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(81) Designated States (*unless otherwise indicated, for every
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AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
 BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
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(84) Designated States (*unless otherwise indicated, for every
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 TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
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 DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
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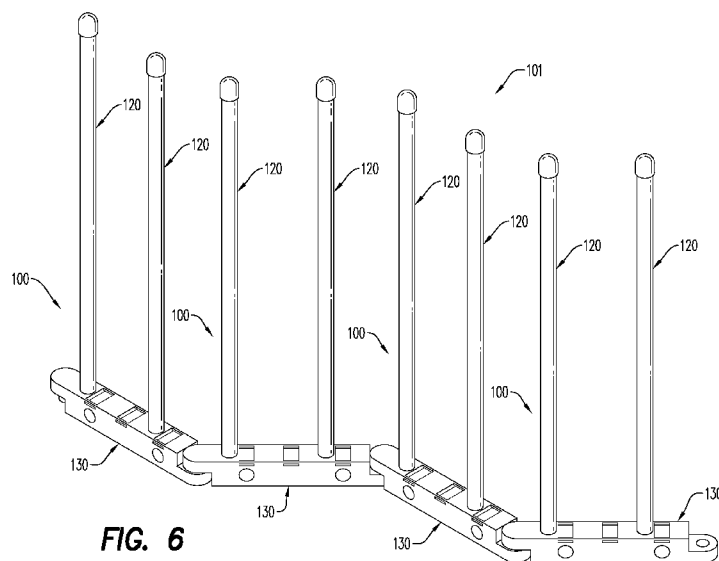
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(54) Title: BIRD CONTROL ASSEMBLIES FOR PROTECTING WIRES

**FIG. 6**

(57) Abstract: Systems and methods for providing modular bird control deterrent devices with spikes for use with overhead electrical wire are provided. A modular bird control segment base provides locking support for one or more bird control spikes by including locking flanges in a spike support cavity of the segment base that engages and locks a spike by engaging a groove in the bottom portion of the respective spike. The bird control segment base provides attachment support for fasteners that secure the bird control segment base to the electrical wire in use by providing opposing slot openings in a groove on the top of the segment base to engage a fastener. The bird control segment base also has opposing fastening mechanisms for connecting multiple segments together.



BIRD CONTROL ASSEMBLIES FOR PROTECTING WIRES

BACKGROUND

1. Field of the Disclosure

[0002] The illustrative embodiments described in the present application are useful in systems including those for providing pest control and more particularly are useful in systems including those for providing bird control deterrent features for protecting electrical wire.

2. Description of Related Art

[0003] Many electric utilities employ metal conductor overhead electrical wires for the distribution of electricity. Birds, bats and other pests may be drawn to the electrical wires and may be detrimental to the electrical system.

[0004] Several bird control products exist, and there is a need, among other needs, for relatively more robust bird control products for electrical wires that include one or more features such as providing devices that are relatively inexpensive, relatively easy to assemble, that are relatively sturdy, relatively durable, modular and relatively easy to install.

SUMMARY

[0005] The present application describes illustrative embodiments of systems and methods of making and using systems for providing bird control deterrent features for protecting electrical wire. In certain illustrative embodiments, the systems and methods are useful in systems including those for providing inexpensive, sturdy, durable, modular and easy to assemble install bird control devices that are easy to install.

[0006] In one illustrative example, a bird control segment base provides locking support for one or more bird control spikes such as by including locking flanges in a spike support cavity

of the segment base that engages and locks a spike by engaging a groove in the bottom portion of the respective spike.

[0007] In another illustrative embodiment, a bird control segment base provides attachment support for fasteners that secure the bird control segment base to the electrical wire in use. For example, opposing slot openings in a groove on the top of the segment base allow for a fastener such as a typical automobile engine hose clamp to be partially installed and supported by the slots during the installation process. The bird control segment base also has opposing fastening mechanisms on each end of the segment for connecting multiple segments together.

[0008] In some embodiments, a pest control assembly is provided that includes a modular base, a spike, and a fastener engaging cavity. The modular base has a spike mounting cavity with a locking mechanism for engaging the spike. The spike has a receiving mechanism for engaging the locking mechanism. The modular base includes first and second modular connectors for engaging other similar modular bases.

[0009] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the pest control assembly is configured to control birds.

[0010] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the modular base includes two spike mounting cavities.

[0011] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the modular base includes three fastener engaging cavities, each including opposing slots in a respective cavity in the modular base.

[0012] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the locking mechanism is a flange and the receiving mechanism is a groove in the spike.

[0013] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the modular base includes high density polyethylene.

[0014] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the fastener engaging cavity includes a slot for engaging a fastener.

[0015] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the fastener engaging cavity includes two slots in a groove on a top surface and perpendicular to a length of the modular base.

[0016] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the fastener is a clamp having a screw portion and a band having a screw thread pattern.

[0017] A pest control assembly is also provided that includes a base, a spike depending from the base, clamp cavity with first and second slots, and a clamp. The base has a top, a bottom, a first side, and a second side. The clamp cavity is in the top of the base with the first slot passing from the first side into the clamp cavity and the second slot passing from the second side into the clamp cavity. The clamp has a screw portion and a band with a screw thread pattern. The band has a first end secured to the screw portion and a second or loose end. The screw portion is in the clamp cavity with the band passing through the first slot such that the loose end is receivable by the screw portion after being passed through the second slot.

[0018] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the pest control assembly further includes a spike receiving cavity in the base, the spike being secured in the spike receiving cavity.

[0019] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the spike receiving cavity and the spike have intergaging locking mechanisms that secure the spike in the spike receiving cavity.

[0020] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the intergaging locking mechanisms includes a flange and a groove, respectively.

[0021] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the spike receiving cavity is defined in one or more of the top, the first side, the second side, and any combinations thereof.

[0022] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the base includes a plurality of spike receiving cavities and a spike secured in each of the plurality of spike receiving cavities.

[0023] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the base further includes a first end and a second end. The first end includes a first modular connector and the second end includes a second modular connector. The first and second modular connectors are connectable to one another so that the first modular connector of the base can be connected to the second modular connector of an adjacent base.

[0024] In some embodiments alone or in combination with the afore or aft mentioned embodiments, the base and/or the spike are high density polyethylene.

[0025] A method for protecting electrical wires is also provided. The method includes placing a base on the electric wire, the base having a clamp with a screw portion in a cavity of the base and a threaded band that depends from the screw portion passing through a first slot of the base; wrapping the threaded band around the wire and passing a loose end of the threaded band through a second slot of the base into the screw portion; threadably engaging the loose end of the threaded band and the screw portion; tightening the screw portion until the threaded band secures the base to the wire; and securing a spike to the base.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The accompanying drawings illustrate presently preferred embodiments of the invention, and together with the general description given above and the detailed description given below, serve to explain the principles of the invention. As shown throughout the drawings, like reference numerals designate like or corresponding parts.

[0027] FIG. 1 is a side view of a representative modular bird control device according to an illustrative embodiment of the present application;

[0028] FIG. 2 is a front view of a representative modular bird control device according to an illustrative embodiment of the present application;

[0029] FIG. 3 is a side view with a partial exploded view of a bird control spike for use with the illustrative embodiment of FIG. 1;

[0030] FIG. 4B is a top perspective view of a representative modular base of a modular bird control device according to FIG. 1;

[0031] FIG. 4A is a top perspective cutaway view of the modular base according to FIG. 4A.

[0032] FIG. 5 is a side perspective view of a representative modular bird control device having fastening devices attached according to an illustrative embodiment of the present application.

[0033] FIG. 6 is a side perspective view of a representative bird control device having four modular sections connected according to an illustrative embodiment of the present application.

DETAILED DESCRIPTION

[0034] The illustrative embodiments of the present application describe systems and methods of making and using systems for providing bird control deterrent features for protecting electrical wire. The systems and methods are useful in systems including those for providing inexpensive, sturdy, durable, modular and easy to assemble install bird control devices that are easy to install. The illustrative embodiments are described with reference to bird control, but may be used for pest control generally. The number of spikes and fastener support slots may be varied as appropriate for a particular application.

[0035] In one illustrative example, a bird control segment base provides locking support for one or more bird control spikes such as by including locking flanges in a spike support cavity of the segment base that engages and locks a spike by engaging a groove in the bottom portion of the respective spike.

[0036] In another illustrative embodiment, a bird control segment base provides attachment support for fasteners that secure the bird control segment base to the electrical wire in use. For example, opposing slot openings in a groove on the top of the segment base allow for a fastener such as a typical automobile engine hose clamp to be partially installed and supported by the slots during the installation process. The bird control segment base also has opposing fastening mechanisms on each end of the segment for connecting multiple segments together. For example, a snap fit opposing locking feature may be provided with male and female portions each on the respective side of the modular base for connecting multiple modular bases together.

[0037] Certain bird control assemblies include smooth surfaced spikes that assembled into a smooth cavity in the base using a pressed in interference fit. Accordingly, that cavity or that the hole of the base and the exterior of the spike were smooth circular cross sections. With such a device, environmental conditions could cause the base to crack from the stress of having an interference fit and the spikes could fall out. The illustrative embodiments described herein solve this issue by adding a groove in the spike and a “snap lip” inside of the base that allowed the spike to positively engage with the base unit.

[0038] Additionally, certain bird control devices include slots in the top of a base.

Unfortunately, such systems were hard to install on wire because the fastener had to be separately held during installation. The illustrative embodiments described herein solve this issue by adding a slotted feature so that the fastening hardware can be partially pre-installed and fed through the slot. The fastener then remains attached to the base while it is situated onto the structure it is being mounted and installation is much easier.

[0039] In the illustrative embodiments described herein, the base and spike components are constructed of black UV resistant high density polyethylene (HDPE). The fastening devices include stainless steel hose clamps. Other suitable materials such as other plastics may be used.

[0040] Referring to FIG. 1, a side view of a representative modular bird control device 100 according to an illustrative embodiment of the present application. Here HDPE base 130 includes 3 front slots 132 with respective back slots and respective cavity formed in a top portion of the base, wherein the slot is perpendicular to the length of the base. Other types of physical supports to engage a fastener such as a hose clamp can be fashioned using two raised portions of the base to define a channel or some other support structure. A male modular connector 150 is provided that may include a locking mechanism as described herein with reference to the spike mechanism and associated base spike mounting cavity mechanism. A respective female modular connector 152 is on the opposing end of the base. Spikes 120 are shown installed in the base 130 and are shown with caps 110 installed. The spikes may be solid or hollow cylinders.

[0041] Referring to FIG. 2, a front view of a representative modular bird control device 100 according to an illustrative embodiment of the present application is shown. Base 130 is shown with male modular connector 150 and spike 120 installed with cap 110 attached.

[0042] Referring to FIG. 3, a side view with a partial exploded view of a bird control spike 120 for use with the illustrative embodiment of FIG. 1 is shown. Here, cap 110 is shown disassembled from spike 120. Spike 120 is shown disassembled and detail A shows groove

122 that is provided as a spike receiving mechanism for locking into a flange of the respective base cavity.

[0043] Referring to FIG. 4B, a top perspective view of a representative modular base 130 of a modular bird control device 100 according to FIG. 1 is shown. Here, each cavity 136 is shown running perpendicular to the length of the top of the base. A first slot 132 in each cavity is shown on one end of the cavity 136 and a second slot 134 is shown on the opposing side of each cavity 136. Here, the top of the slots are flush with the top of the base. Each slot is for engaging a fastening device and engaging it to hold it during the installation process.

[0044] Referring to FIG. 4B, a top perspective cutaway view of the modular base 130 according to FIG. 4A is shown. Here, each cavity 136 is shown running perpendicular to the length of the top of the base. A second slot 134 is shown on the depicted side of each cavity 136. Here, the top of the slots are flush with the top of the base. Each slot is for engaging a fastening device and engaging it to hold it during the installation process. The cutaway shows internal flanges 138 that act as a locking mechanism for the base to engage and lock in the spikes. Here, modular connector 150 is shown as hollow, but could instead be solid. Cavity 160 may also be configured to engage bird control spike and may be used to reduce the weight and material usage in the base.

[0045] Referring to FIG. 5, a side perspective view of a representative modular bird control device 100 having fastening devices 170 attached according to an illustrative embodiment of the present application is shown. Here, fastening devices 170 are stainless steel hose clamps and are shown installed in the modular base 130 with screw portions 172 partially disposed in respective grooves 136.

[0046] Hose clamp 170 includes a galvanized or stainless steel band 174 into which a screw thread pattern 176 has been formed. The band 174 has a first end 178 secured to screw portion 172 and a second or loose end 180 that removably received in the screw portion. When the screw portion 172 is turned a first direction, the screw portion acts as a worm drive on the screw pattern 178 to pull on the loose end 180 into the screw portion to

tighten the clamp around the wire to be protected. Conversely, when the screw portion 172 is turned a second, opposite direction, the screw portion acts as a worm drive on the screw pattern 178 to push the loose end 180 away from the screw portion to loosen the clamp from the wire to be protected.

[0047] During assembly, the clamp 170 is opened – by removing the loose end 180 from screw portion 172. The loose end 180 is first passed through one of the slots 132, 134 of base 130 so that the screw portion is received in cavity 136. In this manner, the clamp 170 is held in the desired position in the base 130 while the base is placed on a wire to be protected. Then, the loose end 180 is fed through the remaining slot 132, 134 of the base 130 until the loose end is received by screw portion 172.

[0048] Advantageously, clamp 170 provides a more secure connection between base 130 and the wire to be protected than previously possible, temporarily secures the clamp to the base to make the securement of the base to the wire easier, and allows replacement of the clamp if necessary.

[0049] Referring to FIG. 6, a side perspective view of a representative bird control device 101 having four modular sections 100 connected according to an illustrative embodiment of the present application is shown. Here, 4 modular sections 100 are connected using connectors 150, 152 to create a longer bird control device 101.

[0050] While illustrative embodiments of the invention have been described and illustrated above, it should be understood that these are exemplary of the invention and are not to be considered as limiting. Additions, deletions, substitutions, and other modifications can be made without departing from the spirit or scope of the present invention. Accordingly, the invention is not to be considered as limited by the foregoing description.

CLAIMS

What is claimed is:

1. A pest control assembly as shown and described.
2. A pest control assembly comprising:
 - a spike having a receiving mechanism;
 - a modular base having a spike mounting cavity with a locking mechanism for engaging the receiving mechanism of the spike; and
 - a fastener engaging cavity included in the modular base, wherein the modular base includes first and second modular connectors for engaging other similar modular bases.
3. The pest control assembly of claim 2, wherein the pest control assembly controls birds.
4. The pest control assembly of claim 2, wherein the modular base includes two spike mounting cavities.
5. The pest control assembly of claim 2, wherein the modular base includes three fastener engaging cavities, each including opposing slots in a respective cavity in the modular base.
6. The pest control assembly of claim 2, wherein the locking mechanism is a flange and the receiving mechanism is a groove in the spike.
7. The pest control assembly of claim 2, wherein the modular base includes high density polyethylene.
8. The pest control assembly of claim 2, wherein the fastener engaging cavity includes a slot for engaging a fastener.

9. The pest control assembly of claim 2, wherein the fastener engaging cavity includes two slots in a groove on a top surface and perpendicular to a length of the modular base.
10. The pest control assembly of claim 8, wherein the fastener comprises a clamp having a screw portion and a band having a screw thread pattern.
11. A pest control assembly comprising:
 - a base having a top, a bottom, a first side, and a second side;
 - a spike depending from the base;
 - a clamp cavity in the top of the base;
 - a first slot passing from the first side into the clamp cavity;
 - a second slot passing from the second side into the clamp cavity; and
 - a clamp having a screw portion and a band having a screw thread pattern, the band having a first end secured to the screw portion and a second or loose end, the screw portion being positioned in the clamp cavity with the band passing through the first slot such that the loose end is receivable by the screw portion after being passed through the second slot.
12. The pest control assembly of claim 11, further comprising a spike receiving cavity in the base, the spike being secured in the spike receiving cavity.
13. The pest control assembly of claim 12, wherein the spike receiving cavity and the spike having intergaging locking mechanisms that secure the spike in the spike receiving cavity.
14. The pest control assembly of claim 13, wherein the intergaging locking mechanisms comprise a flange and a groove, respectively.
15. The pest control assembly of claim 12, wherein the spike receiving cavity is defined in one or more of the top, the first side, the second side, and any combinations thereof.

16. The pest control assembly of claim 12, wherein the base comprises a plurality of spike receiving cavities and a spike secured in each of the plurality of spike receiving cavities.
17. The pest control assembly of claim 11, wherein the base further comprises a first end and a second end, the first end having a first modular connector and the second end having a second modular connector, the first and second modular connectors being connectable to one another so that the first modular connector of the base can be connected to the second modular connector of an adjacent base.
18. The pest control assembly of claim 11, wherein the base and/or the spike comprise high density polyethylene.
19. A method for protecting electrical wires, comprising:
- placing a base on the electric wire, the base having a clamp with a screw portion in a cavity of the base and a threaded band that depends from the screw portion passing through a first slot of the base;
 - wrapping the threaded band around the wire and passing a loose end of the threaded band through a second slot of the base into the screw portion;
 - threadably engaging the loose end of the threaded band and the screw portion;
 - tightening the screw portion until the threaded band secures the base to the wire;
- and
- securing a spike to the base.

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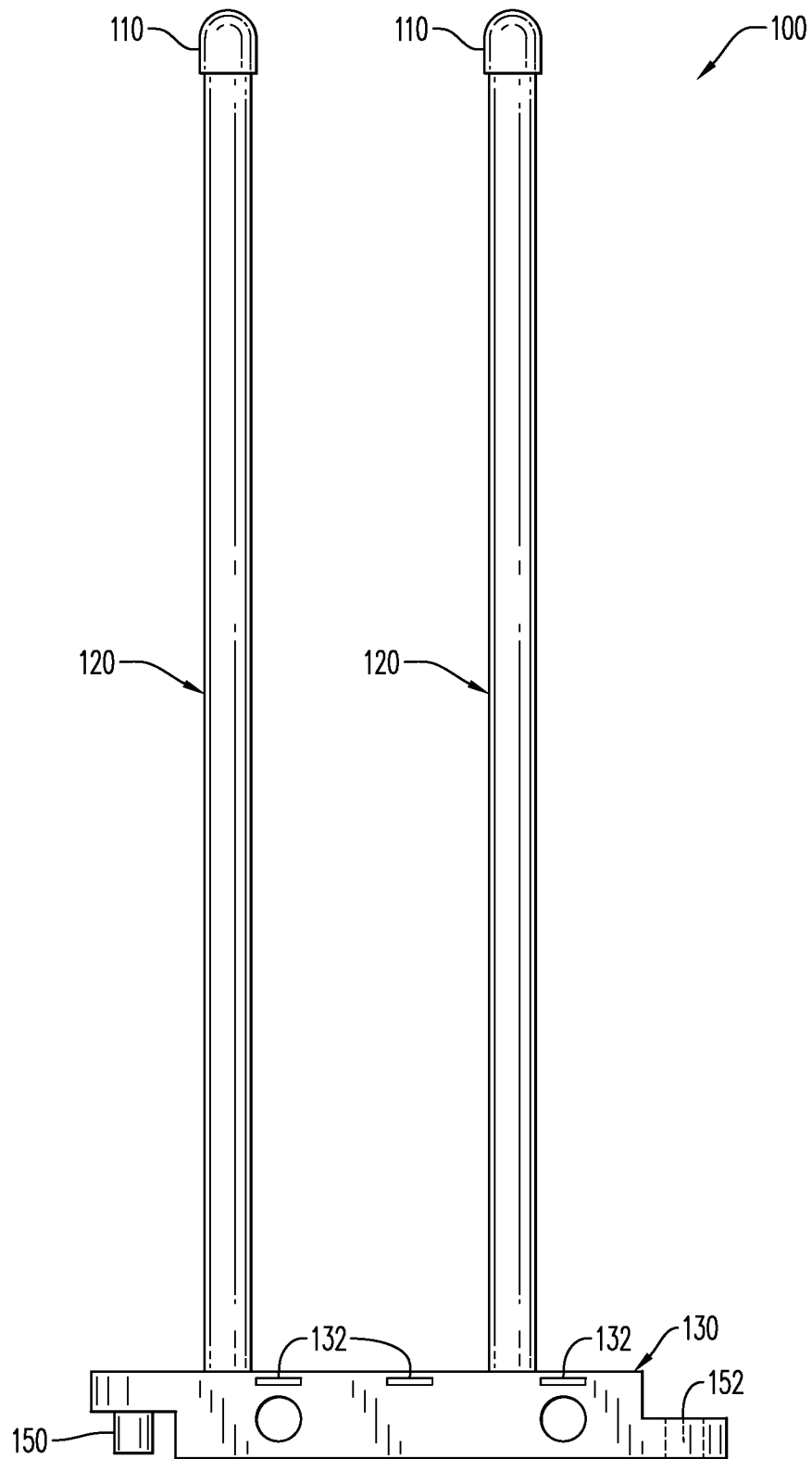
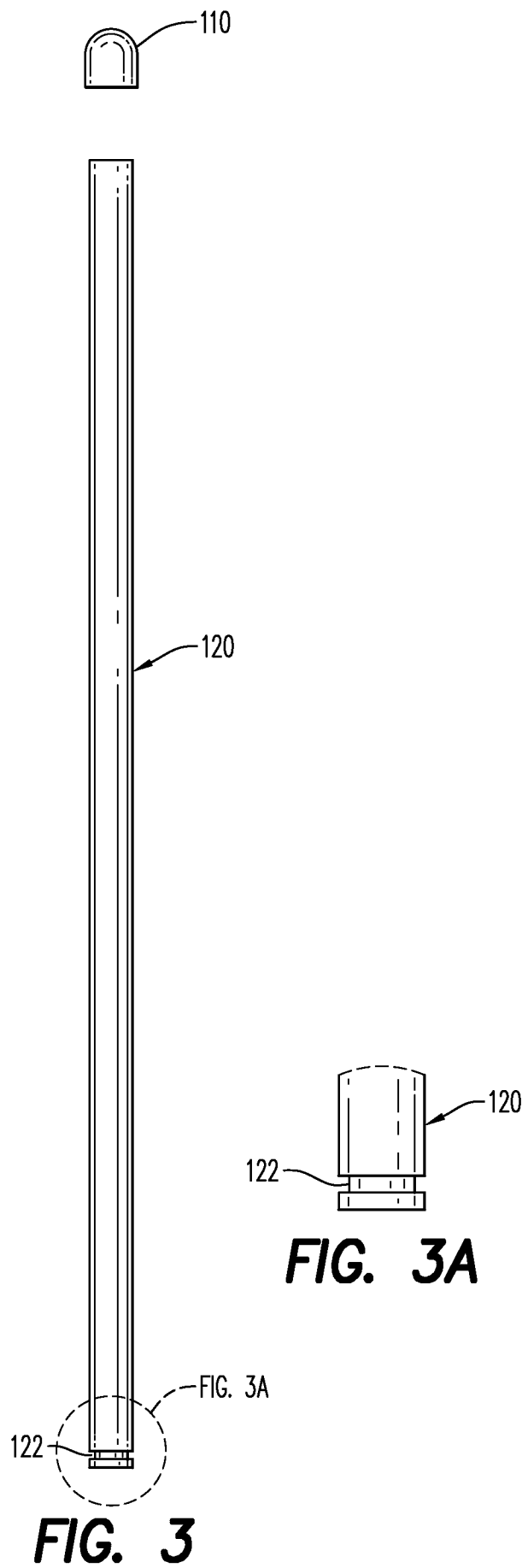
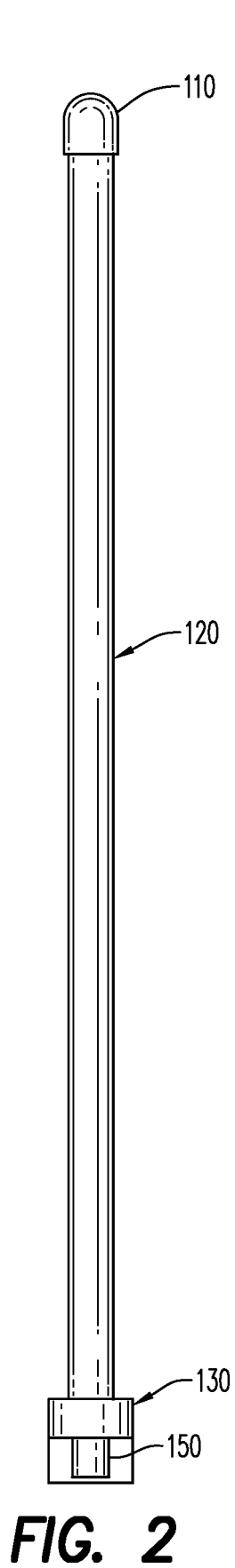
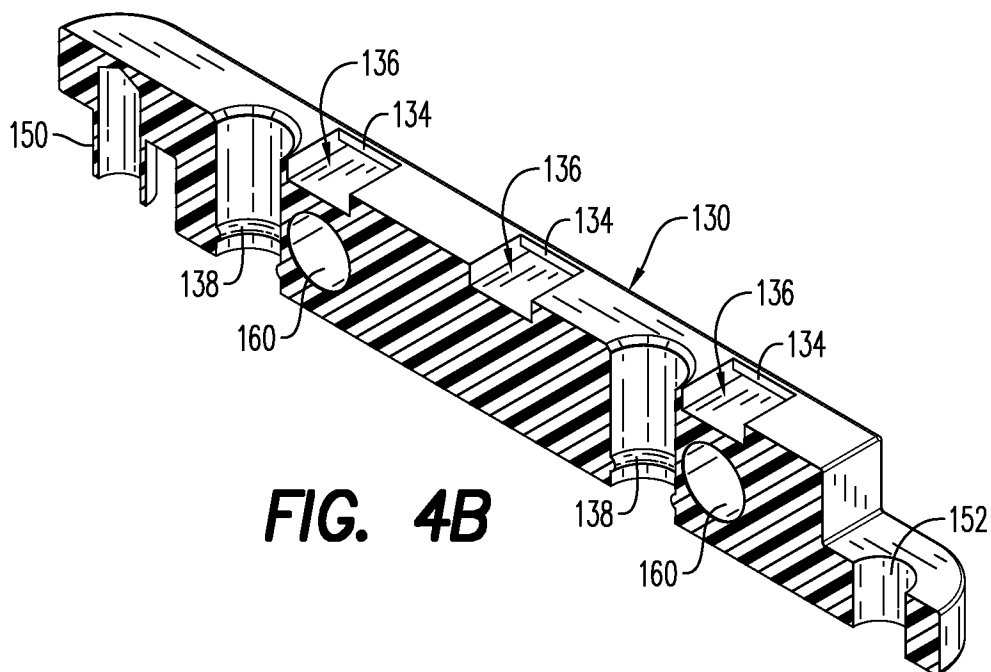
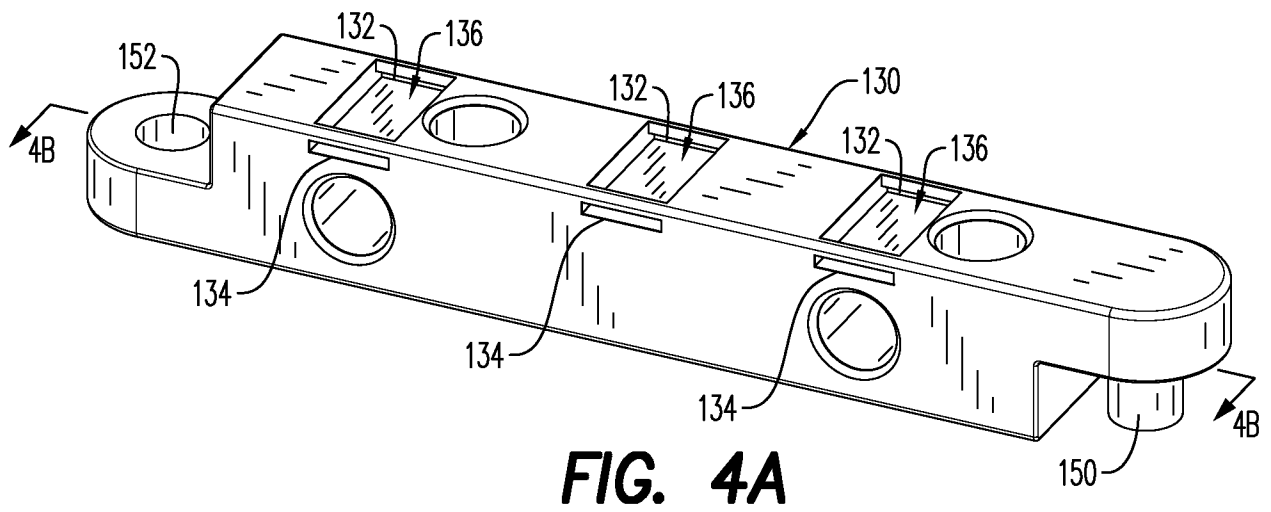


FIG. 1

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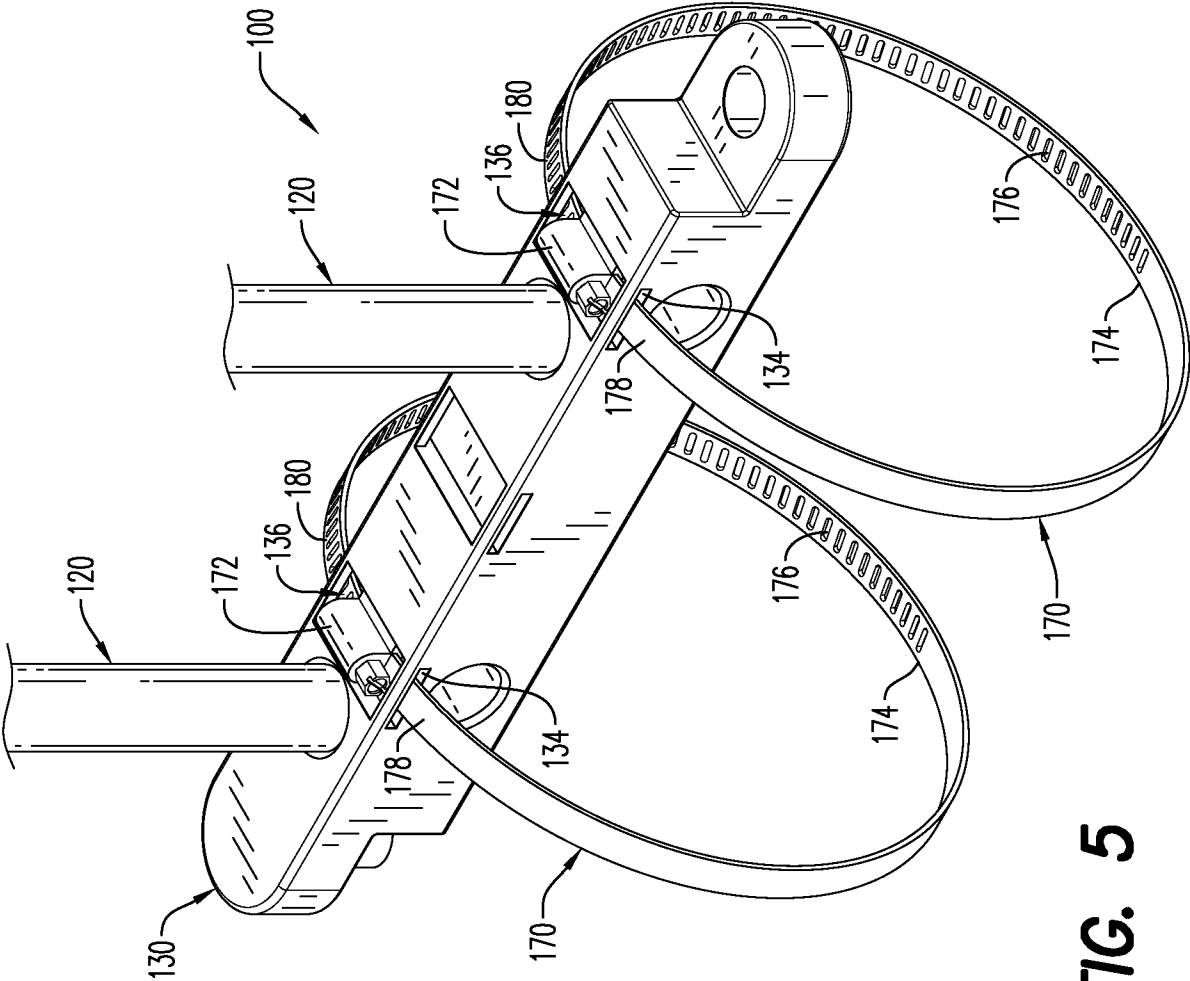


FIG. 5

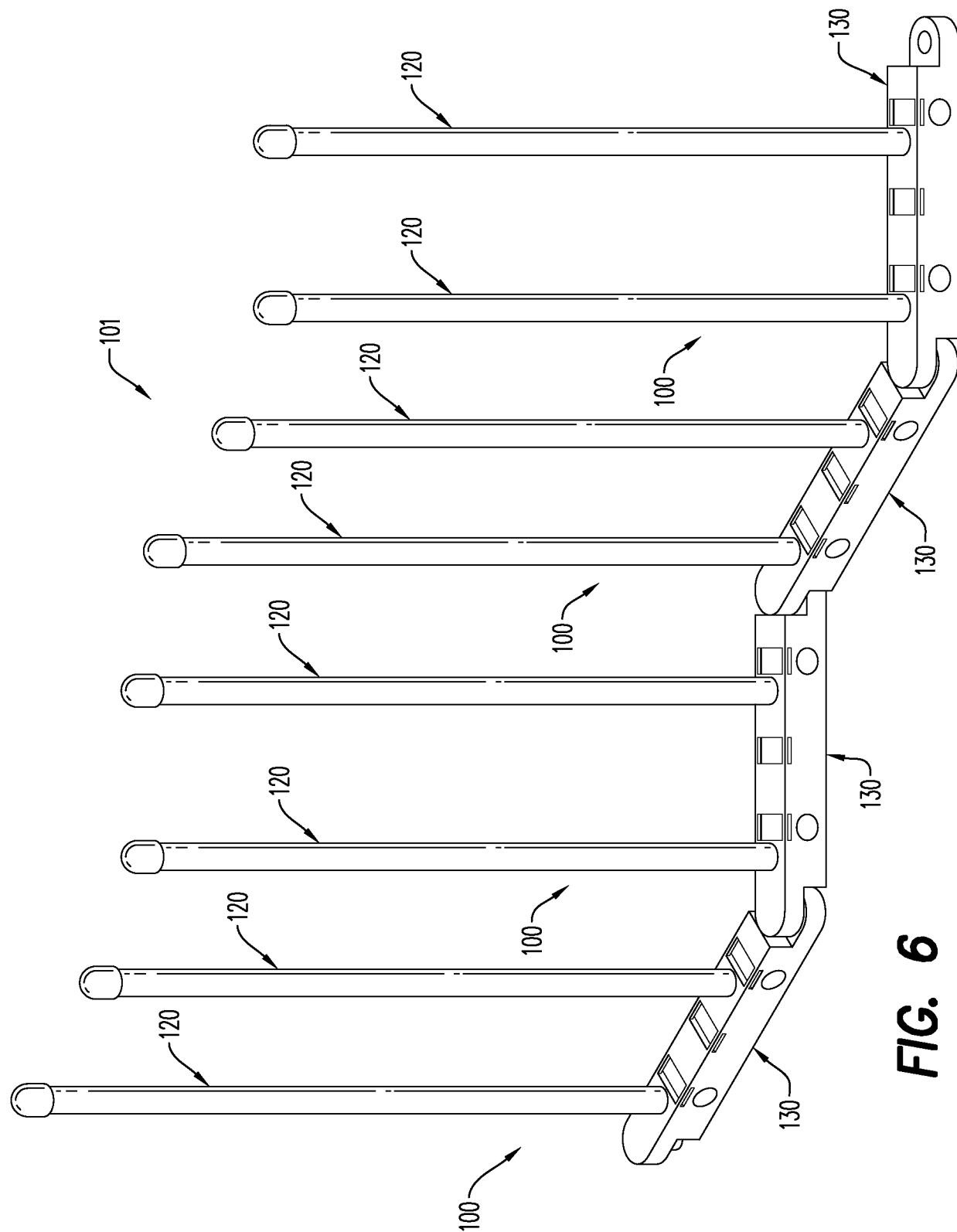


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 15/22450

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A01M 29/00, A01M 29/30, A01M 29/32, H02G 7/00, F16L 33/08 (2015.01)

CPC - A01M 29/00, A01M 29/30, A01M 29/32, H02G 7/00, F16L 33/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8): A01M 29/*, H02G 7* (2015.01)

CPC: A01M 29*, H02G 7*

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

IPC(8): A01M 29/*, H02G 7*, E04B 1/72, A01K 3/00, F16L* (2015.01)

CPC: A01M 29/*, H02G 7*, E04B 1/72, A01K 3/00, F16L*

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patents, Google Web

Keywords: spike, modular, fastener, clamp, hose, screw, bird, tine, pest, worm, gear, belt, strap, strip, slit, slot, avian, pigeon, lock, opening, aperture, thread, feed, cable tie, support, bracket, mount, lock, locking

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95/31099 A1 (PASK) 23 November 1995 (23.11.1995), entire document	2-4
-		-----
Y		2-4, 6-7
-		-----
A		5, 8-19
Y	WO 02/21911 A1 (NAIDOO) 21 March 2002 (21.03.2002), entire document	2-4, 7
-		-----
A		5, 8-19
Y	US 6,250,023 B1 (DONOHO) 26 June 2001 (26.06.2001), entire document	6
A	US 8,627,613 B2 (PARKER) 14 January 2014 (14.01.2014); entire document	5, 8-19
A	WO 2010/123614 (PAULIN) 28 October 2010 (28.10.2010), entire document	2-19
A	US 5,941,483 A (BAGINSKI) 24 August 1998 (24.08.1998), entire document	2-19
A	US 5,332,179 A (KUFFEL et al.) 26 July 1994 (26.07.1994), entire document	2-19
A	US 3,632,069 A (THAYER et al.) 04 January 1972 (04.01.1972), entire document	2-19

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 May 2015 (29.05.2015)

Date of mailing of the international search report

02 JUL 2015

Name and mailing address of the ISA/US

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Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 15/22450

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
the term "as shown and described" does not properly limit the scope of the claim.

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.