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(54) **LOCK CYLINDER AND LOCKSET**

(57) The description discloses a new type of lock cylinder and lockset, including: connection member, and there is fixing sleeve for extending on the connection member; a lock cylinder mechanism, including a lock cam set in the back of the fixing sleeve. The unlocking cam has a slip connection with the fixing sleeve. There is an axle sleeve in the said unlocking cam, and there is a connection shaft in the said unlocking cam. The front end of the said connection shaft goes across the fixing sleeve, and the back end of the connection shaft has limit through-holes. There is an elastic part in the said limit through-holes, and there are balls on both end of the elastic part, and there is a stop collar in the limit through-hole corresponding to the said connection shaft. The lock set has a number of characteristics, such as simple structure, easy fabrication and strong rigidity. At the same time, the new type of lock cylinder provided by the utility model is easy to manufacture, convenient to assemble, and it is stable in structure and durable in use.

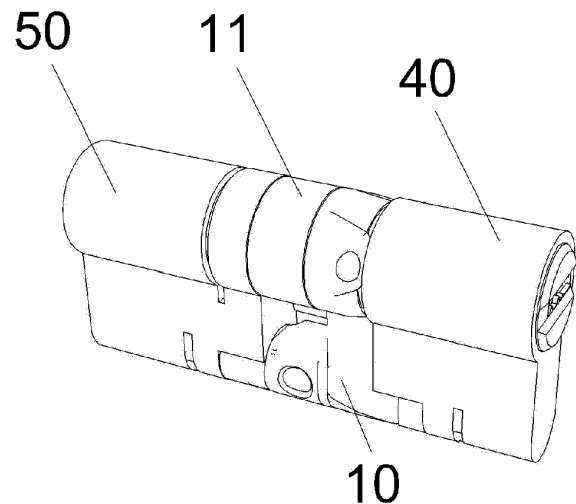


Figure 1

Description

Technical Field

[0001] The utility model is related to anti-theft locks, and it specifically involves in a new type of lock cylinder and lockset.

Background technology

[0002] The traditional security door lock cylinder is easy to be unlocked by using powerful unlocking tools, and it is also easy to be drilled by electric drill, because pins are used to lock the barrel of the lock cylinder, and the barrel is directly connected with the latch. When the barrel encounters a strong torsion, the pins will be destroyed, and then the barrel will be rotated, so it drives the latch to rotate and the door lock will be unlocked. In addition, the reason why traditional security door lock cylinder is easy to be unlocked by electric drill is because the rotating barrel is locked by the pins, and when the electric drill drills the rotating barrel, it's easy to force, and the rotating barrel is easily damaged. Therefore, traditional security door lock cylinder cannot effectively prevent prying and impact, so the inventor has developed a lock shown in patent: CN201610199496.9, which is an improved lock cylinder mechanism. It cooperates with the spring, external cam flange and two locking pieces to achieve the effect of being harder to pick or force, but there are also some problems in actual use and assembly, and it needs certain skills when installing each locking piece and axle sleeve, so it is impossible to achieve the actual production effect in the rapid fabrication and production process.

[0003] According to the present invention, there is provided a new lock cylinder, including: a connection member, and the fixing sleeve set on the extension of the said connection member; a lock cylinder mechanism, including an unlocking cam set in the back of the fixing sleeve, and the unlocking cam having a slip connection with the fixing sleeve. There is an axle sleeve in the said unlocking cam, and there is a connection shaft in the said unlocking cam. The front end of the said connection shaft extends through the fixing sleeve, and the rear end of the connection shaft features limit through-holes, the limit through-holes including an elastic part within, there being balls on both end of the elastic part, and a stop collar in the limit through-hole corresponding to the said connection shaft.

[0004] Further, there is a flange in the middle of the connection shaft, and the said connection shaft forms a lock-out cavity through the flange part and axle sleeve. The said connection shaft is set in the middle of the unlocking cam between the stop collar, axle sleeve and flange activities.

[0005] Further, there is a transmission block in the end of the connection shaft, and there is a cavity in the internal of the said transmission block. There is a compression

spring in the said cavity, and there are top bolts on the said compression spring, and the said top bolts are contacted with the connection shaft.

[0006] Also, the invention provides a lock device, including front lock shell, rear lock shell and new lock cylinder. The new lock cylinder is the one described above.

[0007] When considering the technical scheme of the lock set, at the initial state, there is a lock shell on the front and back end of the connection member, and normally, when the key is inserted into the lock shell and rotated, the correct aligns the pins and then the lock will be unlocked. But when it is unlocked by force outside the door, as shown in figure, the lock shell on the outside of the door will loosen and detach, so that there is no obstacle in the front of the connection shaft, and the top bolt in the back of the connection shaft pushes the connection shaft forward due to the action of internal compression spring. The limit through-hole of the connection shaft moves away from the position of the stop collar, so there is vacancy both in upper and lower space, and at the same time, the elastic part set up in the limit through-hole pushes out the balls, so that the connection shaft cannot be connected to the transmission block. Because the lock-out cavity is occupied by the balls, the connection shaft cannot be pushed towards the inside, so that the lock cylinder mechanism provided by the utility model performs the anti-force and anti-theft role.

[0008] Therefore, the utility model has a number of characteristics, such as simple structure, easy fabrication and strong rigidity. At the same time, the new type of lock cylinder provided by the utility model is easy to manufacture, convenient to assemble, and it is stable in structure and durable in use.

[0009] In addition to the purposes, features and advantages described above, the utility model has other purposes, features and advantages. The utility model is described in more detail with reference to the figure below.

Description of figures

[0010] The figure attached here which constitutes a part of this disclosure and which is used for further understanding of the invention shows the optimized example of the invention, and it shows the principle of this invention together with the operation. In the attached figures:

FIG. 1 is a three-dimensional structural diagram of the first embodiment of the lock set.

FIG. 2 is a three-dimensional structural diagram of a component of the first embodiment of the lock set.

FIG. 3 is a partial sectional structural diagram of the lock set.

FIG. 4 is a structural diagram when the lock set is damaged by force.

FIG. 5 is a structural diagram of the stop collar in example 2 of the lock set.

FIG. 6 is a partial sectional structural diagram of example 2 of the lock set.

[0011] The above figures include the following parts: 10 is a connection member; 11 is a fixing sleeve; 20 is a lock cylinder mechanism; 21 is a unlocking cam; 22 is a axle sleeve; 23 is a connection shaft; 24 is a limit through-hole; 25 is an elastic part; 26 are balls; 27 is a stop collar; 271 is a circular groove; 272 is a pin roller; 28 is a flange part; 29 is a lock-out cavity; 30 is a transmission block; 31 is a cavity; 32 is a compression spring; 33 is a top bolt; 40 is a front lock shell; 50 is a rear lock shell; 51 is a rotating handle.

Description of Embodiments

[0012] Next, the examples of the lock set will be described in detail though combining with the attached figures, but the lock set may be implemented by various ways limited and covered by the right requirements.

Example 1:

[0013] Referring to FIG. 1 to FIG. 4, FIG. 1 particularly shows a new lock cylinder, including: connection member 10, a fixing sleeve 11 set on the extension of the said connection member 10; lock cylinder mechanism 20, the said lock cylinder mechanism 20 includes an unlocking cam 21 set in the back of the fixing sleeve 11, and there is a sliding connection between the unlocking cam 21 and the fixing sleeve 11. There is an axle sleeve 22 in the said unlocking cam 21. There is a connection shaft 23 in the said unlocking cam 21, and the front of the said connection shaft 23 goes through the fixing sleeve 11, and there is limit through-hole 24 in the back of the said connection shaft 23. There is an elastic part 25 in the said limit through-hole 24, and there are balls 26 on both ends of the said elastic part 25, and there is a stop collar 27 in the limit through-hole 24 corresponding to the said connections shaft.

[0014] As shown in Figure 3 and Figure 4, there is a flange part 28 in the middle part of the said connection shaft 23, and the said connection shaft 23 forms a lock-out cavity 29 between the flange part 29 and axle sleeve 22. The said connection shaft 23 is set in the middle part of the unlocking cam 21 through the stop collar 27, axle sleeve 22 and flange part 28.

[0015] As shown in Figure 3 and Figure 4, there is a transmission block 30 on the back end of the said connection shaft 23, and there is a cavity 31 in the internal of the said transmission block 30. There is a compression spring 32 in the said cavity 32, and there is a top bolt 33 on the said compression spring 32, and the said top bolt 33 abuts with the connection shaft 23.

[0016] According to another aspect of the invention,

there is provided a lockset, including front lock shell 40, rear lock shell 50, as well as the new lock cylinder in the above embodiment. The said front lock shell and rear lock shell are adaptively installed on the new lock cylinder. In the initial state, the lock shells are positioned on the front and back ends of the connection member, and normally, when the key is inserted into the lock shell, the key profile correctly aligns the pins and then the lock will be unlocked. But when it is unlocked by force outside the door, as shown in Figure 4, the lock shell on the outside of the door is unconstrained and will detach, so that there is no obstacle in the front of the connection shaft, and the top bolt at the back of the connection shaft forwardly pushes out the connection shaft due to the action of internal compression spring. The limit through-hole of the connection shaft moves away from the position of the stop collar, and there is space both in upper and lower space, and at this time, the elastic part disposed in the limit through-hole pushes out the balls, so that the connection shaft cannot be connected to the transmission block. Because the lock-out cavity is occupied by the balls, the connection shaft cannot to be pushed into the inside, so that the lock cylinder mechanism provided by the lock set can perform the anti-force and anti-theft role.

Example 2:

[0017] Referring to FIG. 1 to FIG. 6, but particularly FIG. 4 to 6 which particularly shows a new lock cylinder, including: connection member 10, a fixing sleeve 11 set on the extension of the said connection member 10; Lock cylinder mechanism 20, the said lock cylinder mechanism 20 includes an unlocking cam 21 set in the back of the fixing sleeve 11, and there is a sliding connection between the unlocking cam 21 and the fixing sleeve 11. There is an axle sleeve 22 in the said unlocking cam 21. There is a connection shaft 23 in the said unlocking cam 21, and the front of the said connection shaft 23 goes through the fixing sleeve 11, and there is limit through-hole 24 in the back of the said connection shaft 23. There is an elastic part 25 in the said limit through-hole 24, and there are balls 26 on both ends of the said elastic part 25, and there is a stop collar 27 in the limit through-hole 24 corresponding to the said connections shaft.

[0018] As shown in Figure 5, a number of circular grooves 271 are arranged on the stop collar 27, and the pin roller 272 is arranged on the circular grooves 271.

[0019] As shown in Figure 6, there is a flange part 28 in the middle part of the said connection shaft 23, and the said connection shaft 23 forms a lock-out cavity 29 through the flange part 29 and axle sleeve 22. The said connection shaft 23 is set in the middle part of the unlocking cam 21 through the stop collar 27, axle sleeve 22 and flange part 28.

[0020] As shown in Figure 6, there is a transmission block 30 on the back end of the said connection shaft 23, and there is a cavity 31 in the internal of the said transmission block 30. There is a compression spring 32 in

the said cavity 32, and there is a top bolt 33 on the said compression spring 32, and the said top bolt 33 abuts with the connection shaft 23.

[0021] According to another aspect of the invention, a lock device is provided, including a front lock shell 40, a rear lock shell 50 and a new type of lock barrel as described above.

[0022] As shown in figures, because the rear lock shell is unlocked by the rotating handle 51, this lockset is single-sided unlocking type, and the rear lock shell of the single unlocking lock cylinder only rotates idly. Therefore, several circular grooves are arranged in the stop collar, and are connected with the unlocking cam through the pin roller set on the circular grooves, which are changed from the original surface-to-surface contact configuration into line-surface contact, greatly reduced the friction, and enhancing the service life of the lockset while providing an anti-theft and anti-force role.

[0023] The above examples are only the preferred examples of the invention, and they are not used to restrict the invention. For technical personnel in this field, the lock set can have various modifications and changes. Any modification, equivalent replacement and improvement made within the spirit and principles of the invention shall be included in the protection scope of the invention.

Claims

1. A lock cylinder, **characterised in that** it includes:
 - a connection member having a fixing sleeve extending from it;
 - a lock cylinder mechanism, the said lock cylinder mechanism including
 - an unlocking cam set behind the fixing sleeve, the unlocking cam being slidably connected with the fixing sleeve,
 - an axle sleeve disposed in the said unlocking cam, and
 - a connection shaft in the said unlocking cam

the front end of the said connection shaft extends through the fixing sleeve, and the rear end of the connection shaft features limit through-holes, the limit through-holes including an elastic part within, there being balls on both end of the elastic part, and a stop collar in the limit through-hole corresponding to the said connection shaft.
2. A lock cylinder according to claim 1, **characterized in that** there is provided a flange part in the middle of the said connection shaft, the said connection shaft forming a lock-out cavity with the flange part and axle sleeve, the said connection shaft being set in the middle of unlocking cam, the stop collar, axle sleeve and flange part limiting the movement of the

unlocking cam.

3. A lock cylinder according to claim 1, **characterized in that** there is a transmission block in the end of the connection shaft, and there is a cavity formed in the said transmission block, there being a compression spring in the said cavity, and top bolts on the said compression spring, the said top bolts abutting with the connection shaft.
4. A lock device, including front lock shell, rear lock shell and new lock cylinder, and it is **characterized in that** the said new lock cylinder is a lock cylinder according to any of claims 1 to 3.

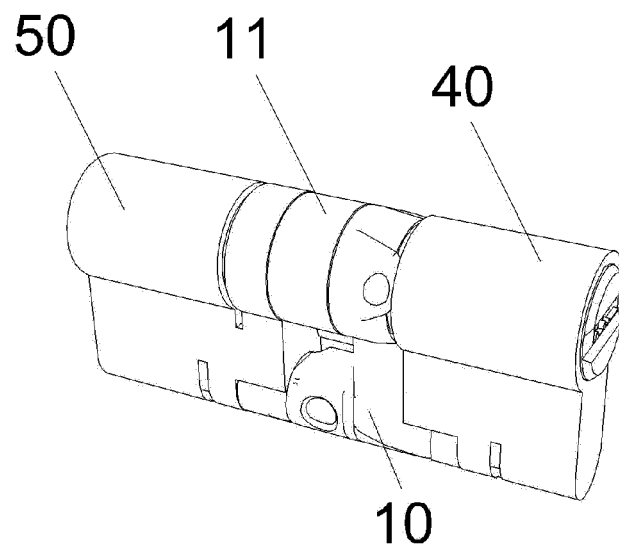


Figure 1

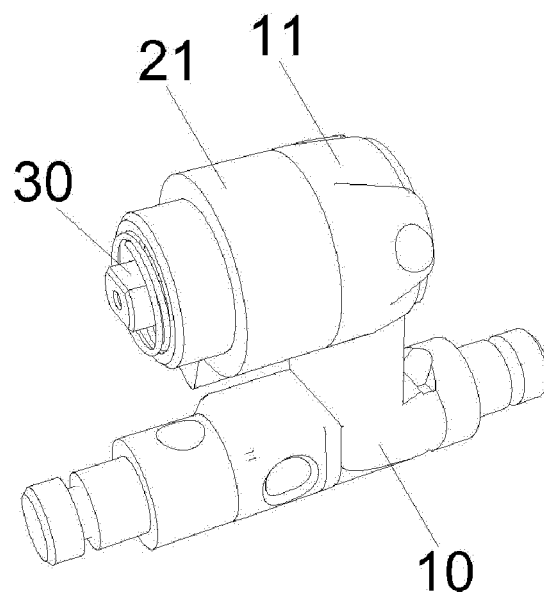


Figure 2

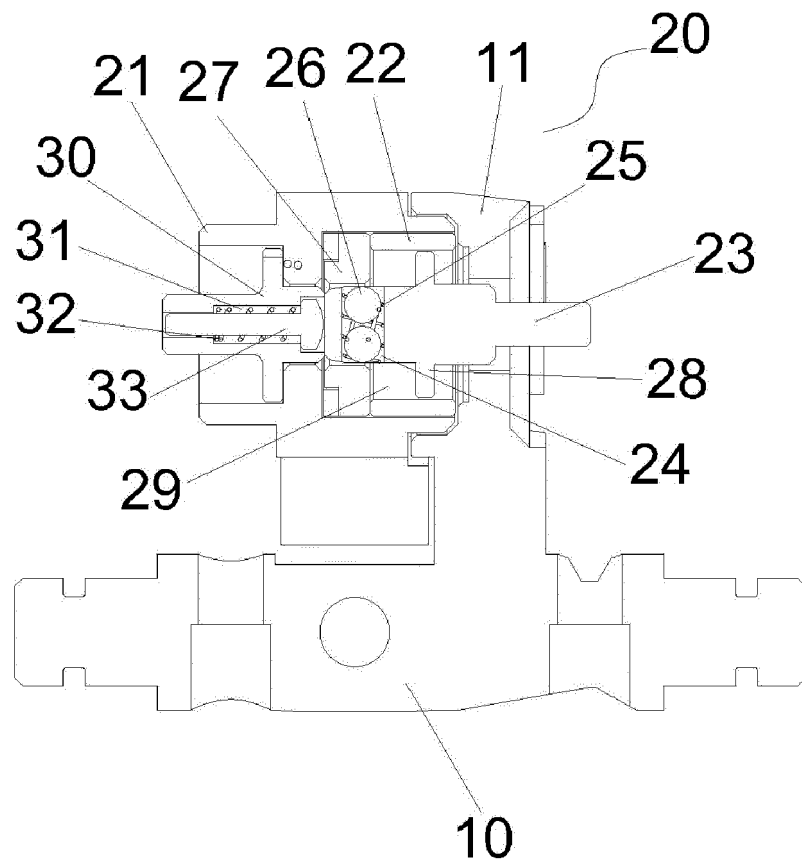


Figure 3

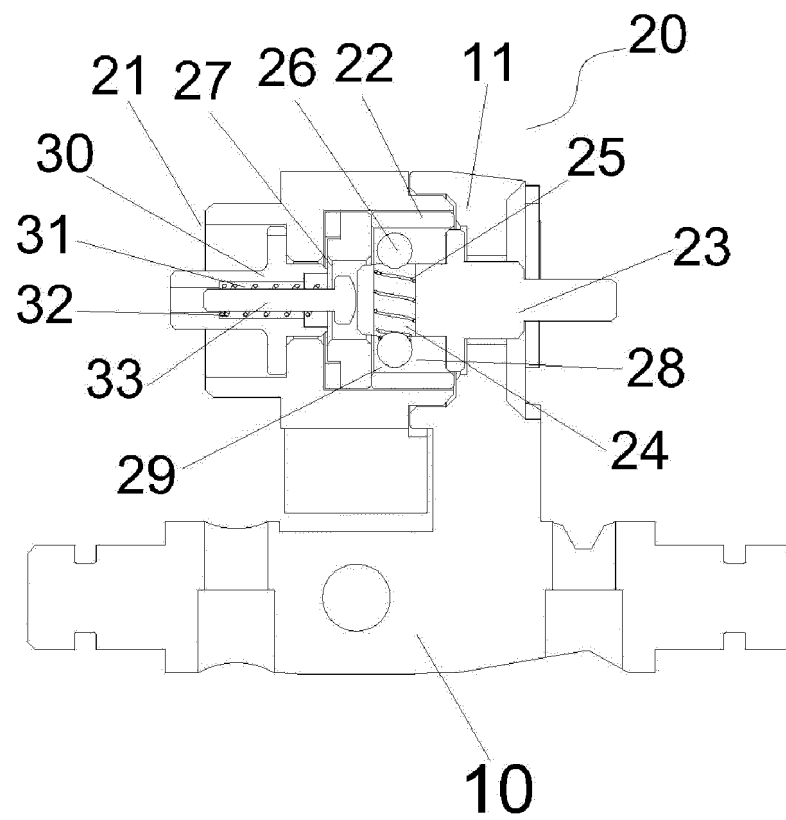


Figure 4

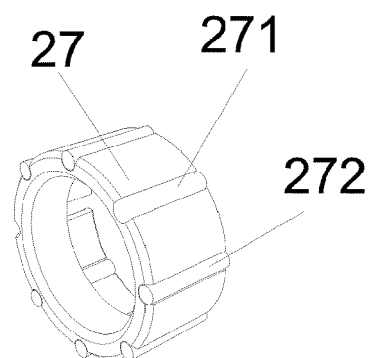


Figure 5

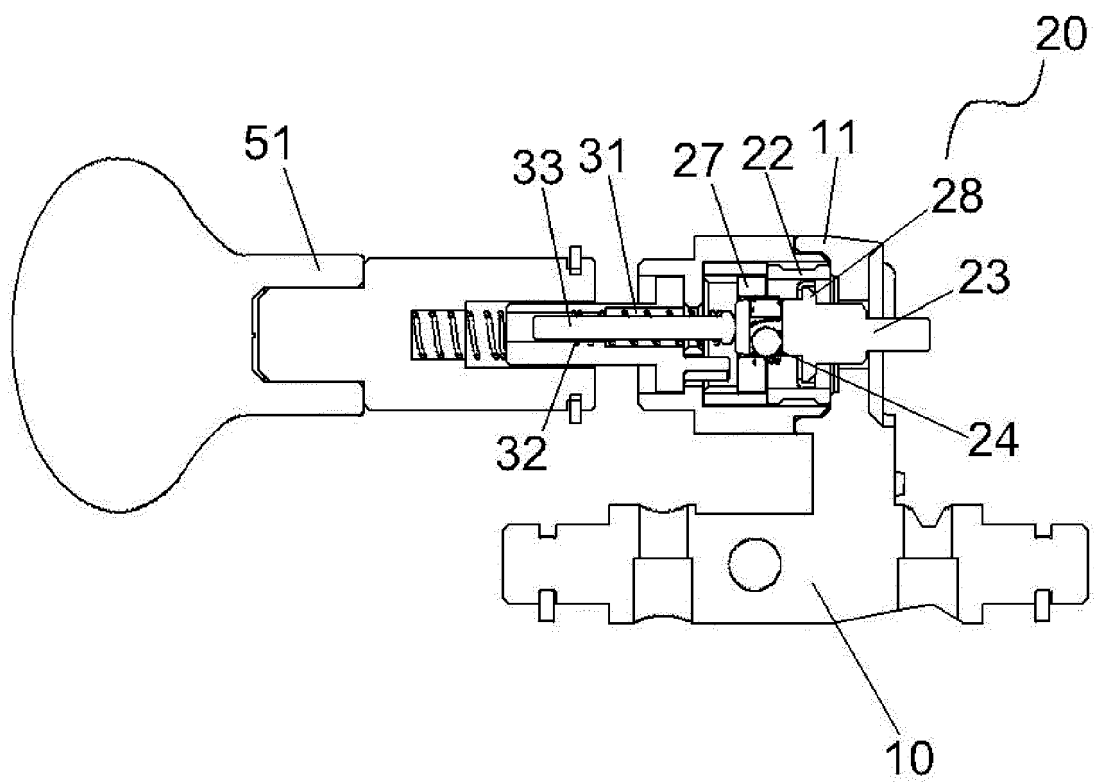


Figure 6



EUROPEAN SEARCH REPORT

Application Number
EP 18 20 2309

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	CN 205 502 753 U (XU JUXIANG) 24 August 2016 (2016-08-24) * the whole document *	1-4	INV. E05B17/20 E05B9/04
A	CN 102 606 004 A (JUXIANG XU) 25 July 2012 (2012-07-25) * the whole document *	1-4	
A	GB 2 556 336 A (UAP LTD [GB]) 30 May 2018 (2018-05-30) * the whole document *	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 May 2019	Examiner Viethen, Lorenz
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ON EUROPEAN PATENT APPLICATION NO.**

EP 18 20 2309

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27-05-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 205502753 U	24-08-2016	NONE	
CN 102606004 A	25-07-2012	NONE	
GB 2556336 A	30-05-2018	NONE	

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201610199496 [0002]