13 is made steeper, an increase occurs in the amount of relative rotation between the rear barrel and the front barrel, or in other words an amount of rotary torque required in an operation for rotating the cam main body about a central axis of the barrel, leading to a reduction in the operability of the composite writing implement. In other words, a problem exists in that when the movement amount of the writing shaft is increased, the amount of rotary torque required in the operation to rotate the cam main body also increases.

[0011] An embodiment of the present invention has been designed to solve the problem described above, and an object thereof is to provide a composite writing implement with which it is possible to suppress an increase in an amount of rotary torque required during an operation to rotate a cam main body when a movement amount of a writing shaft is increased.

[Solution to Problem]

[0012] To solve the problem described above, a composite writing implement according to an embodiment of the present invention includes: a barrel having an opening provided in a front end side thereof; a plurality of writing shafts housed in the barrel; a cam main body configured to rotate about a central axis of the barrel, and including a cam projection projecting toward the front end side, an end surface extending along the cam projection so as to face the front end side, and a latch recess provided in an apex part of the cam projection; and a plurality of sliders configured to be connected to respective rear ends of the plurality

of writing shafts, each of the sliders including a cam configured to be latchable to the latch recess of the cam main body, and having a sliding contact surface facing a rear end side to be pressed against the end surface, wherein the end surface includes a first inclined portion that is positioned on the front end side of the cam projection and is inclined relative to the central axis by a first incline angle, and a second inclined portion that is positioned further toward the rear end side of the cam projection than the first inclined portion, and is inclined relative to the central axis by a second incline angle that is larger than the first incline angle, and wherein, when one of the plurality of writing shafts is caused to project, the sliding contact surfaces of the sliders of other writing shafts contact the second inclined portion of the end surface of the cam main body, and as a result of the contact, the cam of the slider latched to the latch recess is configured to obtain a generated rotational reaction force when traveling over the latch recess.

[0012a] A composite writing implement according to another embodiment of the present invention includes: a barrel having an opening provided in a front end side thereof; a plurality of writing shafts housed in the barrel; a cam main body configured to rotate about a central axis of the barrel, and including a cam projection projecting toward the front end side, an end surface extending along the cam projection so as to face the front end side, and a latch recess; and a plurality of sliders configured to be connected to respective rear ends of the plurality of writing shafts, each of

the sliders including a cam configured to be latchable to the latch recess, and having a sliding contact surface facing a rear end side to be pressed against the end surface, wherein the end surface includes a first inclined portion that is positioned on the front end side of the cam projection and is inclined relative to the central axis by a first incline angle, and a second inclined portion that is positioned further toward the rear end side of the cam projection than the first inclined portion, and is inclined relative to the central axis by a second incline angle that is larger than the first incline angle, and wherein, after one of the plurality of writing shafts is caused to project, the sliding contact surfaces of the sliders of remaining writing shafts contact the second inclined portion of the end surface of the cam main body.

[Advantageous Effects of Invention]

[0013] According to this embodiment of the present invention, it is possible to provide a composite writing implement with which it is possible to suppress an increase in an amount of rotary torque required during an operation to rotate the cam main body when a movement amount of the writing shaft is increased.

[Brief Description of Drawings]

[0014]

[Fig. 1]

Fig. 1 is a sectional view illustrating a composite writing implement according to an embodiment of the present invention, deployed along a plane that includes the central axis of the

CLAIMS

1. A composite writing implement, comprising:

a barrel having an opening provided in a front end side thereof;

a plurality of writing shafts housed in the barrel;

a cam main body configured to rotate about a central axis of the barrel, and including a cam projection projecting toward the front end side, an end surface extending along the cam projection so as to face the front end side, and a latch recess provided in an apex part of the cam projection; and

a plurality of sliders configured to be connected to respective rear ends of the plurality of writing shafts, each of the sliders including a cam configured to be latchable to the latch recess of the cam main body, and having a sliding contact surface facing a rear end side to be pressed against the end surface,

wherein the end surface includes a first inclined portion that is positioned on the front end side of the cam projection and is inclined relative to the central axis by a first incline angle, and a second inclined portion that is positioned further toward the rear end side of the cam projection than the first inclined portion, and is inclined relative to the central axis by a second incline angle that is larger than the first incline angle, and

wherein, when one of the plurality of writing shafts is caused to project, the sliding contact surfaces of the sliders of other writing shafts contact the second inclined portion of the end surface of the cam main body, and as a result of the contact, the cam of the slider latched to the latch recess is configured to obtain a generated rotational reaction force when traveling over the latch recess.

2. The composite writing implement according to claim 1, wherein the end surface further includes a third inclined portion that connects the first inclined portion to the second inclined

portion, and is inclined relative to the central axis at a third incline angle that is larger than the second incline angle.

3. The composite writing implement according to claim 2, wherein a connecting portion between the first inclined portion and the third inclined portion, and another connecting portion between the second inclined portion and the third inclined portion, are formed as curved surfaces.

4. The composite writing implement according to claim 1, further comprising a fourth inclined portion forming a rear end recess in which a draw-in amount of the writing shaft reaches a maximum in a position opposing the latch recess in a circumferential direction of the cam main body.

5. The composite writing implement according to claim 1, wherein the end surface further includes a fourth inclined portion forming a rear end recess.

6. The composite writing implement according to claim 5, wherein, in the rear end recess, a draw-in amount of the writing shaft reaches a maximum in a position opposing the latch recess in a circumferential direction of the cam main body.

7. The composite writing implement according to claim 6, wherein the fourth inclined portion continuously extends from the second inclined portion.

8. The composite writing implement according to claim 6, wherein a connecting portion between the second inclined portion and the fourth inclined portion includes a curved surface.

9. The composite writing implement according to claim 2, wherein the end surface further includes a fourth inclined portion forming

a rear end recess.

10. The composite writing implement according to claim 9, wherein, in the rear end recess, a draw-in amount of the writing shaft reaches a maximum in a position opposing the latch recess in a circumferential direction of the cam main body.

11. The composite writing implement according to claim 10, wherein the fourth inclined portion continuously extends from the second inclined portion.

12. The composite writing implement according to claim 11, wherein a connecting portion between the second inclined portion and the fourth inclined portion includes a curved surface.

13. The composite writing implement according to claim 1, wherein, after said one of the plurality of writing shafts is caused to project, the sliding contact surfaces of each of the sliders of the other writing shafts contact the second inclined portion of the end surface of the cam main body.

14. The composite writing implement according to claim 1, wherein, after said one of the plurality of writing shafts is caused to project, the sliding contact surfaces of each of the sliders of the other writing shafts only contact the second inclined portion of the end surface of the cam main body.

15. The composite writing implement according to claim 1, wherein, after said one of the plurality of writing shafts is caused to project, the sliding contact surfaces of each of the sliders of the other writing shafts abut the second inclined portion of the end surface of the cam main body.

16. The composite writing implement according to claim 1,

wherein, after said one of the plurality of writing shafts is caused to project, the sliding contact surfaces of each of the sliders of the other writing shafts are biased at all times against the end surface of the cam main body.

17. A composite writing implement, comprising:

a barrel having an opening provided in a front end side thereof;

a plurality of writing shafts housed in the barrel;

a cam main body configured to rotate about a central axis of the barrel, and including a cam projection projecting toward the front end side, an end surface extending along the cam projection so as to face the front end side, and a latch recess; and

a plurality of sliders configured to be connected to respective rear ends of the plurality of writing shafts, each of the sliders including a cam configured to be latchable to the latch recess, and having a sliding contact surface facing a rear end side to be pressed against the end surface,

wherein the end surface includes a first inclined portion that is positioned on the front end side of the cam projection and is inclined relative to the central axis by a first incline angle, and a second inclined portion that is positioned further toward the rear end side of the cam projection than the first inclined portion, and is inclined relative to the central axis by a second incline angle that is larger than the first incline angle, and

wherein, after one of the plurality of writing shafts is caused to project, the sliding contact surfaces of the sliders of remaining writing shafts contact the second inclined portion of the end surface of the cam main body.

18. The composite writing implement according to claim 17, wherein the end surface further includes a third inclined portion that connects the first inclined portion to the second inclined portion, and is inclined relative to the central axis at a third

incline angle that is larger than the second incline angle.

19. The composite writing implement according to claim 18, wherein the end surface further includes a fourth inclined portion forming a rear end recess.

20. The composite writing implement according to claim 19, wherein, in the rear end recess, a draw-in amount of the writing shaft reaches a maximum in a position opposing the latch recess in a circumferential direction of the cam main body.