

Dec. 30, 1958

K. FEND

2,866,437

WRITING IMPLEMENT

Filed Sept. 19, 1955

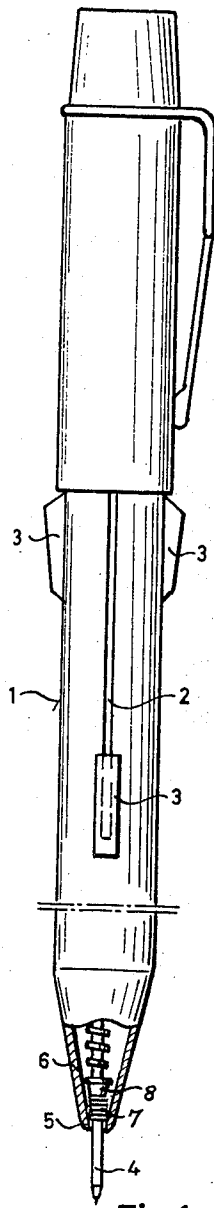


Fig. 1

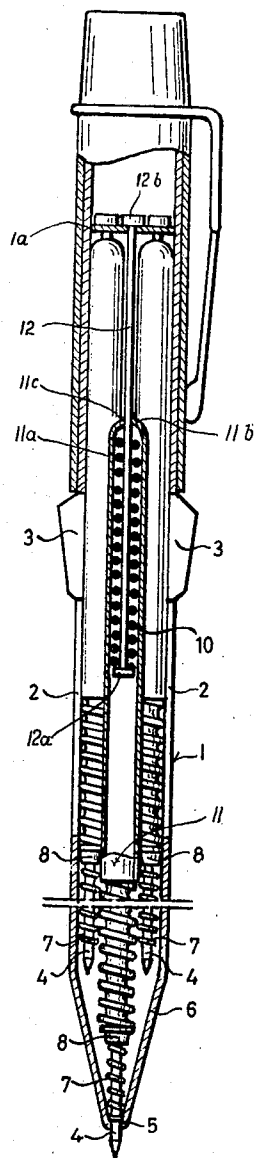


Fig. 2

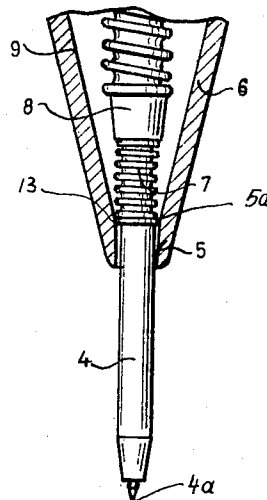


Fig. 3

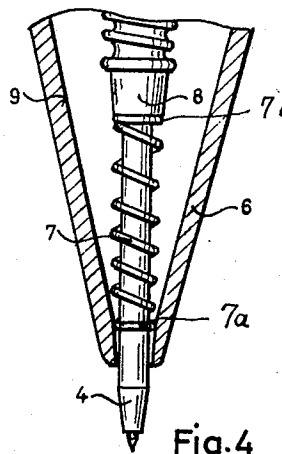


Fig. 4

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2,866,437

WRITING IMPLEMENT

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Application September 19, 1955, Serial No. 535,086

Claims priority, application Germany September 21, 1954

6 Claims. (Cl. 120—20)

The present invention relates to writing implements of the type in which a shiftable carrier of a writing means is advanced and retracted, and more particularly to an arrangement for supporting a shiftable carrier in the front end of the writing implement while the carrier and the writing means are in operative writing position.

Mechanical pencils and ball point pens are known in which the writing means, namely, the lead carrier, and the ball point carrier, respectively, are retracted in inoperative position and advanced to project out of the casing in operative writing position. The writing implements of this type according to the known art frequently have the drawback that the advanced carrier is not firmly supported in the bore in the front portion of the implement, but is loose which is highly undesirable. Particularly, writing implements of the type in which a plurality of selectively shifted carrier for writing means are provided have this disadvantage.

It has been proposed to provide clamping means for holding the carrier in the front end portion of the implement, but the known arrangements are complicated and require a special construction of the front end of the implement resulting in a bulky front end. The appearance of the implement is also detrimentally affected, particularly since the clamping means projects out of the casing.

It is one object of the present invention to overcome the disadvantages of the known art, and to provide a writing implement in which the carrier of the writing means is firmly held in the front end portion of the casing when the carrier is advanced into writing position.

It is another object of the present invention to firmly hold the carrier of the writing means in the front end portion of the casing by means which can be used with already manufactured writing implements.

It is a further object of the present invention to support the carrier of the writing means in the front end portion of the casing in a manner which permits movement of the carrier to a preliminary advanced position and then a slight retraction of the carrier to the normal writing position in which the carrier is still advanced as compared with the fully retracted inoperative position.

With these objects in view, the present invention mainly consists in a writing implement which comprises a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface; at least one carrier for writing means mounted in said casing for movement between a retracted inoperative position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier projecting only in said advanced positions through said bore, said carrier defining in said advanced positions with said annular surface an annular gap having a rear portion and a front portion; and wedging means resilient in direction of the carrier movement and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement

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and surrounding said carrier, said front end portion of said wedging means projecting into said rear portion of said annular gap in said advanced positions of said carrier and being retracted from the same in said retracted position of said carrier, one of said last-mentioned portions tapering in forward direction so that said front end portion of said wedging means is wedged in said rear portion of said annular gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end position of said wedging means is released for longitudinal resilient action of said wedging means.

According to a preferred embodiment of the present invention, the resilient tubular wedging means is a coil spring. If the writing implement is of the type in which the carrier of the writing means is first advanced to a preliminary advanced position and then retracted to normal writing position, the coil spring is compressed in the preliminary advanced position and expanded in the normal advanced writing position. It is possible to provide a coil spring which so tightly embraces the carrier that no special means for securing the coil spring to the carrier are necessary since friction is sufficient for connecting the coil spring to the carrier for movement therewith.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a side view, partly in section, of a writing implement according to the present invention shown in a preliminary advanced position;

Fig. 2 is a sectional view of a writing implement according to the present invention shown in an operative advanced position;

Fig. 3 is a fragmentary sectional view of a detail of Fig. 1 shown on an enlarged scale; and

Fig. 4 is a fragmentary sectional view of a detail of Fig. 2 shown on an enlarged scale.

Referring now to the drawing, the writing implement shown therein is illustrated to be of the type in which a plurality of carriers for writing means can be selectively advanced and retracted so that it is possible to write in different colors.

The casing 1 is formed with longitudinally extending slots 2, each slot guiding a manually operated member 3 which is connected to one of the carriers 11. The implement shown in the drawing has four carriers, and is clearly shown in Fig. 2, when one of the carriers 11 is moved forwardly, the other carriers remain in a retracted inoperative position. An operating member 3 is secured to each carrier 11 and moves in a slot in casing 1.

Each carrier 11 includes a cylindrical front end portion 4, and a rearwardly located hollow portion 11a which is constricted at its rear end 11b. A rod 12 passes through a bore 11c into the hollow portion 11a and has at its forward end an abutment 12a. A spring 10 is arranged between the abutment 12a and the rear end 11b of the hollow portion 11a. The rear end 12b of the rod 12 abuts against a transverse plate 1a fixed in the casing 1 so that the spring 10 tends to retract the carrier 11 from the advanced position in which one carrier 11 is shown in Fig. 1, to an operative advanced position shown in Fig. 2 and to a retracted position located within the casing in which two other carriers 11 are shown in Fig. 2. The well known operating mechanism is not

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illustrated in detail and is of the type in which the operated carrier is first advanced to a preliminary advanced position shown in Figs. 1 and 3 and then slightly retracted to an operative advanced writing position shown in Figs. 2 and 4 in which position the implement is ready for writing. The carriers 11 are operated by manually operated members 3, and if any one of the carriers is moved into the preliminary advanced position shown in Fig. 1, and the respective member 3 is released, the spring 10 retracts the respective carrier into the writing position shown in Fig. 2 where the carrier is arrested in a known manner so as to be immovable in axial direction.

In the illustrated embodiment of the present invention the arrested operative carrier is released when any other carrier is advanced by advancing another member 3 associated therewith. When the previously operative carrier is thus released, it returns to retracted position under the action of the return spring 10.

The holding means for arresting a carrier in the writing position in the illustrated embodiment are described in detail in my prior U. S. Patent 2,136,290. The invention, however, is not limited for use in a multiple writing implement, but may be applied to any writing implement in which a carrier is arrested in advanced writing position, and may be released after use for return into an inoperative, retracted position.

In the advanced positions shown in the drawing, the cylindrical end portion 4 of the carrier 11 projects through the bore 5 in the front end part 6 of the casing 1. The interior of the casing 1 is bounded at the front end of the casing 6 by a conical surface 9 which merges into the rearwardly located portion of the bore 5 so that at least the rearwardly located annular surface 5a of the bore 5 is slightly conical and tapers toward the front end of the casing 2. The conical surface may extend to the front end of bore 5.

In accordance with the present invention, a resilient tubular means, shown to be a coil spring 7, surrounds a portion of the cylindrical carrier end portion 4. An abutment 8 is fixedly secured to the carrier 11, and engages the rearwardly located portion of the coil spring 7 which is freely movable on the cylindrical end portion 4. The rear end of the coil spring 7 can be wound so tightly about carrier end portion 4 that it is held thereon for movement with the carrier 11, but it can also be secured to the carrier in any suitable manner. For example, the rear end of the coil spring 7 can pass into a transverse bore in the end portion 4 located adjacent the abutment 8.

As is apparent from Fig. 2, the coil spring 7 is inoperative when the carriers are retracted. When a carrier 11 is advanced by operation of the grip member 3, the respective carrier 11 is first advanced into a preliminary advanced position shown in Figs. 1 and 3 in which the forwardly located annular wedging portion 7a of the coil spring 7 projects into the annular gap 13 formed by the conical surface portion 5a and the cylindrical surface of the carrier end portion 4. The coil spring 7 is compressed in this position so that its forwardly located end is wedged into the gap 13 which tapers toward the front end of the casing.

Thereupon the carrier 11 is automatically retracted by spring 10 to the operative advanced writing position shown in Fig. 2 in which the writing means 4a, such as a ball point or a lead, can be used. Arresting means, for example as described in my U. S. Patent 2,136,290 arrest the carrier, in this position until another carrier 11 is advanced by operation of its associated operating member 3.

Since the forwardly located portion 7a of the coil spring is wedged into the annular reduced gap 13, and the rearwardly located portion 7b of the coil spring is secured to the carrier 11, the coil spring 7 expands during movement of the carrier from the position shown in Figs. 1 and 3 to the position shown in Figs. 2 and 4.

In the advanced positions shown in the drawing, and

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particularly in the advanced operative position shown in Figs. 2 and 4, the foremost loop of the coil spring 7 is wedged in the annular gap formed between surface 5a and the carrier end portion 4 so that the carrier end portion 4 is firmly held in the bore 5 and cannot wobble during writing.

When the mechanism of the implement is operated, the carrier 11 is released to return under the action of the spring 10 into the retracted position in which the other carriers are shown. The force of spring 10 is greater than the wedging force holding spring 7 so that the forward portion of the spring 7 is pulled out of the gap permitting a complete retraction of the carrier. Since the front end of spring 7 is now free, spring 7 contracts and remains contracted on the retracted carriers 11.

The invention has been described as applied in a writing implement in which a plurality of carriers is selectively operated. It will be understood that the present invention can be applied to a writing implement in which a single carrier is shifted between advanced and retracted positions.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of writing implements differing from the types described above.

While the invention has been illustrated and described as embodied in a writing implement including a coil spring wedged into the front end bore of the casing of the implement for rigidly holding a carrier for writing means, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a writing implement, in combination, a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface; at least one carrier for writing means mounted in said casing for movement between a retracted inoperative position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier projecting only in said advanced positions through said bore, said carrier defining in said advanced positions with said annular surface an annular gap having a rear portion and a front portion; and wedging means resilient in direction of the carrier movement and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement and surrounding said carrier, said front end portion of said wedging means projecting into said rear portion of said annular gap in said advanced positions of said carrier and being retracted from the same in said retracted position of said carrier, one of said last-mentioned portions tapering in forward direction so that said front end portion of said wedging means is wedged in said rear portion of said annular gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end portion of said wedging means is released for longitudinal resilient action of said wedging means.

2. In a writing implement, in combination, a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface; at least one carrier for writing means mounted in said cas-

ing for movement between a retracted inoperative position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier projecting only in said advanced positions through said bore, said carrier defining in said advanced positions with said annular surface an annular gap having a rear portion and a front portion; and a wedging coil spring means surrounding said carrier and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement and surrounding said carrier, said front end portion of said wedging coil spring means projecting into said rear portion of said annular gap in said advanced positions of said carrier and being retracted from the same in said retracted position of said carrier, one of said last-mentioned portions tapering in forward direction so that said front end portion of said wedging coil spring means is wedged in said rear portion of said annular gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end portion of said wedging coil spring means is released for longitudinal resilient action of said wedging coil spring means.

3. In a writing implement, in combination, a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface tapering toward the front end of said casing; at least one carrier for a writing means mounted in said casing for movement between a retracted inoperative position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier projecting only in said advanced positions through said bore, said carrier in said advanced positions defining with said annular surface an annular gap tapering toward the front end of said casing; and wedging means resilient in direction of the carrier movement and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement surrounding said carrier and projecting into said annular tapering gap, said front end portion being wedged in said annular tapering gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end portion of said wedging means is released for longitudinal resilient action of said wedging means.

4. In a writing implement, in combination, a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface tapering toward the front end of said casing; at least one carrier for a writing means mounted in said casing for movement between a retracted inoperative position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier projecting only in said advanced positions through said bore, said carrier in said advanced positions defining with said annular surface an annular gap tapering toward the front end of said casing; and coil spring means resilient in direction of the carrier movement and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement, said coil spring means surrounding said carrier with said front end portion projecting into said annular tapering gap, said front end portion being wedged

in said annular tapering gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end portion of said wedging coil spring means is released for longitudinal resilient action of said wedging coil spring means.

5. In a writing implement, in combination, a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface tapering toward the front end of said casing; at least one carrier for a writing means mounted in said casing for movement between a retracted position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier in said advanced positions passing through said bore and defining with said annular surface an annular gap tapering toward the front end of said casing; means for moving said carrier between said positions and for arresting said carrier in said advanced writing position; and tubular wedging means resilient in direction of the carrier movement and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement surrounding said carrier and projecting into said annular tapering gap, said front end portion being wedged in said annular tapering gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end portion of said wedging means is released by longitudinal resilient action of said wedging means.

6. In a writing implement, in combination, a hollow casing having a front end part formed with a bore and being at least partly bounded by an annular surface tapering toward the front end of said casing; at least one carrier for a writing means mounted in said casing for movement between a retracted position, an advanced writing position, and a preliminary advanced position located forwardly of said advanced writing position, said carrier in said advanced positions passing through said bore and defining with said annular surface an annular gap tapering toward the front end of said casing; means for moving said carrier between said positions and for arresting said carrier in said advanced writing position; and coil spring means resilient in direction of the carrier movement and having a rear end secured to said carrier and a front end portion non-resilient in directions transverse to said direction of carrier movement, said coil spring means surrounding said carrier with said front end portion projecting into said annular tapering gap, said front end portion being wedged in said annular tapering gap in said advanced positions of said carrier for holding said carrier in said bore non-movable in transverse directions while in said retracted position of said carrier, said front end portion of said wedging coil spring means is released for longitudinal resilient action of said wedging coil spring means.

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