

Aug. 25, 1970

K. FEND

3,525,573

WRITING, PAINTING OR DRAWING UTENSIL WITH A MOIST NIB

Filed April 10, 1968

2 Sheets-Sheet 1

FIG. 1

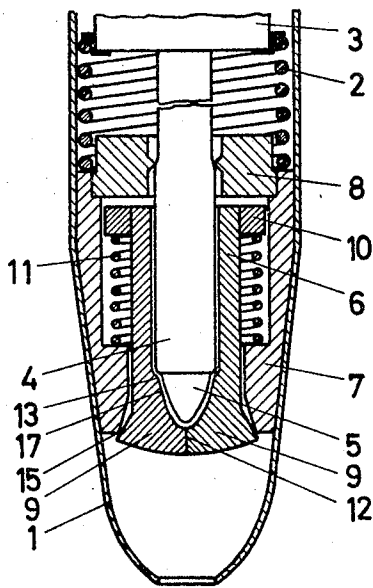


FIG. 2

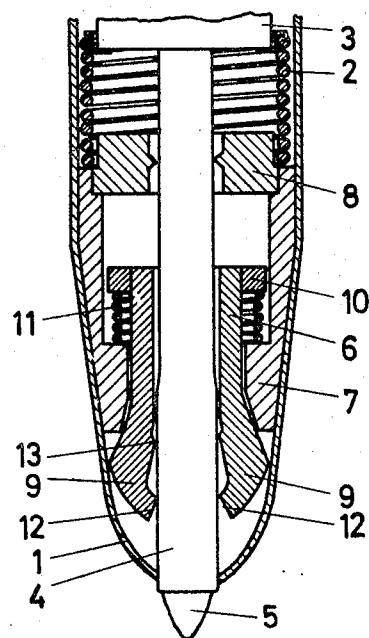


FIG. 3

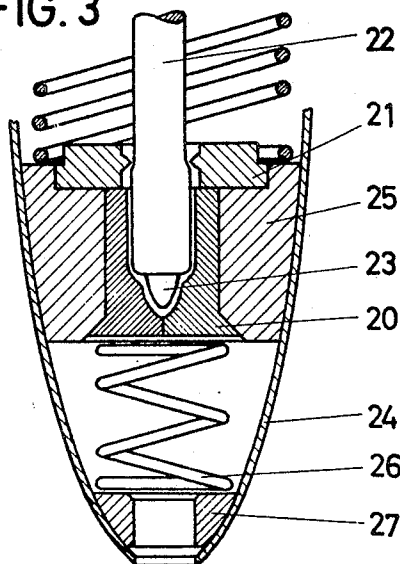
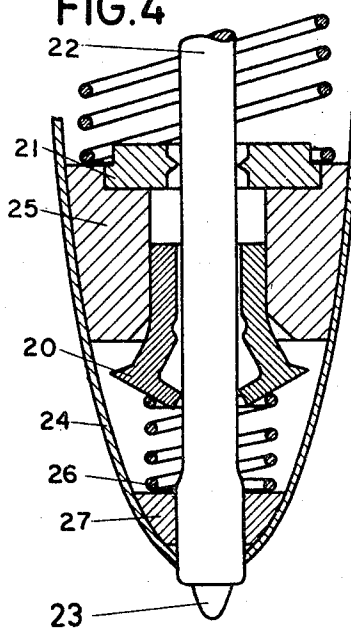


FIG. 4



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2 Sheets-Sheet 2

FIG. 5

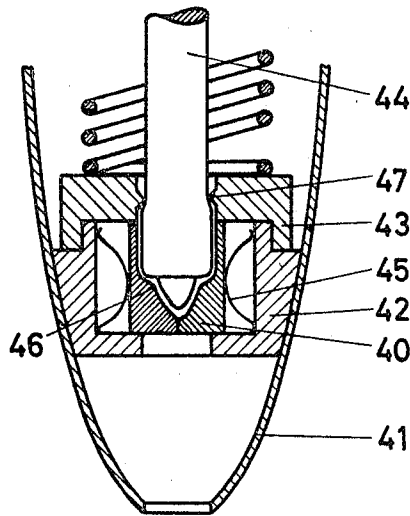


FIG. 6

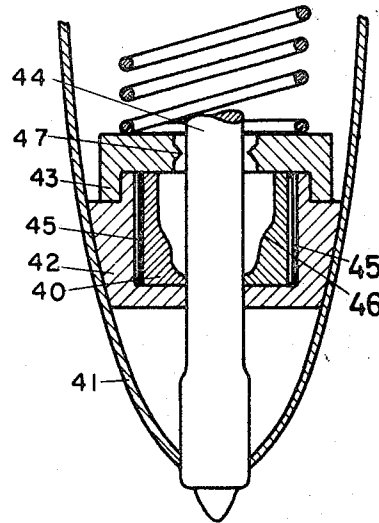


FIG. 7

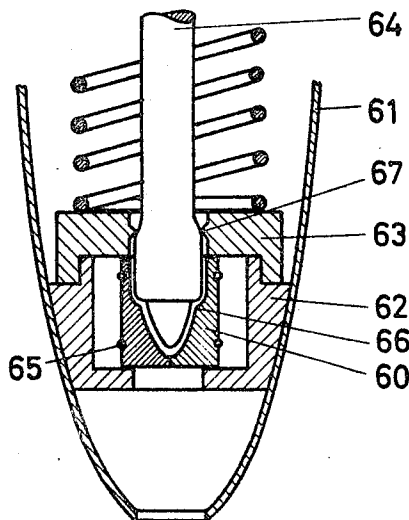
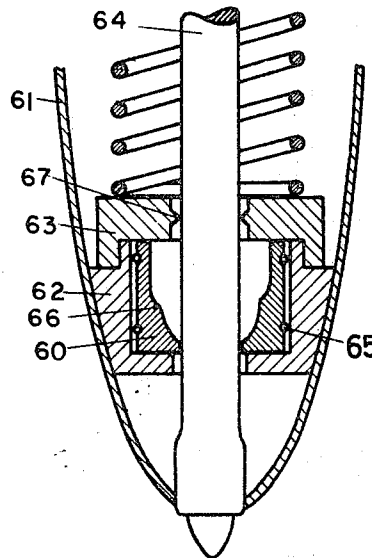


FIG. 8



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WRITING, PAINTING OR DRAWING UTENSIL WITH A MOIST NIB

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F 52,243

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9 Claims

ABSTRACT OF THE DISCLOSURE

A closure device for preventing the moist nib on a retractable nib carrier of a writing, painting or drawing utensil from drying out by sealing the nib when retracted into the casing of the utensil from the access of air. When the nib carrier is being moved in the axial direction within the casing, its operative association with the closure device prevents the nib itself from coming in contact with the closure device or any other part of the utensil.

The present invention relates to a writing, painting or drawing utensil or the like which is provided with a nib which is to be kept in a moist condition and may include different cosmetic utensils, ball-point pens, fountain pens, or utensils with a nib made of felt or fibers or of hairs to form a brush for painting. Such a utensil comprises an outer tubular casing, a nib carrier which is movable in the axial direction within the casing, and a closure device within the casing behind the front opening thereof through which the nib may be advanced when it is to be used. When the nib is retracted into the casing, this closure device should cover the nib from the access of air, and the closure device is opened by advancing the nib.

As long as such utensils with a retractable nib are not being used, it is necessary to provide them with a suitable cover to prevent the nib as much as possible from drying out by the access of air which would render it useless. Such covers often consist of caps which are to be stuck or screwed upon the casing. This simple operation is, however, often forgotten or omitted, especially also because it requires both hands of the user. Consequently, such separate caps cannot be relied upon to prevent the nib from drying out.

It has also been proposed to provide retractable writing utensils which comprise a casing and a cartridge carrying the nib which is movable manually by a pressure mechanism within the casing so as to project the nib therefrom through a front opening which, when the nib is retracted, may be closed by a flap or segmentally shaped tabs the tips of which engage with each other at the center of the opening. Such a flap or such tabs consist of a flexible material and are bent away from the path of movement of the cartridge when the latter is advanced, while when the cartridge is retracted to its neutral position, they spring back to their original position. Such diaphragmlike closing devices do not, however, remain operative for a long time since the frequent reciprocating movements of the cartridge soon wear out the sealing edges and also since the resilience of the material of these closing devices soon decreases because of its frequent strong deformation. The contact between the nib and the closing device when the latter is being opened and closed also results in the transfer of ink upon the closing device which dries thereon and forms a crust on the sealing edges. These disadvantages, all of which usually occur simultaneously, have the result that after a short time the closing device will no longer seal the nib properly so that it will soon dry out and become useless.

Finally, there are fountain pens known which have a

retractable writing tube and are provided at the inside of the front part of the tubular shank or casing with an ink reservoir which serves as a guide bushing for the writing tube and has on its front end a hermetic closure which is formed by the front wall of the ink reservoir which consists of a layer of rubber and is perforated approximately within the longitudinal axis of the fountain pen. Such ink reservoirs also have the same disadvantages as above described that the sealing edges become worn by the writing tube, that after a short time the rubber lips will no longer spring back completely to their original position, and that the rubber lips will be soiled by ink. The ink reservoirs therefore soon become leaky so that the ink can dry out in the writing tubes. Furthermore, if the user of such a fountain pen carries the same in his coat pocket, there is considerable danger that it may soil his clothes.

It is an object of the present invention to provide a closure device for a retractable writing, painting or drawing utensil or the like which is designed so as to seal the nib when in the retracted position completely from the access of air so as to maintain the nib in a moist condition as long as possible regardless of the frequency of operation of this device and the length of time during which it is used.

For attaining this object, the invention relies upon the finding that such a reliable and long-lasting closure device may be attained only if its closing action is not solely dependent upon its own inherent resilience and if it is also designed so as to prevent any contact between the nib and the closure device and also between the nib carrier and the sealing edges or sealing surfaces of this device.

A further object of the invention consists in designing the closure device so that the volume of air with which the nib comes in contact when in the retracted and covered position will be as small as possible so that in this position the loss of moisture from the nib due to evaporation will be limited to a minimum.

The aforementioned objects are attained according to the invention by providing the closure device with at least two rigid or resilient jaws which when the nib is fully retracted into the casing are pressed radially against each other by the action of at least one closing spring. Another feature of the invention consists in providing the closure device with an axially extending bore into which, when the jaws are closed, the nib and a part of its carrier are retracted and which preferably has a slightly larger diameter—at least along a part of its length—than the outer diameter of the nib carrier. This bore ends in front of the nib where the closure device is provided with sealing surfaces between the jaws, and the end of this bore which is adapted to receive the nib is of a reduced diameter or cross section substantially in accordance with the diameter or cross section of the nib but of a slightly larger size so as to be spaced at a small distance from the nib so that the space remaining between the nib and the wall of this end of the bore has a very small volume. Due to the reduced diameter or cross section of the nib as well as of the front end of the bore as compared with the diameter or cross section of the nib carrier and the part of the bore behind its reduced end, a shoulder is formed by the end of the nib carrier and another shoulder at substantially the same level on the wall of the bore. According to another feature of the invention, one or both of these shoulders are tapered or rounded so that, when the nib carrier is advanced from its fully retracted position, the two shoulders will immediately engage with each other and thereby spread apart and open the jaws of the closure device. Thus, there is no possibility that the nib might come in contact with the jaws and the nib carrier will also not come in con-

tact with the sealing surfaces of these jaws. A further feature of the invention consists in providing a suitable gasket which when the nib carrier is in its retracted position encloses the latter directly behind the closure device so that there is only a very small air space to which the nib might pass off some of its moisture.

Since when the nib is retracted the jaws of the closure device are pressed together in the radial direction under the action of at least one closing spring, the nib will be positively and reliably sealed from any access of air from the outside. The closing spring is for this purpose designed and arranged so as still to exert a sufficient positive pressure upon the jaws when it is in its expanded position. According to the invention, there is now also no longer any danger that the sealing surfaces on the jaws will become worn since the closure device will be opened by the engagement of the shoulder on the front end of the nib carrier upon the tapered or rounded shoulder on the wall of the end portion of the bore in the closure device which is located behind the sealing surfaces of the jaws. The opening operation therefore occurs only by the engagement of such parts of the closure device which do not have any sealing function. This, however, means that there is no possibility of any transfer of moisture from the nib to any part of the closure device since the operation of opening the closure device which is effected solely by the nib carrier renders any contact between the nib and the closure device impossible. Finally, when the nib is in its retracted position, its loss of moisture to the air with which it can still come in contact is extremely small since the space surrounding the nib within the closure device as well as the space which remains behind the closure device and which is limited by the gasket surrounding the nib carrier have together a very small volume.

According to one preferred embodiment of the invention, the closure device may consist of a substantially cylindrical closure element which for forming the jaws is divided along the greatest part of its length by at least one cut extending from its front end along one of its axial planes of symmetry. This cylindrical element is provided with a conical enlargement facing toward its front end, and it is inserted into a bore in an annular or tubular member which is rigidly connected to the tubular casing and it is slidable in this bore in the axial direction against the action of the closing spring. When the nib is fully retracted, the conical enlargement on this closure element is pressed by the closing spring at least partly into the end of the bore in the annular or cylindrical member, whereby the jaws are pressed together in a radial direction. The free space between the closure element and the casing which, when the nib is fully retracted, is closed toward the front end of the casing by the engagement of the conical enlargement on this element on the annular or tubular member, remains in connection with the nib through lateral streamlined openings in the closure element since the slots which are formed by the cut in this element are only closed entirely at their front ends by the radial compression of the jaws, while the rear parts of these slots still have the width of the tool which has been used for making them.

In order to interrupt also this connection so as to reduce the volume of air as much as possible which might come in contact with the nib, it is another feature of a preferred embodiment of the invention to provide the closure element in the form of at least two jaws the rear ends of which are inserted in and connected to a ring so that these rear ends are firmly pressed against each other, while near their front ends these jaws are provided with a conical enlargement facing forwardly. These jaws are axially slidable against the action of the closing spring within a bore in an annular member which is inserted in and firmly connected to the tubular casing. When the nib is in its fully retracted position, the conical enlargement on the jaws is pressed by the closing spring at least

partly into the bore in the annular member so that the jaws are thereby pressed radially against each other. A closure device which is thus composed of at least two jaws thus forms a tightly closed element also along its lateral slots.

The closing spring may in both embodiments of the invention as above described be a cylindrical compression spring which may either surround the closure element and engage with one end upon the annular member which is firmly connected to the casing and with its other end upon an annular shoulder on the rear end of the closure element, or the closure spring may extend coaxially to the tubular casing and engage with one end upon an abutment which is provided behind the front opening of the casing and with its other end upon the front surface of the jaws.

Finally, while avoiding any connection between the space surrounding the closure element and the nib, the closure element may consist of at least two jaw parts which are movable relative to each other in the radial direction against the action of closing springs within an annular cage-like member which is firmly connected to the tubular casing. These closing springs may in this case be provided in the form of curved leaf springs which extend in the longitudinal direction of the casing between the jaw parts and the annular member. The ends of these leaf springs are preferably bent-up and guided in the longitudinal grooves in the annular member, while the central parts of these springs act upon the jaw parts. The closing springs may, however, also be provided in the form of one or more spring rings which surround the two or more jaw parts within a plane vertical to the longitudinal axis of the closure element and lie within a groove in the jaw parts.

In order to reduce the force as much as possible which is required for moving the nib carrier in the axial direction, the present invention further provides that, when the nib carrier is in its retracted position, the part thereof which extends from the surrounding gasket to its front end has a larger diameter than the remaining part of its length. The result is hereby attained that the nib carrier after being moved for a short distance toward its operative position will disengage from the gasket so that the frictional braking force which is exerted by the gasket upon the nib carrier and thereby increases the resistance to its movement will only occur during this very short first part of the forward movement. The tapered or rounded shape of the shoulder formed by the front edge of the nib carrier in association with a corresponding taper of the shoulder at the end portion of the bore in the closure element also reduce the force which is required for opening the closure element and spreading apart its jaws at the beginning of the forward movement of the nib carrier. Finally, due to the greater diameter of the front portion of the nib carrier whereby the shoulder for opening the closure element and its jaws is formed, there is no need to make the adjoining part of the nib of a cross-sectional size smaller than that which is desired.

The features and advantages of the present invention will become further apparent from the following detailed description and the accompanying drawings of a sign pen with a felt nib, a so-called felt pen, to which the invention is, however, not limited as it may also be applied with minor modifications to numerous other types of retractable drawing, painting, and writing utensils or the like.

In these drawings,

FIG. 1 shows an axial section of the front part of a felt pen with an axially movable closure element and a felt nib in its retracted position;

FIG. 2 shows the felt pen according to FIG. 1 in its writing position;

FIG. 3 shows an axial section of the front part of a felt pen according to a second embodiment of the invention which is likewise provided with an axially movable closure element and in which the felt nib is shown in the retracted position;

5

FIG. 4 shows the felt pen according to FIG. 3 in the writing position;

FIG. 5 shows an axial section of the front part of a felt pen according to a third embodiment of the invention which is provided with a radially movable closure element and in which the felt nib is shown in the retracted position;

FIG. 6 shows the felt pen according to FIG. 5 in its writing position;

FIG. 7 shows an axial section of the front part of a felt pen according to a modification of the felt pen as shown in FIG. 5 with a radially movable closure element, and in which the felt nib is likewise shown in the retracted position; while

FIG. 8 shows the felt pen according to FIG. 7 in its writing position.

In the drawings, FIG. 1 shows the front part of a tubular casing 1 in which a recording element is slidable in the axial direction and acted upon by a retracting spring 2. This recording element comprises an ink chamber 3, a nib-carrier 4, and a fiber nib 5. This fiber nib 5 and a part of the nib carrier 4 are enclosed within an axially extending bore of a closure element 6 which is made of a resilient material and slidable in the axial direction within a bore in a tubular member 7 which is mounted in and firmly connected to the casing 1. For sealing the free space remaining between the closure element 6 and the tubular member 7 toward the rear, a gasket ring 8 is provided directly behind the closure element 6 and fitted into the rear end of the tubular member 7 to which it is secured, for example, by gluing.

Closure element 6 consists of two jaws 9 which together form a substantially cylindrical body and the rear ends of which are fitted into and connected to a ring 10 so that these rear ends are firmly pressed together. Between ring 10 and an inner shoulder on the tubular member 7 a closing spring 11 in the form of a cylindrical compression spring is mounted which constantly exerts an axial pressure upon the closure element 6 in the direction toward the gasket ring 8. When the recording element 3 to 5 is in its retracted position as shown in FIG. 1, this axial pressure causes the conically enlarged front end of closure element 6 to be drawn partly into the conical front end of the bore of the tubular member 7, whereby the jaws 9 are pressed in a radially inward direction toward each other so that the sealing surfaces 12 of these jaws are pressed tightly against each other and the space remaining between the closure element 6 and the tubular member 6 is sealed toward the front. The space surrounding the fiber nib 5 and the closure element 6 is thus tightly sealed against the access of any air from the outside, and after saturating the small volume of air contained in this space the fiber nib 5 can no longer give off any moisture and therefore also cannot dry out. The quantity of moisture required for saturating the air contained within this space is also extremely small since the axial bore in closure element 6 terminates in a tapered front end 17 of a shape substantially in accordance with that of the fiber nib 5.

When the writing tool according to FIG. 1 is to be shifted to its operative or writing position, it is necessary to actuate a pressure mechanism of a conventional type, not shown, which then shifts the ink container 3 together with the nib carrier 4 and the fiber nib 5 forwardly to the position as shown in FIG. 2. During this movement, the front edge of the nib carrier 4 engages upon a shoulder 13 at the rear end of the tapered part 17 and shifts the closure element 6 forwardly against the action of the closing spring 11 without, however, causing the fiber nib 5 to engage with the jaws 9. The farther this forward movement progresses, the more the jaws 9 will be released in radial directions from the tubular member 7 so that due to their resilience they will yield to the radial component of the force which is exerted by the nib carrier 4 upon the shoulder 13 and will thus spread apart to the position as shown in FIG. 2. Also during this move-

6

ment there will be no engagement between the fiber nib 5 and the jaws 9 since, when the front edge of the nib carrier 4 slides past the shoulder 13, the angle to which the jaws 9 are spread increases quickly and the distance between the sealing surfaces 12 increases in the same ratio as the conical fiber nib 5 passes through these surfaces. When the jaws 9 finally reach their maximum angle, they are spread so far apart by the engagement of the shoulder 13 with the nib carrier 4 that the latter cannot come in contact with the sealing surfaces 12.

In order to require the smallest possible manual force for shifting the fiber pen to its writing position, the part of the nib carrier 4 which in its neutral position extends from the gasket ring 8 to its front end is made of a larger diameter than the remaining part of its length. This has the result that the braking force which is exerted by the gasket ring 8 upon the nib carrier 4 when the latter is moved in its axial direction will cease to exist as soon as the nib carrier has been shifted forwardly for a very short distance. This larger diameter of the front part of nib carrier 4 also has the advantage that on the front end of the nib carrier a shoulder for actuating the closure element 6 is formed without requiring the diameter of the rear part of the fiber nib 5 to be reduced which is connected to the nib carrier 4. The front edge of the nib carrier is preferably made of a tapered or rounded shape, so that the force which is exerted upon the shoulder 13 will have an axial component larger than the radial component. This also contributes to the result that the manual force required for opening the closure element 6 may be very small.

When the fiber pen returns under the action of the retracting spring 2 to its neutral position after its pressure mechanism (not shown) has again been actuated, the closure element 6 will also be retracted by the closing spring 11, whereby the conically enlarged part of jaws 9 will slide toward the rear along the front edge of the tubular member 7 with the result that the jaws 9 will be pressed radially together until the sealing surfaces 12 engage with each other so that the fiber nib 5 will be enclosed airtight.

According to the second embodiment of the invention as illustrated in FIGS. 3 and 4, the closure element consists of a substantially cylindrical body of a resilient material which is divided along the greatest part of its length by a cut extending from the front along one of its axial planes of symmetry so that jaws 20 are formed which are connected at their rear ends to each other. These jaws 20 when in their closed position are provided with an axial bore forming a chamber which encloses the front part of the retracted nib carrier 22 and the fiber nib 23 and is closed toward the rear by a gasket ring 21.

The closure element is axially slidable within a bore in the ring-shaped member 25 which is firmly connected to the casing 24 into which it is inserted. When the nib carrier 22 is retracted, the front end of the closure element which forms a conical head is pressed by a closing spring 26 against the surface of a corresponding conical recess in the front end of the ring-shaped member 25 so that the jaws 20 are pressed radially together and any space surrounding the closure element is closed tightly toward the front. The closing spring 26 is cylindrical and extends coaxially to the casing 24 in front of the closure element, and it presses with one end against the front surfaces of jaws 20 and with its other end against a ring 27 which is secured within the casing 24 behind its front opening.

The closure element is opened and closed in the same manner as already described with reference to FIGS. 1 and 2 by the operative association of the nib carrier 22 with the inner shoulder of the closure element which corresponds to the shoulder 13 in FIGS. 1 and 2.

According to the two further embodiments of the invention as illustrated in FIGS. 5 to 8 which are substantially of the same construction, the closure element consists of a pair of loose jaws 40 or 60, respectively, of a

rigid material which are radially movable within a cage 42 or 62 which is inserted in and firmly connected to the casing 41 or 61 and is closed by a cover 43 or 63. The bottom as well as the cover of this cage are provided with a central bore through which the nib carrier 44 or 64 is movable, and the wall of the bore in the cover 43 or 63 is provided with an annular projection forming a gasket 47 or 67, respectively.

The two jaws 40 or 60 are pressed together by radially acting closing springs which may either consist of curved leaf springs 45 as shown in FIG. 5, which extend in the longitudinal direction of the casing or of spring rings 65, as shown in FIGS. 7 and 8, which surround the closure element within planes extending vertically to the longitudinal axis of the casing. When employing curved leaf springs 45, it is advisable to mount them within the chamber remaining between the jaws 40 and cage 42 and to guide their ends so as to be slidable in grooves which are provided within the cage, while their centers press against the two jaws. The ends of the leaf springs are bent up so as to be able to slide easily and without wear within the grooves. If, however, spring rings 65 are to be used, the outer peripheral surfaces of jaws 60 are provided with circular grooves for holding the spring rings in the desired position.

Even if the closure elements are provided with such radially movable jaws, these jaws will be opened during the forward movement the nib carrier 44 or 64 by its engagement with the inner shoulders 46 or 66 on the closure elements. In order to reduce the manual force which is required for shifting the nib carrier forwardly and for opening the closure element, it is also in this case advisable to taper the front edge of the nib carrier so that the force exerted by the latter when riding over the shoulder 46 or 66 will have a radial component which is greater than its axial component.

Although my invention has been illustrated and described with reference to the preferred embodiments thereof, I wish to have it understood that it is in no way limited to the details of such embodiments but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. In a retractable utensil for writing, painting, drawing, or the like having a tubular casing with an opening in its front end; a nib carrier having a nib projecting from its front end; means for advancing and retracting said nib carrier in the axial direction in said casing from one position in which said nib is retracted into said casing to another position in which said nib projects from said front opening; closure means within said casing behind said front opening for covering said nib when in said retracted position; actuating means for opening and closing said closure means by the advancing and retracting movements of said nib carrier, said nib having a maximum diameter smaller than the part of said nib carrier adjacent to its front end so that said front end forms a shoulder, said closure means comprising a closure element having an axial bore of a shape substantially complementary to the outer shape of the front part of said nib carrier and said nib and adapted to receive the same in said retracted position, said closure element having a shoulder on the wall of said bore between a wider part for receiving said nib carrier and a narrower part for receiving said nib, said narrower part having a wall spaced at a small distance from said nib in said retracted position so as not to engage therewith; at least two jaws formed by at least a part of said closure element, said closure element being at least partly divided by at least one cut extending from said front end and through the greater part of the length of said closure element along an axial plane of symmetry, said jaws having sealing surfaces engaging with each other in said retracted position so as to seal said nib completely from the outer air; an annular member having a central bore inserted

in and firmly connected to said casing, said closure element being axially slidable within said annular member and having a substantially cylindrical outer surface with a conical part near its front end, said conical part increasing in diameter toward said end, said actuating means comprising spring means acting upon said closure element, said conical part being pressed by said spring means at least partly into said bore of said annular member when said nib carrier with said nib is in said retracted position, said jaws being pressed radially together when said conical part at least partially enters said bore, said jaws being opened during the advancing movement of said nib carrier by the engagement of said shoulders with each other, whereby said jaws are spread apart against the action of said spring means without engagement of said nib with said sealing surfaces; and sealing means in a substantially fixed position in said casing and surrounding said nib carrier and being in sealing engagement therewith at least when said nib carrier is in said retracted position.

2. A retractable utensil as defined in claim 1, wherein said cut extends entirely through said closure element so as to form separate jaws, and further comprising a ring fitted over and connected to the rear ends of said jaws, so as to press said rear ends of said jaws firmly together.

3. A retractable utensil as defined in claim 2 further comprising a ring fitted over and connected to the rear end of said closure member, said ring forming an outwardly projecting flange, said spring means being a cylindrical compression spring surrounding said closure element and having one end acting upon a part of said annular member and its other end acting upon said flange.

4. A retractable utensil as defined in claim 1, further comprising an abutment in said casing near said front opening thereof, said spring means being a cylindrical compression spring having one end acting upon the front surfaces of said jaws and its other acting upon said abutment, said nib carrier with said nib passing substantially centrally through said spring when being moved from one of said positions to the other.

5. A retractable utensil as defined in claim 1, wherein when said nib carrier is in its retracted position, the part of said nib carrier extending from a point closely behind its line of engagement with said sealing means to its front end has a larger diameter than its remaining part so that the sealing engagement of said sealing means with said nib carrier and the friction caused thereby upon said nib carrier will cease shortly after said nib carrier starts to move forwardly from its retracted position.

6. A retractable utensil as defined in claim 1, wherein at least one of said shoulders is shaped so as to exert a camming action upon the other shoulder when said nib carrier is shifted forwardly from its retracted position, whereby said jaws are spread apart easily against the action of said spring means.

7. In a retractable utensil for writing, painting, drawing or the like having a tubular casing with an opening in its front end, a nib carrier having a nib projecting from its front end; means for advancing and retracting said nib carrier in the axial direction in said casing from one position in which said nib is retracted into said casing to another position in which said nib projects from said front opening; closure means within said casing behind said front opening for covering said nib when in said retracted position; actuating means for opening and closing said closure means by the advancing and retracting movements of said nib carrier, said nib having a maximum diameter smaller than the part of said nib carrier adjacent to its front end so that said front end forms a shoulder, said closure means comprising a closure element having an axial bore of a shape substantially complementary to the outer shape of the front part of said nib carrier and said nib and adapted to receive the same in said retracted position, said closure element

9

having a shoulder on the wall of said bore between a wider part for receiving said nib carrier and a narrower part for receiving said nib, said narrower part having a wall spaced at a small distance from said nib in said retracted position so as not to engage therewith, at least the front part of said closure element being divided so as to form at least two jaws having sealing surfaces engaging with each other in said retracted position so as to seal said nib completely from the outer air, said actuating means comprising spring means acting upon said jaws and tending to press the same substantially radially together, said jaws being opened during the advancing movement of said nib carrier by the engagement of said shoulders with each other, whereby said jaws are spread apart against the action of said spring means without engagement of said nib with said sealing surfaces; sealing means in a substantially fixed position in said casing and surrounding said nib carrier and being in sealing engagement therewith at least when said nib carrier is in said retracted position and located directly behind said nib carrier at least in said retracted position; an annular cage in said casing and secured thereto and containing said closure element, said closure element for forming said jaws being divided into several separate parts by at least one cut extending entirely through said element along an axial plane of symmetry thereof, said spring means acting upon the peripheral outer surfaces of said parts so as to press them radially together.

10

8. A retractable utensil as defined in claim 7, wherein said spring means consist of curved leaf springs extending in the longitudinal direction of said casing between said cage and said jaw-forming parts, the inner wall surface of said cage having grooves, said leaf springs having central parts pressing radially against said jaw-forming parts and having bent-up ends slidable in said grooves.

9. A retractable utensil as defined in claim 7, wherein said closure element has at least one annular groove in its outer peripheral surface within a plane extending at a right angle to the longitudinal axis of said casing, said spring means consisting of at least one spring ring within said groove for pressing said jaw-forming parts radially together.

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LAWRENCE CHARLES, Primary Examiner

U.S. Cl. X.R.

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