

Un tipo de método de producción de barras corrugadas laminadas en caliente

Abstracto

traducido del chino

The invention provides a method for producing hot-rolled ribbed steel bars, which comprises the following steps: heating a steel billet to a rolling temperature; rough rolling the steel billet; semi-finishing rolling the steel billet; dry fog cooling the steel billet; finishing rolling The hot-rolled ribbed steel bar is obtained from the billet; the hot-rolled ribbed steel bar is subjected to dry fog cooling; the hot-rolled ribbed steel bar is air-cooled; On the steel bar, the cooling of the steel bar during the rolling process is more uniform and gentle, which improves the strength of the steel bar and reduces the consumption of alloys, avoiding the generation of tempered structure. The metallographic structure of the steel bar meets the requirements of the new GB/T1499.2-2018 standard .

Clasificaciones

■ **C22C38/04** Aleaciones ferrosas, por ejemplo, aleaciones de acero que contienen manganeso.

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Información: [Citas de patentes \(3\)](#), [Citado por \(2\)](#), [Eventos legales](#), [Documentos similares](#), [Solicitudes prioritarias y](#)

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Reivindicaciones (10)

Ocultar dependiente ^

1. Un método de producción de barras corrugadas laminadas en caliente, que comprende los siguientes pasos:

El lingote de acero se calienta a la temperatura de laminación;

Palanquilla de acero descrita en desbaste;

El lingote de acero después del laminado de medio acabado;

Es un proceso de enfriamiento que la palanquilla de acero, después del doble laminado de acabado, realiza en seco;

El lingote de acero descrito en el proceso de laminación final da como resultado barras corrugadas laminadas en caliente;

Es un proceso de enfriamiento que se lleva a cabo mediante la aplicación de niebla seca a las barras acanaladas laminadas en caliente;

Las barras acanaladas laminadas en caliente mediante niebla seca, después de enfriarse, se enfrían al aire.

2. El método de producción de barras corrugadas laminadas en caliente según la reivindicación 1, que se caracteriza porque la composición química de las barras corrugadas laminadas en caliente comprende los siguientes componentes en porcentaje en peso: C: 0,20 % ~ 0,25 %, Mn: 1,35 % ~ 1,6 %, Si: 0,48 % ~ 0,8 %, S: ≤ 0,045 %, P: ≤ 0,045 %, V: 0,01 % ~ 0,015 %, el resto es Fe e impurezas inevitables.

3. El método de producción de barras corrugadas laminadas en caliente según la reivindicación 2, que se caracteriza porque el instituto, después del doble laminado final de la palanquilla de acero, lleva a cabo un enfriamiento por niebla seca y se describe que las barras corrugadas laminadas en caliente llevan a cabo dicho enfriamiento por niebla seca mediante un dispositivo de enfriamiento por niebla seca. El dispositivo de enfriamiento por niebla seca incluye un cuerpo de tubo (4), un primer catéter reforzado (21), un segundo catéter reforzado (22) y un mecanismo de pulverización de al menos una boquilla de niebla seca (3), en el que:

El primer catéter reforzado (21) y el segundo catéter reforzado (22) están dispuestos respectivamente en la tubería en el cuerpo del tubo (4) en ambos extremos. Es interior;

El mecanismo de boquilla de pulverización de niebla seca (3) incluye al menos dos boquillas de pulverización de niebla seca (31), y las dos boquillas de pulverización de niebla seca (31) descritas están dispuestas en el cuerpo del tubo (4) entre el primer catéter reforzado (21) y el segundo catéter reforzado (22), la salida de agua de la boquilla de pulverización de niebla seca (31) está dispuesta en la tubería del cuerpo del tubo (4).

4. the production method of hot rolled ribbed bars according to claim 3, which is characterized in that the Dry-fog spray nozzle mechanism (3) there are several, several described Dry-fog spray nozzle mechanisms (3) are distributed at equal intervals in the pipeline of the tube body (4).

5. the production method of hot rolled ribbed bars according to claim 4, which is characterized in that the dry fog cooling device is also Including several third reinforced catheters (9), one described is provided between the every two adjacent Dry-fog spray nozzle mechanism (3) Three reinforced catheters (9).

6. the production method of hot rolled ribbed bars according to claim 5, which is characterized in that the Dry-fog spray nozzle (31) Quantity is three, and the tube body (4) is circular pipe, and three Dry-fog spray nozzles (31) are equal around the axle center of the tube body (4) Equal distribution.

7. the production method of hot rolled ribbed bars according to claim 1, which is characterized in that the rolling temperature is 980 DEG C~1010 DEG C.

8. the production method of hot rolled ribbed bars according to claim 1, which is characterized in that it is cold that the steel billet carries out dry fog But the temperature after is 890 DEG C~920 DEG C.:

9. the production method of hot rolled ribbed bars according to claim 1, which is characterized in that the hot rolled ribbed bars into Row dry fog temperature after cooling is 850 DEG C~880 DEG C.

10. the production method of hot rolled ribbed bars according to claim 1-8, which is characterized in that the hot rolling The metallographic structure of Ribbed Bar includes that ferrite adds pearlite.

Descripción

Un tipo de método de producción de barras corrugadas laminadas en caliente

Campo técnico

La invención pertenece al ámbito de los procesos de laminación de acero, y en particular a un método de producción de barras corrugadas laminadas en caliente.

Técnica de fondo

En el proceso de producción de barras corrugadas laminadas en caliente, las barras corrugadas laminadas en caliente de la técnica de tratamiento térmico por laminación existente alcanzan menos del requisito de tejido en GB/T 1499.2-2018 para el mecanismo metalográfico; un tipo de método utilizado actualmente es el uso simultáneo de laminación controlada y la técnica de enfriamiento controlado para producir barras de refuerzo, es decir, enfriamiento previo con agua y control de enfriamiento inteligente después de la laminación antes de la laminación abierta a baja temperatura, laminación final, pero solo hay presiones de tiro para este método en gran medida, la alta desventaja del consumo de energía, y la destrucción de la capa superficial de las barras corrugadas laminadas en caliente producidas es mayor, puede ocurrir después de la lluvia en comparación con la corrosión grave; otro tipo de método común es el uso de barras de refuerzo de tecnología de aleación para la producción, pero el precio de la aleación VN, ferrocolumbio es relativamente alto, lo que aumenta el costo de producción de la barra de refuerzo.

Resumen de la invención

El problema técnico que resuelve la presente invención radica en superar las deficiencias del estado de la técnica anterior y proporcionar un método de producción de barras corrugadas laminadas en caliente, que comprende los siguientes pasos:

El lingote de acero se calienta a la temperatura de laminación;

Desbaste de lingotes de acero;

Palanquilla de acero después del desbaste de laminación a medio terminar;

Es el enfriamiento que el lingote de acero después del doble laminado de acabado realiza niebla seca;

Finalización del laminado de palanquillas de acero, se obtienen barras corrugadas laminadas en caliente;

Es un proceso de enfriamiento que se lleva a cabo mediante niebla seca en barras acanaladas laminadas en caliente;

Las barras acanaladas laminadas en caliente con niebla seca, después de enfriarse, se enfrían al aire.

Preferably, the chemical composition comprises the following components in percentage by weight of hot rolled ribbed bars are as follows: C:0.20%~0.25%, Mn: 1.35%~1.6%, Si:0.48%~0.8%, S :≤0.045%, P :≤0.045%, V:0.01%~0.015%, remaining For Fe and inevitable impurity.

Preferably, the steel billet after double of finish rolling carries out dry fog cooling and is all made of to hot rolled ribbed bars progress dry fog cooling Be dry fog cooling device, dry fog cooling device includes tube body, the first reinforced catheter, the second reinforced catheter and at least one dry fog Nozzle mechanism, in which:

First reinforced catheter and the second reinforced catheter are respectively arranged in the pipeline at tube body both ends ;

Dry-fog spray nozzle mechanism includes at least two Dry-fog spray nozzles, and two Dry-fog spray nozzles are arranged at the first reinforced catheter and the On tube body between two reinforced catheters, the water outlet of Dry-fog spray nozzle is arranged in the pipeline of tube body.

Preferably, Dry-fog spray nozzle mechanism has several, several Dry-fog spray nozzle mechanisms are distributed at equal intervals the pipe of tube body In road.

Preferably, dry fog cooling device further includes several third reinforced catheters, every two adjacent Dry-fog spray nozzle mechanism it Between be provided with a third reinforced catheter.

Preferably, the quantity of Dry-fog spray nozzle is three, and tube body is circular pipe, and three Dry-fog spray nozzles surround the axle center of tube body Equal distribution.

Preferably, rolling temperature is 980 DEG C~1010 DEG C.

Preferably, it is 890 DEG C~920 DEG C that steel billet, which carries out dry fog temperature after cooling:.

Preferably, it is 850 DEG C~880 DEG C that hot rolled ribbed bars, which carry out dry fog temperature after cooling,.

Preferably, the metallographic structure of hot rolled ribbed bars is mainly that ferrite adds pearlite

The present invention provides a kind of production methods of hot rolled ribbed bars, by designing reasonable rolling temperature, half finish rolling After the completion, on the reinforcing bar being sprayed after being uniformly sprinkled upon half finish rolling when dry fog cools down, so that reinforcing bar cools down more during the rolling process Add it is uniform, gentle, reduced while improving reinforced steel bar strength alloy consumption, avoid the generation reinforcing bar metallographic group of tempered structure Knit the requirement for meeting GB/T1499.2-2018 new standard.

Detailed description of the invention

To describe the technical solutions in the embodiments of the present invention more clearly, make required in being described below to embodiment Attached drawing is briefly described, it should be apparent that, drawings in the following description are only some embodiments of the invention, for For those of ordinary skill in the art, without creative efforts, it can also be obtained according to these attached drawings other Attached drawing.

Fig. 1 is the flow chart of the production method of hot rolled ribbed bars of the invention;

Fig. 2 is the structural schematic diagram of the dry fog cooling device used before finish rolling of the present invention;

Fig. 3 is the structural schematic diagram of the dry fog cooling device used after finish rolling of the present invention.

Specific embodiment

The present invention to solve the above-mentioned problems, improves the gap values between rollers that existing conventional slab caster measures under non-production status The roll gap situation in actual production process cannot be directly reacted, a kind of can be corrected according to stress heating status difference is provided and demarcates heat State roll gap improves the roll gap calibration method of conventional slab caster roll gap precision.The embodiment of the present invention is done in detail below in conjunction with attached drawing It describes in detail bright.

Fig. 1 is the flow chart of the production method of hot rolled ribbed bars of the invention, as shown in Figure 1, one kind of the present embodiment The production method of hot rolled ribbed bars, which comprises the following steps:

S01, heating steel billet to rolling temperature;

Before being rolled for the first time to steel billet, need first to heating steel billet. In the present embodiment, it is desirable that the rolling of steel billet Temperature be 980 DEG C~1010 DEG C, therefore, heating temperature should be above this temperature, allow steel billet temperature be quickly raised to 980 DEG C~ 1010°C.

S02, roughing steel billet;

Roughing steel billet uses roughing mills, and online temperature monitor is equipped with before roughing mills, is examined by online temperature Survey instrument and accurately control the temperature of steel billet, it is ensured that into roughing mills steel billet temperature in 980 DEG C~1010 DEG C, subsequent steel Base is rolled in roughing mills, accumulative deflection $\geq 40\%$ of rolling.

Steel billet after S03, half finish rolling roughing;

After steel billet comes out from roughing mills, without carrying out other processing, half finish rolling can be directly carried out, half finish rolling steel billet is adopted It is intermediate mill, accumulative deflection $\geq 30\%$ of the steel billet in intermediate mill.

It is cooling that steel billet after S04, double of finish rolling carries out dry fog;

The outlet of intermediate mill is connected with dry fog cooling device, after steel billet enters dry fog cooling device, the height of nozzle ejection Fast, uniform droplet is penetrated on high temperature hot rolled ribbed bars surface, is vaporized takes away heat rapidly, due to the spray of dry fog cooling device Mouth is distributed around steel billet, and subsequent high speed droplet breaks micro- steam blanket of rebar surface formation, continues to cool down, a large amount of disperses Equally distributed droplet makes to cool down more uniform, and internal heat is rapidly to external diffusion after leaving nozzle location for reinforcing bar, then again It is cooled down at next Dry-fog spray nozzle, prevents the generation of tempered structure.

S05, finish rolling steel billet, obtain hot rolled ribbed bars;

Finish rolling steel billet uses mm finishing mill unit, and online temperature monitor is equally equipped with before mm finishing mill unit, passes through online temperature Degree detector accurately controls the temperature of steel billet, it is ensured that into mm finishing mill unit steel billet temperature in 890 DEG C~920 DEG C, with Steel billet is rolled in mm finishing mill unit afterwards, and after the completion of finish rolling, hot rolled ribbed bars can be obtained.

S06, hot rolled ribbed bars are carried out with dry fog cooling;

The outlet of mm finishing mill unit is also connected with another group of dry fog cooling device, and hot rolled ribbed bars enter dry fog cooling device Afterwards, further cooling, the droplet that nozzle sprays can not generate destruction to hot rolled ribbed bars surface, so that hot rolled ribbed bars Has the characteristics of corrosion resistant.

It is S07, dry fog hot rolled ribbed bars after cooling are air-cooled.

Air-cooled hot rolled ribbed bars are equally equipped with online temperature monitor using cold bed before cold bed, by Line temperature monitor accurately controls the temperature of hot rolled ribbed bars, it is ensured that the hot rolled ribbed bars temperature into cold bed exists In 850 DEG C~880 DEG C, subsequent hot Ribbed Bar is air-cooled to room temperature in cold bed.

In the present embodiment, the chemical composition comprises the following components in percentage by weight of hot rolled ribbed bars are as follows:
C:0.20%~0.25%, Mn:1.35%~1.6%, Si:0.48%~0.8%, S : $\leq 0.045\%$, P : $\leq 0.045\%$, V:0.01%~0.015%, Remaining is Fe and inevitable impurity, and after the completion of rolling, the metallographic structure of hot rolled ribbed bars is mainly that ferrite adds pearly-lustre Body.

It is worth noting that, Fig. 2 is the structural schematic diagram of the dry fog cooling device used before finish rolling of the present invention, Fig. 3 is this The structural schematic diagram of the dry fog cooling device used after invention finish rolling, in conjunction with Fig. 2 and Fig. 3, the S04 of the present embodiment, double of finish rolling Steel billet afterwards carries out cooling dry fog and S06, hot rolled ribbed bars is carried out with the dry fog being all made of in the two cooling

steps of dry fog Cooling device, the dry fog cooling device include tube body 4, the first reinforced catheter 21, the second reinforced catheter 22 and Dry-fog spray nozzle mechanism 3, in which:

First reinforced catheter 21 and the second reinforced catheter 22 are respectively arranged in the pipeline at 4 both ends of tube body, and the first reinforcing bar is led Pipe 21 is arranged in the feeding inlet of tube body 4, and the second reinforced catheter 22 is arranged in the discharge port of tube body 4, i.e., reinforcing bar to be cooled is from One reinforced catheter 21 enters, and comes out after completing cooling from the second reinforced catheter 22, the first reinforced catheter 21 and the second reinforced catheter 22 pairs of reinforcing bars play supporting role.

Further, Dry-fog spray nozzle mechanism includes three Dry-fog spray nozzles 31, and three Dry-fog spray nozzles 31 are arranged at the first steel On tube body 4 between muscle conduit 21 and the second reinforced catheter 22.

Tube body 4 is circular pipe, and three Dry-fog spray nozzles 31 surround the axle center equal distribution of tube body 4, is provided on tube body 4 solid Determine hole, fixation hole is threaded hole, and external screw thread is provided on Dry-fog spray nozzle 31, and Dry-fog spray nozzle 31 is screwed on fixation hole, dry fog spray The water outlet of mouth 31 is arranged in the pipeline of tube body 4.

Further, drainage hole is provided on tube body 4, the quantity of drainage hole is identical as the quantity of Dry-fog spray nozzle 31, and three Dry-fog spray nozzle 31 arranges that the water for facilitating Dry-fog spray nozzle 31 to spray can smoothly be discharged with corresponding drainage hole face respectively.

Further, dry fog cooling device further includes drainpipe 6, and the quantity of drainpipe 6 and the quantity of drainage hole are identical, and three A 6 one end of drainpipe is fixedly connected with the other end with corresponding drainage hole and connect with vapor device is taken out, and taking out vapor device can take out The atomized steam inside tube body 4 is walked, so that heated steam is discharged rapidly.It is worth noting that, drainage hole is threaded hole, draining External screw thread is provided on pipe 6, drainpipe 6 is screwed on drainage hole.

The dry fog cooling device of the present embodiment further includes fixed plate 7 and fixed frame 8, and the quantity of fixed plate 7 and fixed frame 8 is equal It is two, two fixed plates 7 are separately fixed on two fixed frames 8, and two fixed plates 7 are separately positioned on the bottom at 4 both ends of tube body Portion is supported tube body 4 by fixed frame, can keep the stability of tube body.

The Dry-fog spray nozzle mechanism of dry fog cooling device can be set to several, several Dry-fog spray nozzle mechanisms are equidistant It being distributed in the pipeline of tube body 4, multiple Dry-fog spray nozzle mechanisms repeatedly can carry out misting cooling to hot rolled ribbed bars 1, due to Dry-fog spray nozzle arranged for interval, internal heat is rapidly to external diffusion after leaving nozzle location for hot rolled ribbed bars 1, then again under It is cooled down at one Dry-fog spray nozzle, forms cooling-reply-cooling mode of alternation, steel surface is avoided to form tempering group It knits, so that the tissue of hot rolled ribbed bars 1 is more uniform.

Further, the dry fog cooling device of the present embodiment further includes several third reinforced catheters 9, every two adjacent dry A third reinforced catheter 9 is provided between atomizing nozzle mechanism, when Dry-fog spray nozzle mechanism number increases, 4 length of tube body also can Increase, at this point, multiple third reinforced catheters 9 can support the hot rolled ribbed bars 1 inside tube body 4 well, prevents The deformation of reinforcing bar.

The dry fog cooling device that the present embodiment uses can according to need increase length, and it is cold to carry out multiple dry fog to reinforcing bar But, it is ensured that rear temperature is accurate out from dry fog cooling device for hot rolled ribbed bars, ensure that the good technique ring of subsequent technique Border.

To sum up, the embodiment provides a kind of production methods of hot rolled ribbed bars, are reasonably rolled by design Temperature processed, after the completion of half finish rolling, the spraying of dry fog cooling device is uniformly sprinkled upon on reinforcing bar, so that reinforcing bar is cold during the rolling process More uniform, gentle, alloy consumption is reduced while improving reinforced steel bar strength, avoids the generation reinforcing bar gold of tempered structure Phase constitution meets the requirement of GB/T1499.2-2018 new standard.

Como se mencionó anteriormente, esta especificación describe una realización específica. Otras realizaciones están dentro del alcance de las reivindicaciones adjuntas. En algunos casos, el movimiento registrado en detalle en las reivindicaciones o el paso puede llegar de acuerdo con una secuencia diferente a la de la realización que se ejecuta y aún así se puede implementar el resultado deseado. Además, el proceso representado en el dibujo no necesariamente requiere mostrar una secuencia

específica adecuada o un orden consecutivo, simplemente puede lograr el resultado deseado. En algunas realizaciones, el procesamiento paralelo y multitarea también puede ser ventajoso.

Cabe señalar que, para los expertos en la materia, bajo la premisa de no apartarse del principio de aplicación, también se pueden realizar varias mejoras y modificaciones, las cuales también deben considerarse dentro del alcance de protección de la aplicación.

Patent Citations (3)

Publication number	Priority date	Publication date	Assignee	Title
CN101367094A *	2008-08-22	2009-02-18	马鞍山钢铁股份有限公司	A combination controlled rolling process of hot-rolled ribbed steel bars
CN101428292A *	2008-12-22	2009-05-13	武钢集团昆明钢铁股份有限公司	Method of manufacturing high-strength hot rolled ribbed steel bar
CN104307890A *	2014-11-13	2015-01-28	攀枝花钢城集团有限公司	Combined controlled rolling and cooling production technology of HRB400 hot rolled ribbed steel bars
Family To Family Citations				

* Cited by examiner, † Cited by third party

Cited By (2)

Publication number	Priority date	Publication date	Assignee	Title
CN110846584A *	2019-12-26	2020-02-28	芜湖新兴铸管有限责任公司	Steel for large-scale concrete pole and production method thereof
CN114643289A *	2022-03-08	2022-06-21	石横特钢集团有限公司	Deformed steel bar controlled cooling process method
Family To Family Citations				

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
CN105032958B	2018-04-20	Using the instant cooling system and cooling means of cooling technique controlled rolling between passage
CN101381806A	2009-03-11	A strip cooling device and cooling control method thereof
CN107414049B	2020-01-21	Refining control method for metallographic structure of surface layer of corner of continuous casting slab

CN102248012B	2013-05-08	Cooling device and method for hot-rolling process of wire rod
CN109628849A	2019-04-16	A kind of production method of hot rolled ribbed bars
CN102513383B	2015-03-11	Ultra fast cooling and conventional laminar flow cooling method for medium plate
CN104017975A	2014-09-03	Spray cooling device for long steel rail online quenching unit
CN114985461B	2024-11-05	A method for preparing large-size bars by controlled rolling and controlled cooling
KR101760654B1	2017-08-04	Method and apparatus for producing steel pipes having particular properties
CN102029296B	2014-10-08	Method for fast cooling low-carbon hot-rolling small H-shaped steel
CN102448632B	2014-09-03	Cooling device, cooling method, manufacturing device, and manufacturing method of hot-rolled steel sheet
CN1952199A	2007-04-25	Niobium titanium -combined microalloying steel for cooling-control reinforced bar and method for producing same
CN108315532A	2018-07-24	Steel pipe water fog cooling means
CN120169850B	2025-09-05	Rapid cooling device, equipment and method for preparing seamless steel pipe
CN201921898U	2011-08-10	After-rolling cooling control device for hot-rolled H-beam
CN102784799A	2012-11-21	Hot rolling method for reducing open grain structures of low-carbon steel wire rod
CN102586565B	2014-04-02	Rapid cooling method and device after medium and thick plate heat treatment furnace
CN203923298U	2014-11-05	A kind of injection cooling apparatus of long chi rail press quenching unit
CN120394563A	1 de agosto de 2025	Tubo de acero sin costura y método de preparación del mismo.
CN109423541A	5 de marzo de 2019	Unidades de proceso y método de temple fuera de línea de tuberías de acero
CN202610276U	19/12/2012	Sistema combinado de control de refrigeración del medio para tratamiento térmico
CN114592112B	17 de marzo de 2023	Dispositivo de refrigeración flexible para chapa de acero templado
CN114934229B	5 de mayo de 2023	Acero resistente al desgaste para la preparación de estructuras de fase complejas basadas en la tecnología NG-TMCP y su método de producción.
CN205341520U	29/06/2016	Coloca el sistema de suministro de agua para controlar la carga fría alrededor del molino de sección H en tándem.
CN207414027U	29/05/2018	Un tipo de dispositivo de control de enfriamiento de acero angular después del laminado

Solicitudes prioritarias y relacionadas

Solicitudes prioritarias (1)

Solicitud	Fecha de prioridad	Fecha de presentación	Título
CN201811399329.4A	22/11/2018	22/11/2018	Método de producción de barras de acero corrugado laminadas en caliente

Solicitudes que reivindican prioridad (1)

Solicitud	Fecha de presentación	Título
CN201811399329.4A	22/11/2018	Método de producción de barras de acero corrugado laminadas en caliente

Eventos legales

Fecha	Código	Título	Descripción
16 de abril de 2019	PB01	Publicación	
16 de abril de 2019	PB01	Publicación	
31/05/2019	SE01	Entrada en vigor de la solicitud de examen sustantivo	
31/05/2019	SE01	Entrada en vigor de la solicitud de examen sustantivo	
2 de abril de 2021	GR01	Concesión de patente	
2 de abril de 2021	GR01	Concesión de patente	
11/03/2022	TR01	Transferencia de derechos de patente	Fecha de entrada en vigor del registro : 28/02/2022 Dirección : 134003 No. 255, Dongsheng Road, Distrito de Erdaojiang, Ciudad de Tonghua, Provincia de Jilin Titular de la patente : TONGHUA STEEL LLC Dirección anterior : 046000 No.9, Guxian East Street, Changzhi City, Shanxi Province Titular de la patente anteriormente : SHOUGANG CHANGZHI IRON & STEEL Co.,Ltd.
11/03/2022	TR01	Transferencia de derechos de patente	