CONICALLY MATING EXPLOSIONPROOF HOUSING AND COVER ASSEMBLY

ABSTRACT: The threads by which a cover is secured to a housing for electrical elements are positioned on mating conical surfaces. The taper of the threaded conical surfaces is sufficient to permit bringing the threads on the cover down over most of the threads on the housing by simply axially mating the cover with the housing. A few turns of the thus positioned cover brings all the threads into engagement to provide an "explosionproof" closure, e.g., with six full threads engaged. Stop-lock means prevent advance of the cover to zero clearance between threads and prevent inadvertent partial unthreading.
CONICALLY MATING EXPLOSIONPROOF HOUSING AND COVER ASSEMBLY

BACKGROUND OF THE INVENTION
To be approved for use in hazardous areas, and to meet the standards set for so-called “explosionproof” equipment by well recognized and authoritative agencies (e.g., Underwriters Laboratories), housing and cover assemblies must be joined by a specified number of full threads. The number of threads specified depends on the particular classification of the hazardous atmosphere in which the assembly is intended to be used, and upon the closeness of fit of the threads themselves. The number of threads is not specified on the basis that that number of threads is required to hold the cover in place during an explosion. The number of threads is required to provide a sufficient path to arrest flame propagation therewithin in the event of an internal ignition.

Inasmuch as relatively close fit exists between mating threads of equipment heretofore available, grit, dirt, and other foreign materials tend to either damage the threads, or make threading of the cover onto the housing relatively difficult. It has been observed that service men, rather than struggle with a hard-to-turn cover to bring the entire set of threads into engagement, tend to merely start the cover onto the housing and may turn the cover only a sufficient number of turns, e.g., two or three turns, to hold the cover to the housing.

Another difficulty encountered in handling relatively large covers heretofore available, e.g., fifteen inches in diameter, results from the fact that these elements are relatively cumbersome, bulky, and difficult to precisely manipulate. It has been found that considerable difficulty is encountered in properly starting the threading of relatively large covers. There is a decided tendency to damage a number of the threads because of a “bad start”, i.e., because of cross threading.

The tendency of the heretofore conventional housing and cover assemblies to cross thread, with resulting damage of threads is believed to be a very serious one. Replacement of a housing is no simple matter, and usually involves interruption of service, and replacement or transfer of electrical contents. It sometimes involves the services of several trades classifications, e.g., electricians, millwrights, etc. The tendency to leave a damaged housing and cover assembly in service longer than it should be is very strong, according to my observations.

Another problem encountered in connection with heretofore conventional housing and cover assemblies has been galling and other friction-generated damage to threads, as well as the “freezing” or integration of zero clearance abutting opposing thread faces, particularly in aluminum equipment. The problem is mainly associated with “jamming” of threads upon complete engagement therebetween. In order to alleviate this problem and in order to facilitate the threading of one member on the other it has been common practice to apply oil or grease to the threads. However, the presence of oil or grease further exaggerates the tendency of the threaded surfaces to become contaminated with dust or grit and the undesirable consequences of this were discussed hereinafore. A stop mechanism, disclosed by me in my U.S. Pat. No. 3,393,824 virtually eliminated the jamming problem.

It is an object of this invention to provide a housing and cover assembly for electrical devices, such assembly which provides the full number of meshed threads required in order that the resulting electrical article meet “explosionproof” standards, and yet which does not require making a large number of threading turns. It is another object of this invention to provide a housing and cover assembly in which the cover is “started” without a tendency to “cross thread” and in which it is virtually impossible to damage the threads due to a bad start, or jam the threads due to overengagement.

It is a further object of this invention to provide a cover-housing assembly which affords explosionproof protection for an electrical article, which assembly does not require the use of grease or oil to facilitate smooth and rapid turning of the members with respect to one another. It is a further object to provide a cover-housing assembly which is not significantly subject to “freezing.”

SUMMARY OF THE INVENTION
In accordance with this invention the mating surfaces of a cover and housing for an electrical article are generally conical, and mating threads sufficient in number to qualify the resulting enclosure as “explosion proof,” are engageable on the mating conical surfaces. The taper of the threaded conical surfaces is sufficient to permit most of the threads to overlap by simply axially mating the cover with the housing. An antirotation lock is essential to prevent undesirable increase in clearance between threads caused by relatively small unthreading rotation.

DESIGNATION OF THE FIGURES
FIGS. 1 and 2 are perspective views of an inverted electrical housing-cover assembly improved in accordance with this invention.

FIG. 1 is a cross-sectional elevational view taken approximately along the line 3-3 of FIG. 1, except that the cover is rotated approximately 180° and is being lowered onto the housing member.

FIG. 2 is a fragmentary cross-sectional view taken approximately along the line 3-3 of FIG. 1.

FIGS. 4, 5, and 6 are plan views of the housing, showing alternative embodiments for use with single-, double-, and triple-lead threads respectively.

DESCRIPTION OF PREFERRED EMBODIMENTS
Although the following disclosure offered for public dissemination, in return for the grant of a patent, is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose, as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

The objects set forth above and other objects which are apparent hereinafter are all accomplished by the housing and cover assembly of this invention. In the embodiment illustrated (which has been invented in the drawings for illustration purposes) in FIGS. 1—4 of the attached drawings, dome-shaped cover or cap 10 connects with housing 12 by means of mating threads 15, 16, may be considered as cut from the inside and outside, respectively, of conical surfaces, and the taper of the respective conical surfaces in the illustrated embodiment is sufficient to permit approximately four complete threads to overlap one another as a result of merely positioning cover 10 with axial movement only over threads 16 (see FIG. 2). Subsequently, after two complete turns of cover 10 to thread it onto housing 12, the resulting connection includes the meshing of six threads (see FIG. 3).

HOUSING

Housing 12 includes enlarged middle enclosure section 18 with inlet and outlet connectors 20, 22, respectively, which provide aligned pass-through channel 23 close to one side 24 of housing 12. This pass-through channel 23 facilitates pulling wire through the enclosure without the necessity of removing the contents of housing 12 or cover 10. Details of the means by which connectors 20, 22 are fastened to conduit, pipe, or to another electrical enclosure in a bank, are not shown since they are conventional and do not constitute part of the inventive concept. Enclosed end portion 26 may be an integral part of housing 12, i.e., integral with enlarged portion 18, but alternatively may be provided in the form of a second removable cover substantially identical to dome-shaped cover 10. In such an embodiment, the means of connection, in accordance with
this invention, would be identical to the threaded connection illustrated in the FIGS. 2 and 3 of the attached drawings.

Housing 18 includes mounting bracket 30 in internally fixed threaded connections in a conventional manner, and bracket 30 includes threaded openings 32 or other means for attaching electrical components thereto. Examples of the kinds of electrical components which are housed in housing and cover assemblies in accordance with this invention include circuit breakers, line starters, and other electrical articles, none of which are illustrated because they are conventional. The invention is not dependent upon the particular electrical components housed in the enclosure.

It is not necessary that cover 10 be dome shaped as in the illustrated embodiment although the presence of the relatively large enclosed region 36 permits mounting of electrical articles on bracket 30, which articles can extend through opening 38 of housing 12 into region 36 within dome-shaped cover 10. Thus, in such a utilization of the housing and cover assembly of this invention in accordance with the illustrated embodiment, removal of cover 10 exposes a large bulk of an enclosed electrical article to facilitate the servicing thereof. Alternatively, mounting brackets 30 equipped with conventional swingout or pivot out mounting features can be used to facilitate servicing of components normally residing within enlarged portion 18, upon removal of cover 10.

Mouth 38 of housing 12 passes generally conically neck 40. Threads 16 are positioned on the exterior portion of neck 40. Radially extending flat portion 42 joins the base of neck portion 40 with sidewalls 44. In the illustrated embodiment, sidewall 44 is extended axially to provide lip 46. Lip 46 is employed as a drip lip (when the embodiment is turned right side up) so that water will not run from the sides, across the bottom, and into the threads. Its presence also assists in protecting threads 16 from mechanical damage while cover 10 is removed.

Radial portion 42 includes detent socket 50, the function of which will be described in further detail hereinafter.

**COVER**

Cover 10 is generally domelike, and includes closed end 52, substantially cylindrical sidewall 54, and outwardly tapering sidewall portion 56. In the illustrated embodiment the end of the conical tapered sidewall portion 56 continues radially as extending flat faced flange 58. An enclosure 60 for the releasable lock mechanism, generally 62, is mounted on the side of cover 10. As illustrated, it has been cast as an integral part of the outwardly tapering portion 56 but could be a separable part affixed to the cover. Releasable detent mechanism 62 includes slide 64 and spring 68, and externally accessible release knob 70 which is secured to bolt 64 by means of setscrew 72. Spring 68 is retained within enclosure 60 by collar 66, and, though bolt 64 is retractable into enclosure 60, knob 70 limits its motion in the extending direction. Adjustment of the length of extension by changing the point at which bolt 64 is engaged by setscrew 72 may be necessary for reasons explained more fully hereinafter.

A critical relationship exists between the positioning of threads 15, 16, the positioning of detent mechanism 62, the positioning of detent socket 50 on radial surface 42, and the reach of bolt 64. The relative positioning of the threads 15, 16, releasable lock mechanism 62 and detent 50 must be such that external reaching portion 74 of bolt 64 does not prematurely engage face 42, i.e., detent socket 50 before cover 10 is turned 45

threaded components, is virtually eliminated. The engagement of bolt 64 with detent 50 must occur after a sufficient number of threads 15, 16 have engaged to qualify the element as "explosion-proof" for the particular use intended, and just before a "zero clearance" condition is reached, e.g., within one-eighth of a turn, preferably about 5° to 10° rotation from zero clearance condition.

**HOUSING-COVER RELATIONSHIP**

The following manufacturing procedure is suggested primarily to illustrate the critical relationship which was referred to above. Prior to the final adjustment of the reach of bolt 64, and prior to the placement of the external face 42, cover 10 is threaded gently into complete engagement with housing 12. When further rotation of cover 10 with respect to housing 12 is impossible, due to the complete engagement of threads 15, 16, cover 10 is rotated in the reverse, or "unthreading" direction through a very small arc sufficient to provide the desired clearance between opposing threads. I presently prefer between 0.005-inches and 0.010-inches clearance at the sides of the threads and about 0.005-inches difference in pitch diameter. However, the amount of clearance can be set at any desirable or necessary value, by proper placement of lock socket 50. The desired clearance (e.g., difference in pitch diameter) may be used in calculations based on rate of advance of opposing core surfaces per turn, to determine the precise arc through which the cover must be unthreaded to achieve that clearance. For example, with a single lead threaded system on 30° included angle conical I prefer a backup arc of 5° to 10° from zero clearance. Generally I prefer that the difference between the lock-stop position and the zero clearance position be less than one-sixteenth of a revolution after the cover is "unthreaded" through the predetermined arc, the point at which end 74 of bolt 64 then touches radial portion 42. Cover 10 has then completely unthreaded from housing 12 and detent socket 50 is cut into radial portion 42 at the point marked. Cover 10 is then rethreaded onto housing 12, retracting bolt 64 manually by elevating release knob 72, if necessary. Threading is continued to the point of complete engagement of threads 15, 16 by gently advancing or rotating cover 10 into the thread, reversing rotation of cover 10 slightly brings bolt 64 into alignment with detent socket 50. At this point spring 68 urges end 74 of the bolt 64 into engagement with socket 50. The housing and cover assembly is now in operating position.

To complete the final adjustment of the assembly in accordance with the invention, release knob 72 is manually elevated until end 74 of bolt 64 clears detent socket 50. Cover 52 is similarly rotated in the unthreading direction until end 74 is at a point approximately three-quarters of a turn away from socket 50, i.e., within about one-quarter of a turn of being realigned, for the first time during unthreading rotation, with socket 50. At this point setscrew 72 is loosened and release knob 70 is engaged on bolt 64 so that knob 72 rests at this point, on top 75 of enclosure 60. Upon reightening setscrew 72, the end 74 of bolt 64 is thus adjusted so that it does not engage socket 50 except at the completion of the last threading turn.

It is not essential that end 74 of bolt 64 engage housing 12 almost a complete turn prior to engagement with socket 50. It is, however, important that end 74 of bolt 64 cannot engage detent 50 prematurely, i.e., immediately before the "loose fit" point is reached. Premature engagement of bolt 64 with socket 50, e.g., during the second to last threading turn, would leave an excessively great clearance, or an excessively "loose fit" between the threads. End 74 of bolt 64 may be adjusted to engage housing 12 at any point during the last revolution, although if too small an arc is turned between the initial engagement of bolt 64 with socket 50, the point at which it seats in socket 50, the depth to which end 74 reaches into
socket 50 may be inadequate to provide a reliable lock of the cover 10 against rotation with respect to housing 12. Generally speaking, therefore, the "reach" of bolt 64 beyond the face of the member in which it is mounted cannot equal or exceed the axial distance between adjacent threads 15, or 16. It is desirable that latch or detent 62 not be on the "back" of the unit when it is mounted. To achieve this, one procedure would be to make the detent enclosure a separable part and not to affix it on the cover 10, until after the threads were formed on the cover. The first thread was the "reach" of bolt 64 beyond the standard housing 12 and the proper position for the enclosure 60 marked on cover 10 so that the enclosure could be put in place in the proper position.

In the embodiment of FIGS. 1-4, a single lead thread is utilized and consequently only a single stop point or "jam" point is possible upon complete engagement of the threads. If a double lead thread were utilized it is apparent that two "jam" points would be possible. In such an embodiment (FIG. 5) two detents 80 are placed in accordance with the above described procedure, and the end of bolt 64 is adjusted to initially contact face 42 within the last half turn of the threading rotation. In the event a triple lead thread is utilized (FIG. 6) three "jam" points are possible. Consequently three detents 81 are placed on face 42 in accordance with the above described procedure. Again, in accordance with the above described procedure the end of bolt 64 is adjusted in the latter mentioned embodiment to engage the face 42 in the final third of a turn. Obviously, the stop means utilized in conjunction with double, triple, and other multiple thread embodiments could include use of multiple lock mechanisms 62 in conjunction with a single socket 50. However this alternative construction would necessitate the use of a large number of structural parts, and would be considerably more difficult to precisely adjust.

It must be emphasized that releasable lock mechanism 62 is essential in accordance with this invention. Because of the relatively large change in clearance between threads which occurs during a relatively small arc of threading or unthreading rotation, and because the magnitude of the clearance between the threads greatly affects the efficiency of the resulting threading connection for the purpose of arresting propagation of a flame front therebetween, it is essential that the housing and the cover assembly be provided with positive locking mechanism to prevent even a small quantum of rotation in the unthreading direction. Therefore, providing mere stop means which prevents advance of the cover to the point at which the engaging threads would jam is inadequate and not at all acceptable, due to the fact that the clearance between the threads depends greatly on the extent to which the threads are engaged in this invention.

GENERAL DISCUSSION

The taper of neck 14, and consequently of threads 16 mounted thereon, and the conical taper of tapered portion 56, and of threads 15 on the inner face thereof, must be sufficiently great to permit most of threads 15, 16 to overlap as a result of axial movement of threads 15 over threads 16, except for that number of threads which will be engaged by three or less turns of threads 15, 16 with respect to each other. The Underwriter Laboratories standard for explosionproof equipment in group C and D environment (which includes ethyl-ether, acetone, and gasoline mixtures with air) is five full threads. One large manufacturer of "explosionproof" electrical fixtures uses at least six threads to provide an even greater margin of safety. Thus in an embodiment of this invention in which six threads is specified for "fully engaged" condition, the taper of neck 40 and tapered walls 56 must be sufficiently great to permit the overlap of at least three threads and preferably four threads, as a consequence of the axial mating of cover 10 onto housing 12.

The Underwriter Laboratories standard requires a larger number of threads for other environments, for example for groups A and B which include the acetylene-air and the hydrogen-air mixtures. Those skilled in the art, given the subject matter disclosed herein can readily utilize the subject matter disclosed herein in the manufacture of explosionproof fixtures having any number of threads required for particular environments for which the fixtures are to be used.

In the embodiment illustrated in FIGS. 1 through 4 threads 15, 16 are single-lead threads. The upper end or beginning 76 of thread 16 is perhaps best seen in FIG. 4. However, as suggested hereinbefore, it is not essential that a single thread, or single-lead thread be used in accordance with this invention. It is considered within the purview of this invention that multiple lead threads, for example double or triple threads, may be utilized. Thus, in FIG. 5, two beginnings 77 of a double-lead thread are indicated. In FIG. 6 the three beginnings 78 of a triple-lead thread are indicated. In the event a double-lead thread is utilized, as suggested in FIG. 5, it is necessary that double-detent sockets 80 be utilized, in the event a triple lead thread is used, three detent sockets 81 are utilized, and so on.

The use of single lead threads has the advantages that these threads are easier to machine, there is only one stop point, and, due to the relatively slow advance per revolution, rotation of the cover through a small arc causes a relatively small change in clearance between the threads 15, 16. Multiple-lead threads have the advantage of providing relatively great axial advance per given rotation of cover 10. However, if a double-lead thread is used bolt 74 must be sized and adjusted to contact face 58 at a point between sockets 80 in the last or final part of rotation of cover 10 prior to its engagement in that socket 80 which stops rotation just prior to zero clearance condition, i.e., within one-third turn of that socket 80. Likewise when a triple thread is utilized it is necessary to provide three sockets 81 at a position such that rotational motion of cover 10 is locked immediately before the "zero clearance" condition is reached, and bolt 74 must be sized and adjusted to engage face 58 between sockets 81 in the last or final portion of the rotation of cover 10 just prior to engagement by bolt 74 with that socket 81 which stops rotation just prior to zero clearance, i.e., within one-third turn of final socket 81.

As a result of my observation of the use and abuse of explosionproof housing and cover assemblies over a period of years I have concluded that the improvement of this invention must not require more than three turns in order to bring the specified standard number of threads into proper mating engagement. It is highly preferred that only two or less turns be required.

In the illustrated embodiment in which a single-lead thread is illustrated, the taper of neck 40 and sidewalls 56, i.e., the taper of the cone in which threads 15, 16 may be considered to be located, is approximately 30° at the tip or point of the cone, i.e., at the "included angle." In this embodiment, in which six threads are fully engaged when bolt 74 engages socket 50, four threads overlap as a result of the axial movement of the cover 10 over neck 40, and two additional turns are required to completely, i.e., properly, mesh six full threads.

Although full square threads or Acme threads are imminently satisfactory for use in accordance with this invention, provided adequate clearance is provided at the sides of the "full square" threads, I prefer to use a modified square thread, that is, a thread having between 7.5° and 10° taper on the tooth.

Removal of cover 10 from housing 12 in accordance with the use of this invention is an extremely simple matter. Release knob 72 is withdrawn sufficiently to permit bolt 64 to clear socket 50, and cover 10 is turned in the withdrawal direction. Only two turns are required to move cover 10 axially a sufficient distance for threads 15, 16 to disengage and to permit cover 10 to be withdrawn axially without further turning action. As soon as turning starts, the clearance between threads, i.e., the difference in pitch diameter, increases rapidly as one cone withdraws from the other. Hence, turning
becomes less hindered due to friction as unthreading continues.

In accordance with this invention, socket 50 can be positioned to terminate pivoting of cover 10 when threads 15, 16 are very close to zero tolerance, i.e., in a condition of very close fit. As indicated above the number of threads which must be fully engaged to qualify a housing-cover assembly as "explosion-proof" in accordance with Underwriter Laboratories standards, depends not only on the nature of the intended environment, but also on the closeness of the fit of the threads themselves. It will be appreciated that the closer the fit of the threads during operation, the greater the effectiveness of the threadedconnection with respect to arresting the propagation of an igniter. Thus, the combination of engaging threads on tapered mating faces, and stop means in an explosion-proof cover-housing assembly of this invention is particularly advantageous.

I have been unable to cross thread cover 10 onto neck 40, and I have asked others to attempt to do so. To my knowledge all attempts to do so have failed. When cover 10 is moved axially over neck 40 to the limit of axial mating engagement therewith, the alignment of cover 10 with respect to housing 40 is virtually perfect, and slight deviation from perfect alignment seems to be automatically corrected when cover 10 is turned over neck 40 to begin threading of threads 15, 16 without cross threading. Hence, this housing and cover assembly virtually eliminates the risk of thread damage due to cross threading, the nuisance of having to replace or rehouse electrical components in hazardous areas because of cross threading damage to threads, and hence also eliminates the risk of leaving a closure, damaged as a result of cross threading, in service.

1. In an explosion-proof electrical enclosure comprising a threaded cap, and a housing having opening means including a threaded collar, cap being spaced apart from the point of rotation of which opposed mating threads would actually meet at zero clearance.

2. The improvement of claim 1 in which the threaded portions are provided with six complete turns of a single lead thread, and wherein the threaded portions are so inclined that the cap is axially seatable or at least four of the threads without turning said cap.

3. The improvement of claim 1 in which the threaded portion of both the cap and collar are provided with three complete turns of a double thread, wherein the tapered portion is inclined to such an extent that the cap is initially axially seatable over the collar to a point at which all but one or less of the complete turns of the mating threads are in opposition to each other without threading of the cap onto the collar, there being two arcs at which fully engaged threads are no longer rotatable, and in which the locking means includes means stopping rotation just ahead of both jam points.

4. An improved quick-release nonjamming housing and cover assembly for electrical components comprising the combination:
a housing having a neck portion and an opening passing through said neck portion, said neck portion of said housing having the configuration of a truncated cone, the outer surface of said neck portion being tapped outwardly with respect to the housing and inwardly with respect to said opening, said neck portion having external threads extending away from its outer surface;
a cover over said opening having an internally threaded rim in threaded engagement with the threads on the conical surface of said neck portion; and
lock means preventing rotation of said cover and said housing with respect to each other, said lock means including releasable bias means automatically stopping the threading rotation of the cover with respect to the housing within the last eighth of a turn immediately preceding that point of rotation at which a condition of zero clearance would exist with respect to opposed threads on said housing and cover.

5. The assembly of claim 4 in which the threads provide six complete turns of a single lead thread, and wherein the tapered portions are so inclined that the cap is axially seatable over at least four of the threads without turning said cover.

6. The assembly of claim 4 in which the threaded portion of both the cover and housing have three complete turns of a double lead thread, wherein the tapered portions are inclined to such an extent that the cover is initially axially seatable over the tapered portion of the housing to a point at which all but one or less of the complete turns of the mateable threads are in opposition to each other without threading of the cover onto the tapered portion of the housing;
the resulting structure being capable of two relative positions of said cover with respect to said housing referred to herein as zero clearance points, at which zero clearance would be obtained between opposing threads; and
in which the lock means include means automatically stopping rotation of the cover with respect to the housing at a point immediately ahead of the zero clearance points.

7. A housing and cover assembly for use with electrical components including:
an annular housing portion;
means for mounting electrical components in said housing portion;
line access means for providing ingress and egress from said housing portion, said line access means intersecting the housing portion;
said housing portion having equipment access opening means having substantially circular sidewalks tapering outwardly with respect to said housing portion and tapering inwardly with respect to said opening, said sidewalks having threads extending away from said sidewalks on the external face thereof;
a cover portion over said opening having substantially circular mouth and being of hollow, domelike configuration enclosing a substantial region in which electrical components can reside, the walls of the mouth having threads on the inner face thereof, said mouth and said threads being mated with the threads on said sidewalks of said housing;
one of said portions including releasable lock means extending axially between opposing parts of said cover portion and housing portion, said lock means comprising a sideable bolt, bias means urging the extension of said bolt axially, release means for manually retracting the bolt;
socket means on the other of said portions engaging said bolt, said socket means being positioned to engage said bolt to lock the cover portion against rotation with respect to said housing portion at a point just ahead of the point at which zero clearance would be obtained between the threads on the housing and cover portions;
said bolt being of sufficient length to initially engage the other portion on the last revolution prior to locking at a point ahead of said socket means.

8. A housing and cover assembly for use with electrical components including:
a housing member;
means for mounting electrical components in said housing member;
line access means for providing line ingress and egress from said housing member, said housing member having equipment access opening means having substantially circular sidewalls tapering outwardly with respect to said housing member and tapering inwardly with respect to said opening, said sidewalls having threads extending away from said sidewalls on the external face thereof, said sidewall having the configuration of a truncated cone, said cone having an included angle of about 30°;

a cover over said opening, said cover having a substantially circular mouth having an inner wall having the configuration of a truncated cone, the wall of the mouth having threads on the inner face thereof, said mouth and said threads being mated with the threads on said sidewalls of said housing;

said cover including releasable lock means extending axially between opposing portions of said cover and housing member, said lock means comprising a slideable bolt, bias means for urging the extension of said bolt axially, release means for manually retracting the bolt; socket means on said housing engaging said bolt, said socket means being positioned to engage said bolt to lock the cover against rotation with respect to said housing at a point within about 10° rotation ahead of that point of rotation at which zero clearance would be obtained between the threads on the housing member and the cover; said bolt having a reach less than the axial distance between adjacent threads on said sidewalls.
CERTIFICATE OF CORRECTION

Patent No. 3,582,535 Dated June 1, 1971

Inventor(s) Arthur I. Appleton

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 49, "The" should read --This--. Column 2, Line 49, after "16," insert --on mating cover 10 and housing 12 respectively. Threads 15, 16,--. Column 3, line 3, "in" should be deleted. Column 4, line 31, "threaded" should read --thread--. Column 5, line 30, "w9th" should read --with--.

Signed and sealed this 14th day of December 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. ROBERT GOTTSCHALK
Attesting Officer Acting Commissioner of Patents