intermediate barrel forward of the slide hole, a projected bump is provided on a front inner surface of the clip body, and the bump longitudinally slides in the guide groove in association with a longitudinal movement of the clip body.

~~12~~11. The thermochromic writing instrument of any one of claims 1 through ~~11~~10, wherein the friction unit is made from a low wear elastic material, and a portion of the friction unit abuts on the clip body in a nib retraction condition.

~~13~~12. The thermochromic writing instrument of any one of claims 1 through ~~12~~11, wherein the friction unit is made from a low wear elastic material, and is fastened to the rear end of the rear barrel by press fitting, engaging, screwing, fitting, adhesion, and two color molding, or an entire of the rear barrel is formed with the elastic material as the friction unit.

~~14~~13. The thermochromic writing instrument of any one of claims 1 through ~~13~~12, wherein an outward projection is formed on an outer surface of the intermediate barrel, an inward projection is formed on an inner surface of the rear barrel, and the outward projection on the outer surface of the intermediate barrel and the inward projection on the inner surface of the rear barrel climb over and are engaged with each other.

~~15~~14. The thermochromic writing instrument of claim ~~8~~7, wherein the operation body has a stem stored in the intermediate barrel and extending longitudinally, a cylindrical body attached to the stem, a plurality of guide projections is formed on the outer surface of the cylindrical body, the guide projections are engaged with the cam grooves longitudinally movably therealong, a plurality of cam teeth is formed at the front end of the cylindrical body, and the cam teeth of the cylindrical body abut on the projected ribs of the rotary member.

~~16~~15. The thermochromic writing instrument of claim ~~15~~14, wherein an outward projection is formed on an outer surface of the stem, an internal hole penetrates longitudinally the cylindrical body, an inward projection is formed on an inner surface of the internal hole, and the outward projection on the outer surface of the stem and the inward projection on the inner surface of the internal hole climb over and are engaged with each other.