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(54) Earth connector for earthing pipes

(57) The present invention relates to an earth connector comprising a body (10) having a connecting member (14) integrally attached to it. The connecting member (14) is designed to be connected to a cable (24) to earth a pipe (10).

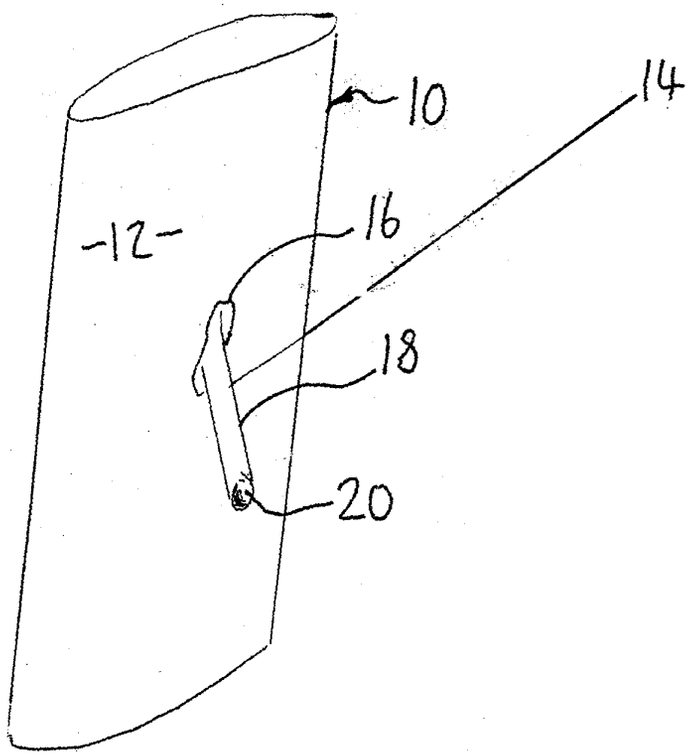

Fig 1

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Description

[0001] The present invention relates to improvements in earthing pipes. In particular, but not exclusively, the invention relates to earthing pipes in a central heating system of a building.

[0002] At present, when installing a combination central heating boiler in a building, all piping to and from the boiler must be earth bonded by law.

[0003] The known system of earth bonding the piping is to use an earth bonding clamp. A known earth bonding clamp is of a similar form to the so called Jubilee clip, with an additional screw and washer fastener to grip an electrical cable. Accordingly, the clamp is placed around the pipe and fastened, after which the cable is located between a plate and the washer in the screw fastener portion of the earth clamp. The screw fastener is screwed to increase the tension between the plate and the washer, thereby clamping the cable to the clamp, and hence against the pipe. In all, this process can take about 2 minutes per earth. In a typical central heating system, six or more pipes go to and from the boiler. Therefore, the time it takes to earth all of the pipes can be about twelve minutes or more.

[0004] An aim of the invention is to provide an improved method of, and product for, earthing a pipe.

[0005] According to a first aspect of the invention there is provided an earth connector comprising a body for attachment with a metal pipe, the body having an integral connecting member, the connecting member being designed to be connected to a cable to earth a metal pipe.

[0006] According to a second aspect of the invention there is provided an earth connector comprising a body for attachment with a metal pipe, the body having a surface contoured to match the pipe outer and the body having an integral connecting member, designed to be connected to a cable to earth a metal pipe.

[0007] The body of the first and second aspects of the invention preferably is made of metal, although a body not made of metal and defining a conductive path for the cable is envisaged.

[0008] The connecting member is blind to the metal body.

[0009] Preferably, the connecting member is conductive, for example copper, which allows compatibility with the predominant types of pipe in commercial use.

[0010] The connecting member is preferably soldered to the metal body.

[0011] The connecting member is preferably designed to connect to the cable by a clamping action of one or the other, most preferably the connecting member clamping the cable. Preferably, the connecting member has a cavity, most preferably the cavity is designed to receive an earth cable, most preferably the cavity roughly geometrically matches the cable. The connecting member may be in the form of a tube. Preferably the connecting member is designed to be manually deformed by a hand tool such as pliers to clamp and securely grip an earth cable.

[0012] The connecting member may have a recess in an outer wall thereof so as to allow better clamping of a cable.

[0013] The metal body may be pre soldered, in one form internally of the pipe or member. In a preferred embodiment recesses of the metal body house the solder, most preferably the recesses being one or more annulus.

[0014] The metal body may be designed to fit on 12½ mm or 25 mm diameter pipe, of copper type.

[0015] Preferably, the metal body has a pipe like outer surface. The metal body may be open so as to allow it to be fitted to a pipe from the side of the pipe rather than over the pipe. The body may be designed to fit on a pipe via a push-fit. In one preferred embodiment of the invention, the metal body is a half pipe.

[0016] According to a third aspect of the invention there is provided a kit of parts for earthing a metal pipe, the kit comprising a metal body for attachment with a metal pipe and an earth cable, the metal body having a connecting member integrally attached to it for connecting the metal body to the cable, which in turn is connectable to earth.

[0017] Preferably, the cable has pre-solder thereon or therein.

[0018] According to a fourth aspect of the invention there is provided a (central) heating system having pipes into and out of a boiler, one or more of the pipes having an earth connector in accordance with the first or second aspect of the invention fitted thereto.

[0019] Preferably, all of the pipes have an earth connector in accordance with the first or second aspect of the invention fitted thereto. Most preferably all of the pipes are earthed.

[0020] According to a fifth aspect of the invention there is provided a method of earthing a metal pipe, comprising the steps of, providing an earth connector in accordance with the first aspect or the second aspect of the invention and connecting an earth cable thereto.

[0021] Preferably, a cable is inserted into the connecting member. Most preferably, the connecting member is crimped into place over the cable.

[0022] According to a sixth aspect of the invention there is provided an earth connector comprising a body integrally attachable to a pipe and a clamp portion adapted to receive and securely fasten an electrical wire in electrical communication with the body.

[0023] The clamp portion is preferably mechanically deformable, for example, using pliers, to securely grip an electrical cable.

[0024] The clamp portion may comprise a tube integrally formed with the body.

[0025] Earthing systems in accordance with the invention will now be described by non-limiting example with reference to the accompanying drawings, in which,

Figure 1 is a perspective view of an earth connector in accordance with a first embodiment of the invention,

Figure 2 is a perspective view of a cable for attachment to the earth connector of Figure 1,

Figure 3 is a side view of the cable fitted to the earth connector,

Figure 4 is a top view of the same,

Figure 5 is a front view of the earth connector fitted on a pipe network,

Figure 6 is a top view of an earth connector in accordance with a second embodiment of the invention,

Figure 7 is a side view of the same,

Figure 8 is a perspective view of an earth connector in accordance with a third embodiment of the invention,

Figure 9 is a sectional view of the earth connector of Figure 8 showing internal details, and

Figure 10 is an earth connector in accordance with a fourth embodiment of the invention.

[0026] Referring to Figure 1, an earth connector 8 comprises a tube 10, which has an outer surface 12, on which a connecting member (in the form of a clamp 14) is attached. The clamp 14 is made of copper like the tube 10 but is of much smaller diameter than the tube and has a much a thinner external wall than the tube. The clamp 14 is fitted to the tube 10 by solder or the like. The clamp 14 has an outer wall 18. At one end of the clamp 14, remote from the outer clamp pipe 10, there is a recess 20. Indeed, in the embodiment shown, the clamp 14, is in the form of a tube so in fact this recess 20 continues throughout the clamp 14 to the wall of the tube 10.

[0027] Referring to Figure 3, the outer wall 18 of the tee 14 has a recess 22, designed to receive a hand operated clamping tool such as pliers.

[0028] Referring back to Figure 2, an earth cable 24 made of copper wire(s) has insulating material 26 along most of its length and an exposed end 28.

[0029] Referring again to Figure 3, the exposed end 28 of the cable 24 is inserted in the cavity 20 of the clamp 14. The clamp 14 is then pressed, e.g. by pliers, (or by a rotating crimper), to clamp the cable 24 in place. This can be more easily done if the clamping tool such as pliers is located in the recess 22 and the clamp 14 is pressed there.

[0030] It will be noted from viewing figure 3 that the cable 24 is attached to the tube 10 of the earth connector 8 at an acute angle with respect to the tube longitudinal axis, which allows a greater surface area of the tee 14 to be in contact with the tube and thereby make permanent connection more reliable. It should also be noted, by referring to Figure 4, that the cable 24 departs radially from the tube 10.

[0031] Referring to Figure 5, in use, an earth connector 29, comprising a tube 30 having a clamp 32, is fitted in line with two pipe parts 34 and 36. The diameter of the pipes, 34 and 36 is about 12½ mm. The pipe parts 34 and 36 are each fed (midway) into the tube 30 and soldered in place. In another embodiment of the invention which is not shown for conciseness, the pipe diameter is about 25 mm. The tube 30 and pipe parts 34 and 36 cooperate to form a continous pipe, which can be one or more in number, leading to and/or from a boiler.

[0032] Figure 6 shows another embodiment of the invention, in which an earth connector in accordance with the invention, in the form of a half pipe 38, has an outer surface 40 on which a clamp 42 is attached. The clamp 42 is like the clamp 14 and is fixed to the cable 44 like the clamp 14 is fitted to the cable 24 . Figure 7 shows more detail of the connection between the clamp 42 and the half pipe 38. Again, the half pipe 38 can be of 12½ mm or 25 mm diameter.

[0033] Also, since the half pipes 38 are made of thin walled copper, they can be press fitted over existing pipes, whether manually or with the use of a pressing tool.

[0034] Figure 8 shows yet another embodiment of the invention, in which an earth connector 46, of tubular form, has two annular raised portions 48 50 and a mid point 51. Figure 9, a cut away of the earth connector 46, shows that inside the annular raised portion 48, 50 there is provided a ring of solder material 52, 54. In use, pipe parts 56, 58 (shown in broken line) can be inserted into each end of the earth connector 46 until the meet at a halfway point 51. The in situ solder 52, 54, which is of the same internal diameter as the tube 46 can be heated so as to solder and fit the pipe parts 56, 58 to the connector. Then, a clamp 60 can be connected to an earth lead 62 which can in turn be connected to an earth point of the building.

[0035] Figure 10 shows a half pipe earth connector 64, which is basically half of earth connector 46.

[0036] It will be appreciated that using the earth connectors and systems described hereinabove in accordance with the invention, earthing is quick and simple in comparison with the prior art method.

Claims

1. An earth connector comprising a body for attachment with a metal pipe the body having an integral connecting member, the connecting member being designed to be connected to a cable to earth a metal

pipe.

2. An earth connector comprising a body for attachment with a metal pipe, the body having a surface contoured to match the pipe outer and the body having an integral connecting member, designed to be connected to a cable to earth a metal pipe.

3. An earth connector according to any preceding claim, wherein the connecting member has a recess in an outer wall thereof so as to allow easier clamping of a cable to the connecting member.

4. An earth connector according to any preceding claim, wherein the body is pre soldered so as to allow it to be soldered to the metal pipe to which the connector is to be attached.

5. An earth connector according to Claim 4, wherein the body is pre soldered internally.

6. An earth connector according to Claim 4 or 5, wherein recesses of the metal body house the solder.

7. An earth connector according to Claim 6, wherein recesses comprise one or more annulus.

8. An earth connector comprising a body integrally attachable to a pipe and a clamp portion adapted to receive and securely fasten an electrical wire in electrical communication with the body wherein the clamp portion is mechanically deformable, for example, using pliers, to securely grip an electrical cable.

9. An earth connector according to Claim 8, wherein the electrical wire is an earthing cable.

10. An earth connector according to Claim 8 or 9, wherein the clamp portion is mechanically deformable by a ratcheting crimper.

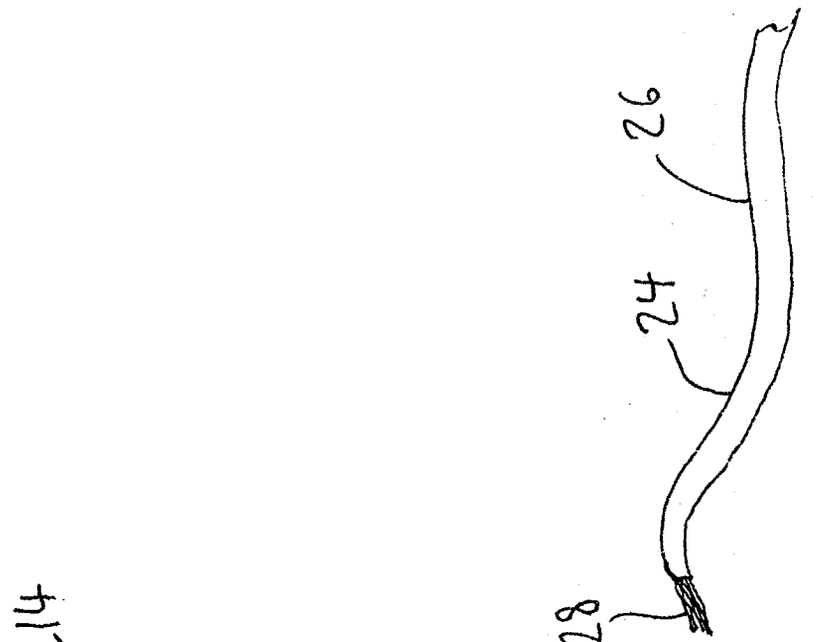

Fig 2

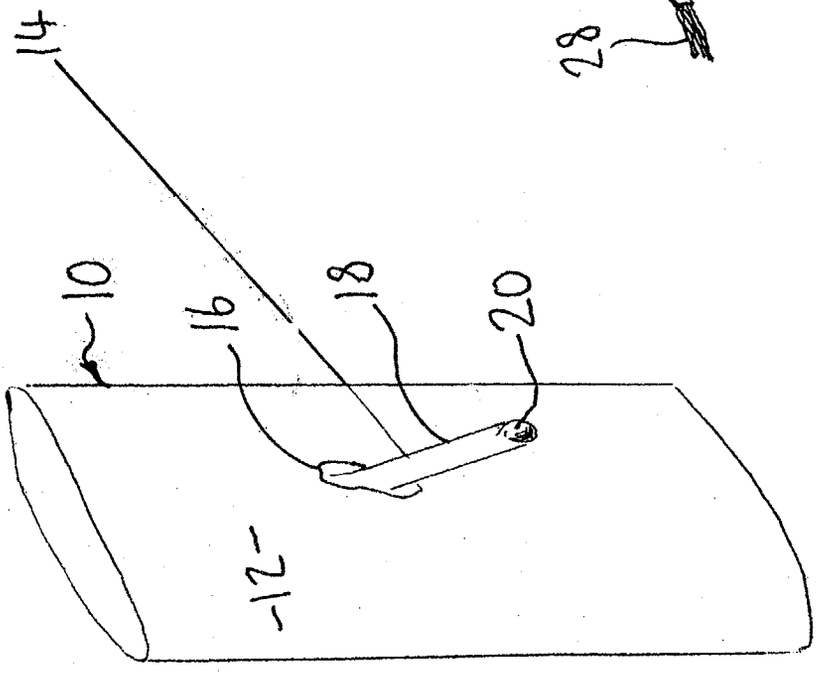

Fig 1

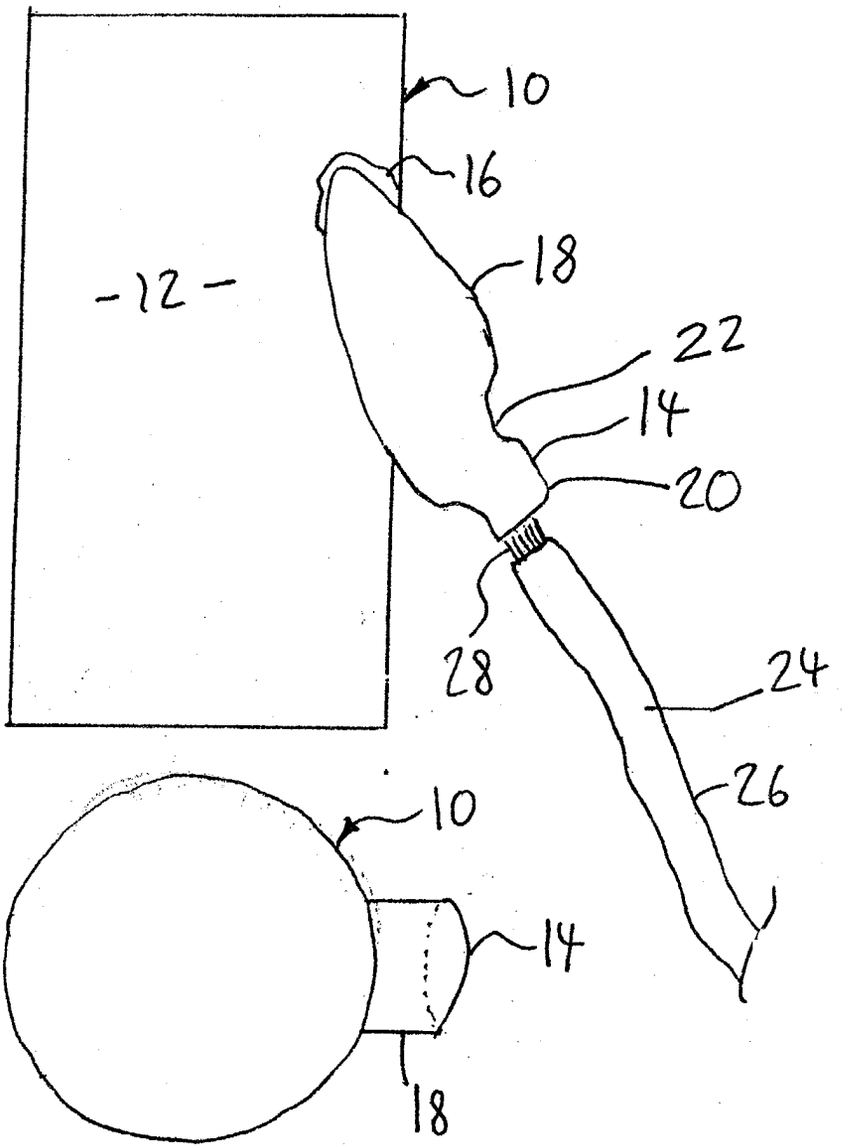

Fig 3

Fig 4

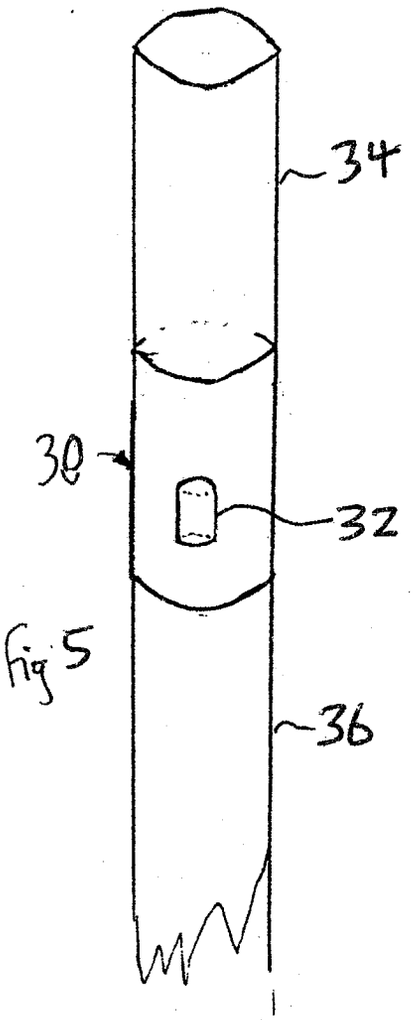

fig 5

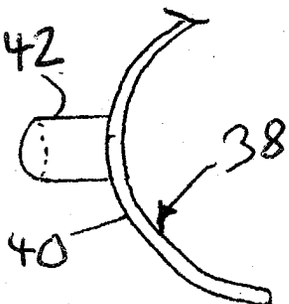

Fig 6

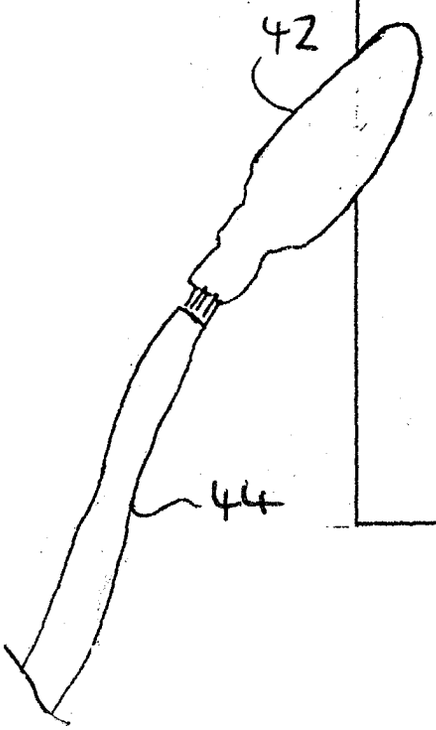

Fig 7

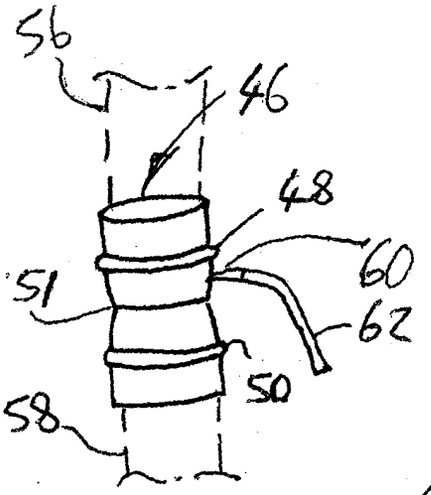

Fig 8

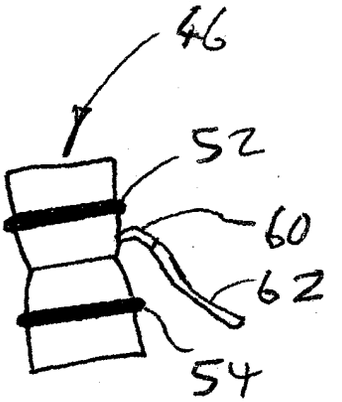

Fig 9

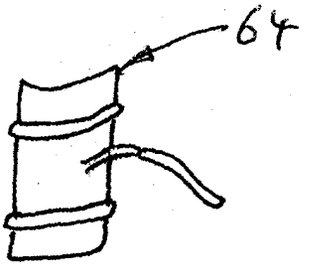

Fig 10

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EUROPEAN SEARCH REPORT

Application Number
EP 03 25 1709

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	FR 2 696 877 A (CATU ETS) 15 April 1994 (1994-04-15) * figures 1-4 *	1,2,8-10	H01R4/64 H01R4/20 H01R4/02
X	US 4 106 832 A (BURNS JOHN JOSEPH VINCENT) 15 August 1978 (1978-08-15) * figures 1,2 *	1-3	
X	GB 2 276 282 A (HEWSON HENRY JAMES VINCENT) 21 September 1994 (1994-09-21) * figure 1 *	1-3	
A	GB 2 202 693 A (STANTON PLC) 28 September 1988 (1988-09-28) * page 5, line 1 - line 24; figures 1,2 *	4-6	
A	DE 299 23 517 U (KARIN DAUME MASCHINENTEILE GMB) 23 November 2000 (2000-11-23) * page 23, line 13 - line 22; figures 14-16 *	1-10	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H01R
F16L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	16 July 2003	Arenz, R

CATEGORY OF CITED DOCUMENTS

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16-07-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2696877 A	15-04-1994	FR 2696877 A1	15-04-1994
US 4106832 A	15-08-1978	NONE	
GB 2276282 A	21-09-1994	NONE	
GB 2202693 A	28-09-1988	NONE	
DE 29923517 U	23-11-2000	DE 19841199 A1	02-03-2000
		DE 29923517 U1	23-11-2000
		AT 201260 T	15-06-2001
		AU 741852 B2	13-12-2001
		AU 5518299 A	14-03-2000
		BR 9913657 A	05-06-2001
		CA 2340190 A1	02-03-2000
		CN 1251473 A	26-04-2000
		CZ 20010640 A3	17-10-2001
		CZ 12327 U1	14-08-2002
		DE 19939331 A1	13-04-2000
		DE 59900092 D1	21-06-2001
		WO 0011391 A1	02-03-2000
		EP 0982524 A1	01-03-2000
		ES 2158716 T3	01-09-2001
		PL 346708 A1	25-02-2002
		TR 200100572 T2	23-07-2001
		US 2002058430 A1	16-05-2002

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