Arrangement of a throttle cable in a straddle type vehicle

To provide a wiring structure of a throttle cable in a straddle type vehicle in which it is hard to exert the influence upon the volume of a container box.

A wiring structure of a throttle cable 58 comprises a vehicle body frame 11, a unit swing engine 50 being supported on the vehicle body frame 11 in a swingable fashion, a container box 71 being arranged above the engine 50, an intake passage 55 extending from a cylinder section 50a of the engine 50 rearwardly along an engine main body 50B in such a way as to pass through between the container box 71 and the engine main body 50B, a throttle valve 56 being provided in the intake passage 55 so as to open and close the intake passage 55, a throttle cable 58a on the opening side and a throttle cable 58b on the closing side being fitted to a throttle drum 57 for operating the throttle valve 56. The throttle cable 58a on the opening side and the throttle cable 58b on the closing side are arranged side by side in the forward and backward direction of the vehicle substantially horizontally above the intake passage 55.
The present invention relates to a wiring structure of a throttle cable in a straddle type vehicle and, in particular, to the wiring structure of the throttle cable in the straddle type vehicle which is equipped with a unit swing engine on a vehicle body frame thereof.

BACKGROUND ART

With respect to the wiring structure of the throttle cable in a conventional straddle type vehicle, there is well known the straddle type vehicle in which the throttle cable for opening and closing a throttle valve is connected to a rotational grip of a steering handle and arranged between the throttle valve and the grip. With respect to the throttle cable, there are disclosed two throttle cables composed of the throttle cable on the pull side and the throttle cable on the return side each of which is connected to the grip, for example in JP 2010-221988.

DISCLOSURE OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

In such vehicle having the throttle cable on the pull side (hereinafter, referred also to as “throttle cable on the opening side”) and the throttle cable on the return side (hereinafter, referred also to as “throttle cable on the closing side”) which becomes the pull side when the grip is returned, the number of throttle cables is increased and so ways and means for wiring are required to be figured out. In particular, since, in the straddle type vehicle provided with a swingable unit swing engine for example, a container box is provided above the engine, a predetermined space has to be provided for preventing these throttle cables from interfering with the engine at the time of swinging motion thereof. Like this, the throttle cables exert an influence upon the volume of the container box. Therefore, it is required that the wiring structure of the throttle cables which hardly exerts the influence upon the volume of the container box is provided even in the vehicle which has two throttle cables on the pull side and on the return side.

MEANS FOR SOLVING THE PROBLEM

In order to achieve the above object, according to a first feature of the present invention, there is provided a wiring structure of a throttle cable in a straddle type vehicle comprising a vehicle body frame, a unit swing engine being supported on the vehicle body frame in a swingable fashion, a container box being arranged above the unit swing engine, an intake passage extending from a cylinder section of the unit swing engine rearwardly along an engine main body in such a way as to pass through between the container box and the engine main body, a throttle valve being provided in the intake passage so as to open and close the intake passage, a throttle drum for operating the throttle valve, a throttle cable on the opening side being fitted to the throttle drum so as to operate the throttle valve toward the opening side and a throttle cable on the closing side being fitted to the throttle drum so as to operate the throttle valve toward the closing side, wherein the throttle cable on the opening side and the throttle cable on the closing side are arranged side by side in the forward and backward direction of the vehicle substantially horizontally above the intake passage.

According to a second feature of the present invention, in addition to the first feature, the throttle cable on the opening side and the throttle cable on the closing side are fitted to the throttle drum in an upwardly and downwardly spaced apart condition in a side view. On an upper surface of the intake passage, the cable connected to an upper side of the throttle drum is arranged on the front side with respect to the vehicle body, while the cable connected to a lower side of the throttle drum is arranged on the rear side with respect to the vehicle body.

According to a third feature of the present invention, in addition to the first or second feature, the throttle cable on the opening side and the throttle cable on the closing side are arranged below an extension of a straight line connecting an uppermost portion of a throttle body and an uppermost end of an injector.

According to a fourth feature of the present invention, in addition to any one of the first to third features, the throttle cable on the opening side and the throttle cable on the closing side are kept in an arrangement position above the intake passage by a drum side holder on the side where the throttle drum is provided and by a counter drum side holder provided on the opposite side of the throttle drum.

EFFECTS OF THE INVENTION

According to the first feature of the present invention, since the throttle cable on the opening side and the throttle cable on the closing side which are located above the intake passage and below the container box are arranged substantially horizontally side by side in the forward and backward direction of the vehicle, a space occupied by these throttle cables in the upward and downward direction of the vehicle body can be restrained. As a result, a bottom of the container box is allowed to be prevented from being occupied by these throttle cables in the upward and downward direction of the vehicle as well.
crease of the space occupied by these throttle cables, so that the volume of the container box can be increased.

According to the second feature of the present invention, the throttle cable on the opening side and the throttle cable on the closing side which are connected to the throttle drum while passing through an upper surface of the intake passage are fitted to the throttle drum in an upwardly and downwardly spaced apart condition in a side view. The cable connected to the upper side of the throttle drum is arranged on the front side with respect to the vehicle body, and the cable connected to the lower side of the throttle drum is arranged on the rear side with respect to the vehicle body. Therefore, the throttle cable on the opening side and the throttle cable on the closing side which are connected to the throttle drum arranged in either of left and right sides of the throttle body can be arranged on or close to the upper surface of the intake passage without crossing, whereby to improve the arrangeability.

According to the third feature of the present invention, since the throttle cable on the opening side and the throttle cable on the closing side are arranged and located below the extension of the straight line connecting the uppermost portion of the throttle body and the uppermost end of the injector, these throttle cables do not occupy an arrangement space for the container box which is located above the engine, so that the influence upon the volume of the container box can be decreased.

According to the fourth feature of the present invention, since the throttle cable on the opening side and the throttle cable on the closing side are kept in a condition where these throttle cables are arranged substantially horizontally side by side in the forward and backward direction of the vehicle, by the drum side holder on the side where the throttle drum is provided and by the counter drum side holder provided on the opposite side of the throttle drum, the space occupied by these throttle cables in the upward and downward direction of the vehicle body is able to be restrained, so that the influence upon the volume of the container box can be decreased all the more.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a left side view of a straddle type vehicle equipped with a wiring structure of a throttle cable in accordance with the present invention;
FIG. 2 is a left side view of an essential part of the wiring structure of the throttle cable in the straddle type vehicle as shown in FIG. 1;
FIG. 3 is a right side view of the essential part of the wiring structure of the throttle cable in the straddle type vehicle as shown in FIG. 1;
FIG. 4 is an enlarged right side view of an area around a throttle body and an intake passage of the wiring structure of the throttle cable in the straddle type vehicle as shown in FIG. 1; and
FIG. 5 is a top plan view of the area around the throttle body and the intake passage of the wiring structure of the throttle cable in the straddle type vehicle as shown in FIG. 1.

BEST MODE FOR CARRYING OUT THE INVENTION

A scooter type vehicle as a straddle type vehicle in accordance with an embodiment of the present invention will be described hereunder with reference to accompanying drawings of FIGS. 1 to 5. Herein the drawings shall be viewed in the direction of reference characters, and in the following description, the orientation such as front, rear, left, right, upper, and lower shall be determined based on the direction viewed from an operator. In addition, in the drawings, a front of the vehicle is designated by a reference character Fr, a rear is designated by R, an upper side is designated by U, and a lower side is designated by D.

Referring first to FIG. 1, the scooter type vehicle 10 includes a vehicle body frame 11 forming a skeletal structure, a front wheel suspension and steering system 16 provided in a front part of the vehicle body frame 11 in order to suspend and steer a front wheel 81, a unit swing engine 50 provided in substantially a center part of the vehicle body frame 11 in suspended fashion in order to suspend and drive a rear wheel 82, a container box 71 and a fuel tank 72 mounted on a rear part of the vehicle body frame 11 and located above the unit swing engine 50.

The vehicle body frame 11 includes a vehicle body frame 11 forming a skeletal structure, a front wheel suspension and steering system 16 provided at an forward end thereof, a pair of left and right down frames 12 extending downwardly from the head pipe 15, a pair of lower frames 13 extending rearwardly from lower ends of the down frames 12, and a pair of rear frames 14 extending upwardly rearwardly from rear ends of the lower frames 13. Moreover, subframes 43 and step floor frames 44 functioning as a reinforcement frame are provided along the down frames 12 and lower frames 13. In addition, between the left and right frames of each pair there are provided properly a plurality of cross members (not shown in the drawing) which provide a connection between these frames.

The unit swing engine 50 includes a cylinder section 50a which extends substantially horizontally in the forward and backward direction of the vehicle body, and a rear wheel drive transmission section 60 which is provided with a non-stage transmission, etc. integrally formed in a rear part of an engine main body 50B. An output shaft 60a functioning as an axle shaft of the rear wheel 82 is provided at a rear end of the rear wheel drive transmission section 60 such that the driving force of a crank shaft 52a within a crank case 62 is transmitted properly to the output shaft 60a.

The front wheel suspension and steering system 16 includes a front fork 17 fitted in the head pipe 15
in a steerable fashion, and a bar handle 19 mounted on an upper end of a steering shaft 18 of the front fork 17 and provided with left and right handle grips 19a (only the left one is shown in the drawing).

[0019] In addition, an intake system 67 is mounted on an upper part of the rear wheel drive transmission section 60 provided in the rear part of the unit swing engine 50. An exhaust system (not shown) provided with an exhaust pipe 91 is mounted on a lower part of the unit swing engine 50. Further, a main stand 63 is attached to a lower part of the crank case 62.

[0020] A suspension structure for mounting the unit swing engine 50 on the vehicle body frame 11 includes a link mechanism 20L which holds a lower side of a front part of the engine 50, and a rear cushion unit 20R which holds the rear wheel drive transmission section 60 of the rear part of the engine 50. The link mechanism 20L, as shown in FIGS. 2 and 3, is supported on a front bracket 25 and has a first link member 21, a second link member 22 and a third link member 23. The link mechanism 20L is connected to a pivot portion 50p of the lower side of the front part of the engine 50 so as to carry the unit swing engine 50 in a swingable (rockable) fashion.

[0021] By the way, the vehicle body is covered properly with cover members such as a handle cover 65, a front cover 69, a step floor 74, a front fender 78 and a rear fender 79, etc. and with a seat 73. In addition, on a front part and a rear part of the vehicle there are provided a head lamp 66 and a tail lamp 76.

[0022] Further, the unit swing engine 50, as shown in FIG. 2, is provided with an intake passage 55 which extends from the cylinder section 50a to the rear of the vehicle body along the engine main body 50B. Namely, the intake passage 55 extends from the throttle body 54 toward the rear between the container box 71 and the engine main body 50B and is connected to the intake system 67. In the throttle body 54, a support shaft 56j passes through the inside of the intake passage 55, and a flap type throttle valve 56 is provided on the support shaft 56j so as to open and close the intake passage 55.

[0023] Further, as shown in FIGS. 3 and 4, the support shaft 56j supporting the throttle valve 56j is connected to a throttle drum 57 which is arranged on the right outer side (see FIG. 5) of the throttle body 54. This throttle drum 57 is formed in substantially a circular shape in a side view.

[0024] To an upper part and a lower part of the throttle drum 57 are connected cables. Namely, a throttle cable 58a on an opening side which rotates the throttle valve 56 toward the opening side thereof (in the direction of an arrow A) is connected to the lower part of the throttle drum 57, while a throttle cable 58b on the closing side which rotates the throttle valve 56 toward the closing side thereof (in the direction of an arrow B) is connected to the upper part of the throttle drum 57.

[0025] By the way, around the support shaft 56j, as shown in FIG. 5, there is provided a coil spring 57s which spring-biases the throttle drum 57 to the closing side (in a predetermined direction). Namely, the coil spring 57s arranged properly between the throttle drum 57 and the throttle body 54 is able to apply rotational force to the throttle drum 57 in the closing direction (in the direction of an arrow B).

[0026] Further, as shown in FIGS. 3 and 4, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side are fixed in a drum side holder 58h located immediately behind the throttle drum 57 in the side view. This drum side holder 58h holds the throttle cable 58a on the opening side and the throttle cable 58b on the closing side in an upwardly and downwardly spaced apart condition in a side by side relationship.

[0027] Herein, as shown in FIG. 5, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side include non-flexible curved pipe members 58ae and 58be (steel tubes in this embodiment) provided in distal ends of flexible outer tubes 58af and 58bf. The throttle cable 58a on the opening side and the throttle cable 58b on the closing side are held through the non-flexible curved pipe members 58ae, 58be by the drum side holder 58h. The outer tubes 58af, 58bf and the curved pipe members 58ae, 58be are connected by rubber members 58ak and 58bk located above the intake passage 55.

[0028] Moreover, as shown in FIG. 4, an inner cable wire 58aw of the throttle cable 58a on the opening side and an inner cable wire 58bw of the throttle cable 58b on the closing side are wrapped just in a predetermined degree around an outer circumference of the throttle drum 57. Each of distal ends 58at, 58bt of the inner cable wire 58aw and the inner cable wire 58bw are engaged in a wire retaining portion 57a. Accordingly, the throttle drum 57 is rotated in the A direction or in the B direction by a pulling movement of the inner cable wire 58a or by a returning movement of the inner cable wire 58bw so as to open and close the throttle valve 56. With respect to the operation of the throttle valve 56, the most curved portions of the cables are formed of the curved pipe members 58ae, 58be, so that the friction of each of the inner cable wires 48aw, 58bw can be reduced.

[0029] Further, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side are arranged on and pass through an upper surface of the intake passage 55. Namely, these throttle cables 58a, 58b are spaced apart from each other in relation to a drum upper side and a drum lower side and connected to the throttle drum 57 which is located on the right side of the throttle body 54. The throttle cable connected to the drum upper side of the throttle drum 57 is located on the front side with respect to the vehicle body, and the throttle cable connected to the drum lower side is located on the rear side such that they are arranged side by side substantially in the horizontal direction.

[0030] Further, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side are supported by the drum side holder 58h on the side where the throttle drum 57 is located, and by a counter drum.
side holder 59h located on the opposite side of the throttle drum 57, so as not to slip out of place.

[0031] Herein, the drum side holder 58h, as shown in FIGS. 4 and 5, is formed of a plate member of an L-shape in a horizontal cross section for example and fixed on the throttle body 54 by a fixing screw 58m, etc. In addition, the drum side holder 58h holds the throttle cable 58a on the opening side and the throttle cable 58b on the closing side by an upright portion thereof extending upwardly in the direction substantially orthogonal to the throttle body 54.

[0032] On the other hand, the counter drum side holder 59h, as shown in FIG. 5, is located on the opposite side of the drum side holder 58h, and a mounting base section 59b retaining a holder section 59a of a clip shape at a distal endpart thereof is fixed on the engine main body 50B by a fixing screw 59m, etc. In addition, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side each of which runs from the drum side holder 58a are securely retained by the clip-shaped holder section 59a in a condition where they are arranged side by side in the obliquely upward direction (see FIGS. 4 and 5).

[0033] Further, on the throttle cable 58a on the opening side and the throttle cable 58b on the closing side there are provided holder guides 58ag, 58bg in a position retained by the holder section 59a. In addition, these holder guides 58ag, 58bg have flange portions 58f for receiving the holder section 59a, in front and in the rear in the longitudinal direction thereof. Accordingly, by fitting the holder section 59a in engagement with insides of the flange portions 58f, 58g, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side are securely fixed so as not to slip out of place.

[0034] Like this, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side which are fixed by the drum side holder 58h and the counter drum side holder 59h are arranged side by side in the forward and backward direction of the vehicle body substantially horizontally above the intake passage 55, as shown in FIGS. 4 and 5, and maintained in position. Moreover, the throttle cables 58 are connected to the right handle grip 19a (the left handle grip is illustrated in FIG. 1), and, when the rider rotates the handle grip 19a in operation, the throttle drum 57 is rotated whereby to allow the throttle valve 56 to be opened and closed.

[0035] Further, in the unit swing engine 50, an injector 59 is arranged on the forward side of the throttle body 54. Fuel is fed to the injector 59 for example through a fuel hose 72a. In this embodiment, the injector 59 forms an uppermost end 59t which is an uppermost position in the front part of the engine 50. In addition, a virtual straight line TL connecting the upper post end 59t and an uppermost end 59t which is an uppermost position in the throttle body 54 forms a substantial uppermost line of the engine main body 50B. Accordingly, this straight line TL has an influence upon the position of a bottom surface 71b of the container box 71, and the throttle cable 58a on the opening side and the throttle cable 58b on the closing side in this embodiment are arranged in such a way as to be located below an extension of the straight line TL in the upward and downward direction of the vehicle body.

[0036] Like this, in this embodiment, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side located above the intake passage 55 and below the container box 71 are arranged substantially horizontally side by side in the forward and backward direction of the vehicle body. With this arrangement, a space occupied by these throttle cables 58a, 58b in the upward and downward direction of the vehicle body can be restrained. As a result, the bottom of the container box 71 is allowed to approach the intake passage 55 side in proportion to decrease of the space occupied by these throttle cables 58a, 58b, so that the volume of the container box 71 can be increased.

[0037] Further, in this embodiment, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side which are connected to the throttle drum 57 in such a way as to pass through the upper surface of the intake passage 55 are spaced apart from each other in the upward and downward direction in a side view. The cable connected to the upper side of the throttle drum 57 is arranged so as to be located on the front side with respect to the vehicle body, and the cable connected to the lower side of the throttle drum 57 is arranged so as to be located on the rear side with respect to the vehicle body. Therefore, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side which are connected to the throttle drum 57 arranged in either of left and right sides of the throttle body 54 can be arranged or close to the upper surface of the intake passage 55 without crossing, whereby to improve the arrangeability.

[0038] Further, in this embodiment, the throttle cable 58a on the opening side and the throttle cable 58b on the closing side are arranged and located below the extension of the straight line TL connecting the uppermost portion of the throttle body 54 and the uppermost end 59t of the injector 59. Thus, since these throttle cables 58a, 58b are located below the straight line TL which is the uppermost line of the engine main body 50B, they do not occupy an arrangement space for the container box 71 which is located above the engine 50, so that the influence upon the volume of the container box 71 can be decreased.

[0039] Furthermore, in this embodiment, since the throttle cable 58a on the opening side and the throttle cable 58b on the closing side are maintained in the arrangement position above the intake passage 55 by the drum side holder 58h on the side where the throttle drum 57 is located and by the counter drum side holder 59h located on the opposite side of the throttle drum 57. Namely, since these throttle cables 58a, 58b on the opening and closing sides are kept in such a good condition as to be arranged substantially horizontally even if a vibration is caused in the vehicle body, the space occupied
by these throttle cables 58a, 58b in the upward and downward direction of the vehicle body is able to be restrained, so that the influence upon the volume of the container box 71 can be decreased all the more.

[0040] As above, while the present invention has been described in its preferred embodiment, it is to be understood that the present invention is not limited to the above described embodiment, and that various changes and modifications may be made without departing from the scope of the present invention.

[0041] For example, also in the construction in which the throttle drum 57 is arranged on the left side of the throttle body 54, when the throttle cable connected to the upper side of the throttle drum 57 is located forwardly of the vehicle body and the throttle cable connected to the lower side of the throttle drum 57 is located rearwardly of the vehicle body, both the throttle cables 58a, 58b can be arranged on or close to the upper surface of the intake passage 55 without crossing.

[0042] In addition, in this embodiment, the supporting structure of the throttle cables 58 is not limited to the above embodiment and may be properly changed.

DESCRIPTION OF REFERENCE CHARACTERS


Claims

1. A wiring structure of a throttle cable (58) in a straddle type vehicle (10) comprising:

- a vehicle body frame (11);
- a unit swing engine (50) being supported on the vehicle body frame (11) in a swingable fashion;
- a container box (71) being arranged above the unit swing engine (50);
- an intake passage (55) extending from a cylinder section (50a) of the unit swing engine (50) rearwardly along an engine main body (50B) in such a way as to pass through between the container box (71) and the engine main body (50B);
- a throttle valve (56) being provided in the intake passage (55) so as to open and close the intake passage (55);
- a throttle drum (57) for operating the throttle valve (56);
- a throttle cable (58a) on the opening side being fitted to the throttle drum (57) so as to operate the throttle valve (56) toward the opening side;
- a throttle cable (58b) on the closing side being fitted to the throttle drum (57) so as to operate the throttle valve (56) toward the closing side;

2. A wiring structure of a throttle cable (58) in a straddle type vehicle (10) according to claim 1, wherein the throttle cable (58a) on the opening side and the throttle cable (58b) on the closing side are fitted to the throttle drum (57) in an upwardly and downwardly spaced apart condition in a side view, and wherein, on an upper surface of the intake passage (55), the cable connected to an upper side of the throttle drum (57) is arranged on the front side with respect to the vehicle body, and the cable connected to a lower side of the throttle drum (57) is arranged on the rear side with respect to the vehicle body.

3. A wiring structure of a throttle cable (58) in a straddle type vehicle (10) according to claim 1 or 2, wherein the throttle cable (58a) on the opening side and the throttle cable (58b) on the closing side are arranged below an extension of a straight line (TL) connecting an uppermost portion (54t) of a throttle body (54) and an uppermost end of an injector (59).

4. A wiring structure of a throttle cable (58) in a straddle type vehicle (10) according to any one of claims 1 through 3, wherein the throttle cable (58a) on the opening side and the throttle cable (58b) on the closing side are kept in an arrangement position above the intake passage (55) by a drum side holder (58h) on the side where the throttle drum (57) is provided and by a counter drum side holder (59h) provided on the opposite side of the throttle drum (57).
The present search report has been drawn up for all claims.
This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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For more details about this annex: see Official Journal of the European Patent Office, No. 12/82
REFERENCES CITED IN THE DESCRIPTION

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