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(12) # EUROPEAN PATENT APPLICATION

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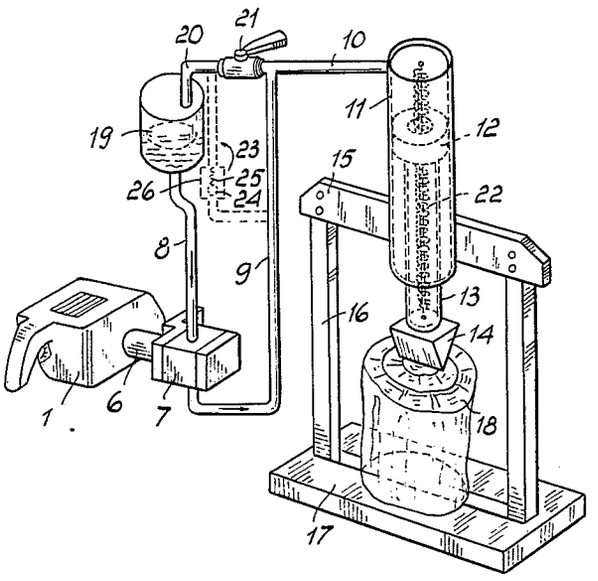
(54) **Hydraulic cylinder wood cleaver driven by the engine of a chain saw.**

(57) The wood cleaver comprises a rectangular frame (16) on the base (17) whereof is placed the log piece (18) to be cleaved, whereon the froe (14) is active under control by the hydraulic cylinder or jack (11), which is actuated by the pump, rotatively driven by the engine (1) of a chain saw, from which the cutting chain has been removed, there being provided a cock (21) for discharging oil into a reservoir (12) as the piston (12) of the jack (11) is returned by a spring (22).



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This invention relates to a hydraulic cylinder actuated wood cleaver, the novel feature whereof resides in that it is driven by the engine of a portable chain saw, from which the cutting chain has been removed.

Long known have been portable chain saws, generally utilized at lumberyards in order to cut logs for the production of firewood.

The log segments thus obtained must normally be cleaved manually, since wood cleaving machines currently available on the market are invariably machines of large size and high cost, so that they are seldom within the reach of private users.

Thus, the latter are obliged to cleave their wood manually, generally by means of broadaxes, which involves some muscular power, while also exposing the operators to the risk of potentially serious injury.

Aged people, and anybody not possessed of the necessary physical power to manually cleave wood, are forced to rely on the assistance of others to carry out such operations, or otherwise to buy readily cut and cleaved firewood from local lumberyards.

With the instant invention, by contrast, the simple ownership of a chain saw is enough to enable, after preliminarly disassembling the cutting chain therefrom, the utilization of its engine to drive the inventive wood cleaver, which being of simple

construction and requiring no electric drive motor, is particularly economical and easy to operate even by private operators, who are thus enabled to readily cleave their firewood without having to exert any high manual effort, while also eliminating any potential injury risk.

The features of the inventive machine will be detailed hereinafter with reference to the accompanying drawings and to a particular embodiment thereof of a merely exemplary character.

In the drawings:

Figure 1 is a general perspective view of the wood cleaver according to the invention, with the portable chain saw engine connected thereto;

Figure 2 is a perspective view of the chain saw in its disassembled condition, the actuating pump of the wood cleaver being also shown disassembled;

Figure 3 is a partly sectional side elevation view of a second embodiment of the inventive wood cleaver;

Figure 4 is a perspective view of a third embodiment of the inventive wood cleaver; and

Figure 5 shows a quick discharge valve replacing the cock shown in Figure 1.

The wood cleaver according to this invention provides for the powerhead 1 of the portable chain saw (Figure 2), from which the cutting chain 2 has been previously removed along with the chain blade 3,

secured to the studs 4 protruding out of the power-head 1 by means of nuts, to be connected with its sprocket pinion 5 to the joint 6 extending from a pump assembly 7, which is provided with a suction line 8 and delivery line 9.

The supporting plate of the pump assembly 7 can be easily attached to the studs 5, after removing the related protection shroud normally equipping the chain saw 1.

The line or pipe 9 (Figure 1) is continued by the line or pipe 10 to feed the jack or cylinder 11, the piston 12 whereof is connected to the rod 13 carrying the cleaver froe 14 at its end.

The cylinder 11 is mounted on the crosspiece 15 of a frame 16, the base plate 17 whereof -- advantageously comprising two angle beams secured to the opposed sides of the uprights 16 -- provides support for a log piece 18 to be cleaved.

A further aspect of the invention provides for the elements making up the machine frame to be all bolt connected, so as to be readily demountable, which reduces the machine bulk dimensions both for transportation and storage purposes.

It should be noted that the embodiment of the hydraulic system depicted in Figure 1 as comprising a cut-off cock or valve 21 is much more economical than other equivalent approaches using readily available valves of a much more expensive type.

It should be further noted that the need for using both hands, respectively to control the engine

detached from the chain saw and driving the wood cleaver and operate the cock 21, constitutes an insurance against the risk of injuring the operator's hands, thus conforming with possible existing accident prevention regulations.

The oil required to operate the cylinder 11 is drawn from the reservoir 19 over the suction line 8 of the pump 7, and is returned to the reservoir 19 over the line 20, once the cock 21 communicating it to the line 9 has been open.

The opening of the cock 21 causes the oil to flow in a closed circuit fashion, whereas the closing of the cock 21 results in the filling of the upper chamber of the cylinder 11 and consequent downward movement of the piston 12, rigid with the froe 14.

The piston 12 is returned to its rest or inoperative position through the bias of the spring 22, stretched between the top head cover of the cylinder 11 and bottom head of the hollow rod 13, after previously opening the cock 21, which allows the oil to be discharged into the reservoir 19.

According to a modified aspect of the invention, it is contemplated that a pressure relief valve 23 be arranged between the line 9 and line 20 which comprises a small ball 24 biased downwardly by the spring 25 located within a small cylinder 26, which valve will open upon the pressure within the line 9 exceeding a preset safety level, to allow the oil pumped through the line 9 by the pump 7 to discharge into the reservoir 19.

Thus, the safety valve 23 serves the function of avoiding damage to the pump 7 and lines 9 and 10, where for a reason whatever, such as an unexpected obstacle met in the log piece 18, the oil pressure in said lines rises to a dangerous level.

Further embodiments of the invention provide, as an example, for the cylinder 27 (Figure 3) to be arranged along a horizontal axis, it being mounted on a base element 28, whereon is placed the log piece to be cleaved, which is clamped between the froe 29 and bracket 30, made rigid with the base 28.

In yet another embodiment of the wood cleaver according to the invention, provision is made for its frame to have a H-like configuration (Figure 4), with a base girder 31 being connected by means of a middle column to a rocker arm 32, which is connected at one end to the piston of the hydraulic cylinder 33 -- being returned to rest by the tension spring 34 -- while at the opposite end of the rocker arm 32 the froe 35 is arranged which is active on the log piece 36 to be cleaved, said log piece being laid on the base plate 37, attached to the girder 31.

It will be appreciated that all of the foregoing embodiments of this wood cleaver fall within the scope of the instant invention, in that both the cylinder 27 (Figure 3) and cylinder 33 (Figure 4) are fed, similarly to the cylinder 11, through the pump 7 which is driven by the chain saw engine 1.

Figure 5 illustrates a quick release or discharge valve adapted for inclusion on the line 20 (Figure 1)

in lieu of the cock 21.

Said valve, of a type known per se, comprises a small cylinder 38, on the interior whereof an elastic membrane 39 is movable which, when subjected to the thrusting action of the pressurized oil from the line 9, will close the mouth of the discharge line 20, thus letting the oil into the line 10 which feeds the cylinder of the cleaver device.

As the delivery flow into the line or pipe 9 is discontinued, the membrane 39 moves down, thus allowing the oil to flow into the discharge line 20, which will return it into the reservoir 19.

Thus, the manual operation of the cock 21 is avoided, with an attendant considerable simplification of a practical order.

Apparent are, therefore, the advantages to be secured through the adoption of the inventive wood cleaver, which, both on account of its constructional simplicity and low cost, lends itself for direct use by the final user, if already the owner of a portable chain saw of a type known per se.

It will be appreciated that the constructional details of the device according to the invention have been described and illustrated in the accompanying drawings with reference to a particular embodiment thereof, given herein by way of example and not of limitation, as they may take different forms and aspects without prejudice for the invention characteristics and departing from the invention scope.

CLAIMS

1. A hydraulic jack wood cleaver driven by the engine of a chain saw, characterized in that it comprises a metal frame adapted to support a log piece to be cleaved, and a hydraulic jack or cylinder (11,27,33) having a piston the rod whereof carries the wood cleaver froe (14,29,35),said cylinder being fed from an oil pump (7) driven by the engine (1) of a chain saw previously stripped of its related cutting chain and chain blade.

2. A hydraulic jack wood cleaver according to Claim 1, characterized in that the pump (7) feeding the wood cleaver jack or cylinder is provided with a supporting plate adapted for attachment to the chain saw engine block (1), as stripped of the cutting chain and related chain blade, a joint (6) being provided, to fit the configuration of the chain saw engine sprocket pinion (5), whereby the pump (7) can be driven by said chain saw engine (1).

3. A hydraulic jack wood cleaver according to Claims 1 and 2, characterized in that said wood cleaver frame has a rectangular configuration with a horizontally extending bottom side (17) whereon is laid a log piece to be cleaved and a horizontally extending top side (16) carrying said hydraulic cylinder (11), the piston (12) whereof is made rigid with said froe (14).

4. A hydraulic jack wood cleaver according to Claims 1 and 2, characterized in that it comprises a U-like frame, one vertically extending side of said frame having said hydraulic jack or cylinder (27) mounted thereon, the piston whereof carries said froe (29), a log piece

to be cleaved being laid on the opposite vertical side (30) thereof.

5. A hydraulic jack wood cleaver according to Claims 1 and 2, characterized in that said wood cleaver frame has an inverted "T" configuration, said hydraulic cylinder (33) being mounted on one end of the base side of said frame and said log piece to be cleaved being laid on the opposite end (37), and in that a rocker arm (32) is pivoted at the center thereof to the end of said frame vertical arm, said rocker arm (32) being connected with one end to the piston of said hydraulic cylinder (33) and to a return spring (34), and with the other end to a froe (35) effective to cleave said log piece placed onto said plate (37) by application of a pressure, said plate (37) being mounted on the opposite end of said frame horizontal arm.

6. A hydraulic jack wood cleaver according to Claims 1- 5, characterized in that a discharge line (20) interconnects the delivery line (9) and oil reservoir (19), wherefrom the suction line (8) picks up the oil feeding said hydraulic pump (7) for said wood cleaver, there being provided a manually operated cock (21) adapted to close the passage between said delivery line (9) and discharge line (20) with said pump (7) in operation, it being opened manually as the froe (14) is returned to the rest position thereof under the bias of said return spring (22).

7. A hydraulic jack wood cleaver according to Claims 1 and 2, characterized in that a quick discharge valve (38), of a type known per se, comprises an elestic

membrane (39) arranged to be movable on the interior thereof, and to close said discharge line (20) as the pressurized oil from the delivery line (9) flows into the hydraulic cylinder actuating said froe through the pipe (10), and to open as the action of the pressurized oil feed pump is discontinued to allow the oil to be discharged into said reservoir during the return strocke of said hydraulic cylinder piston.

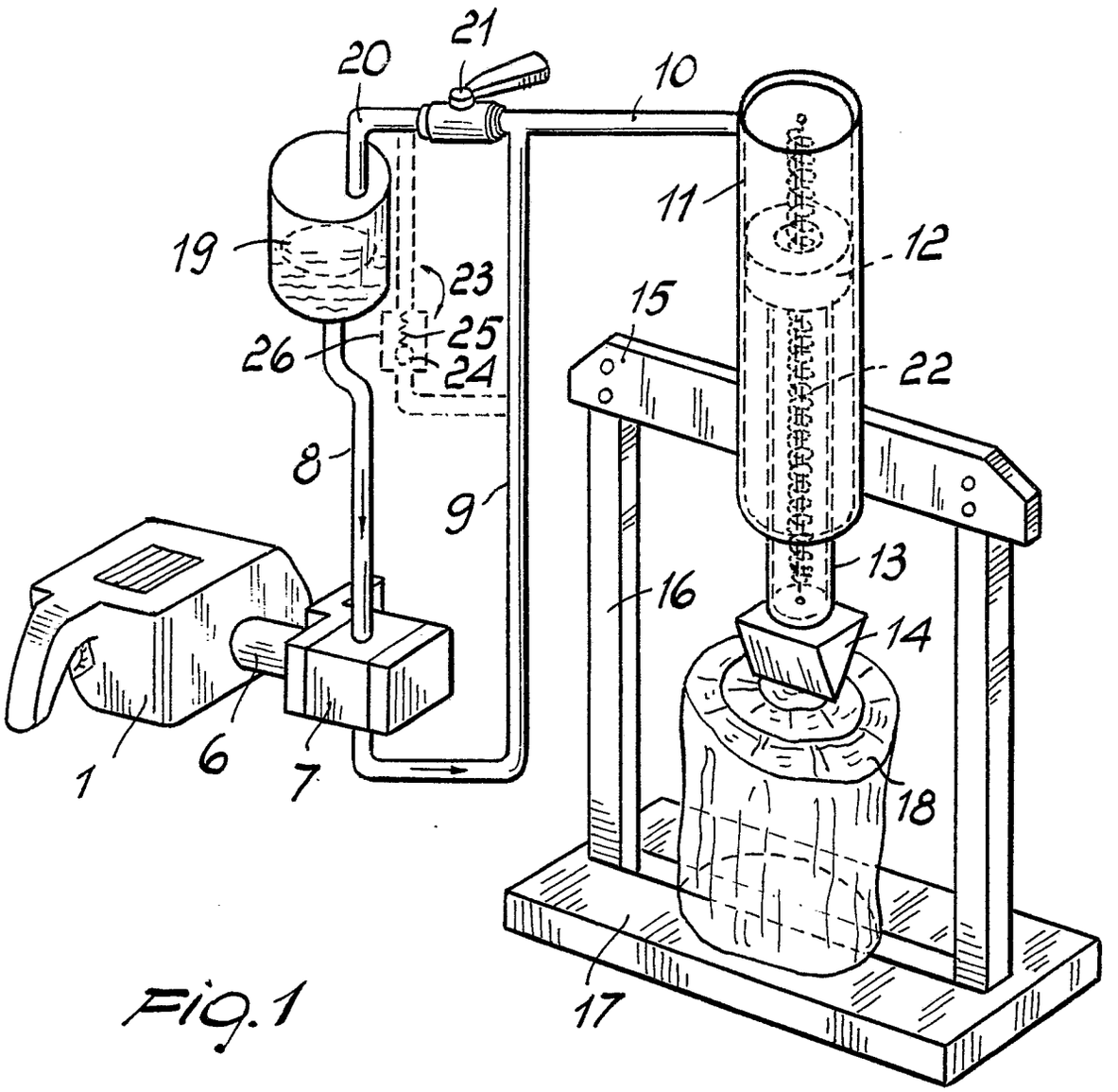

Fig.1

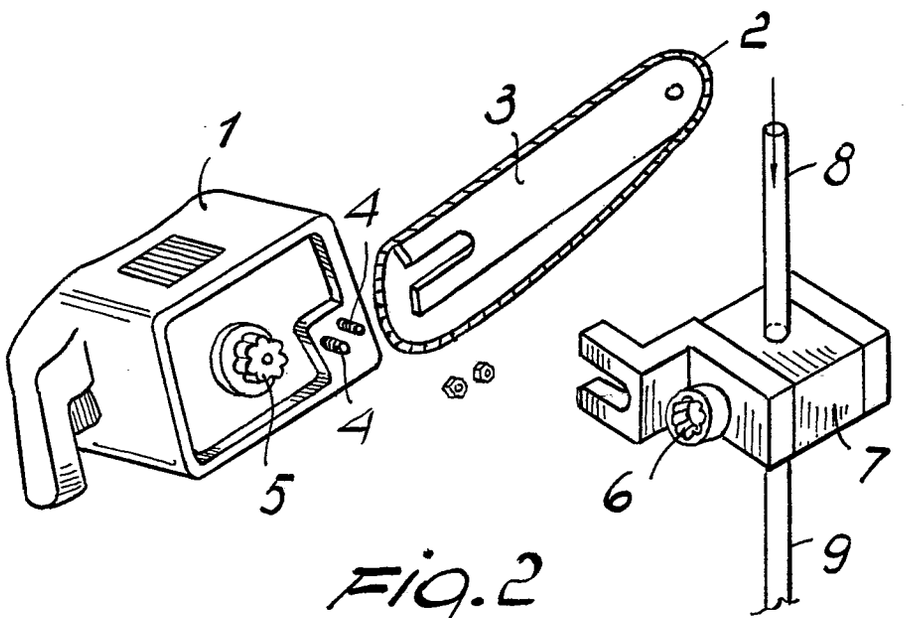

Fig.2

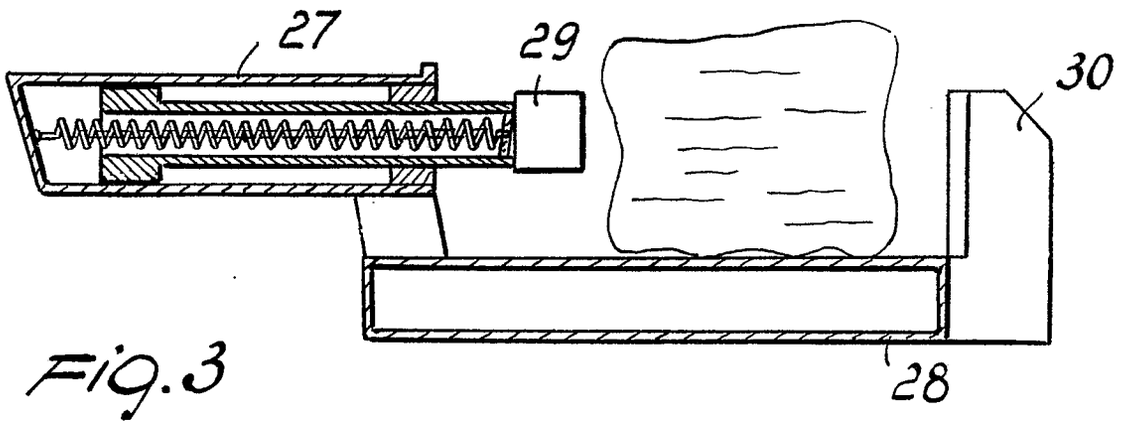

Fig.3

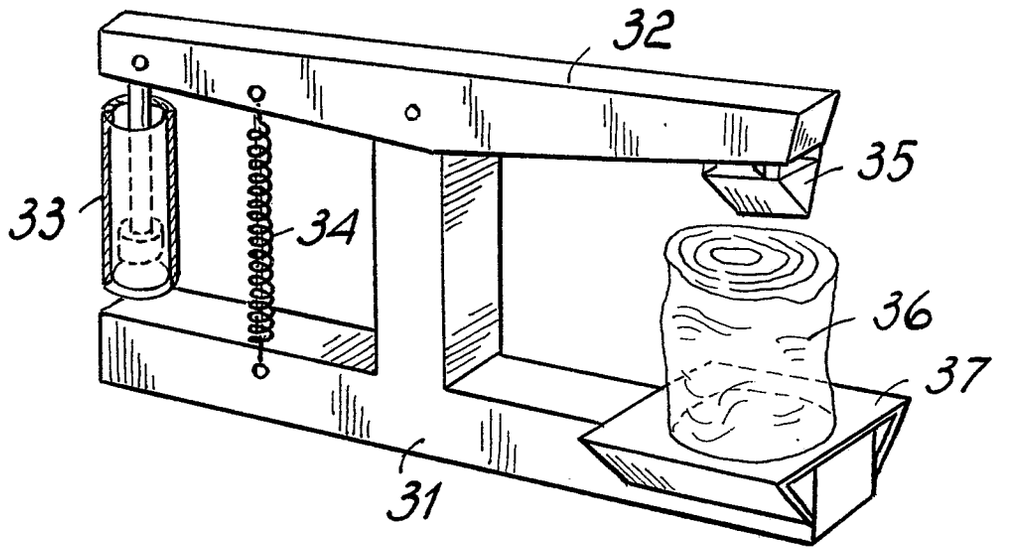

Fig.4

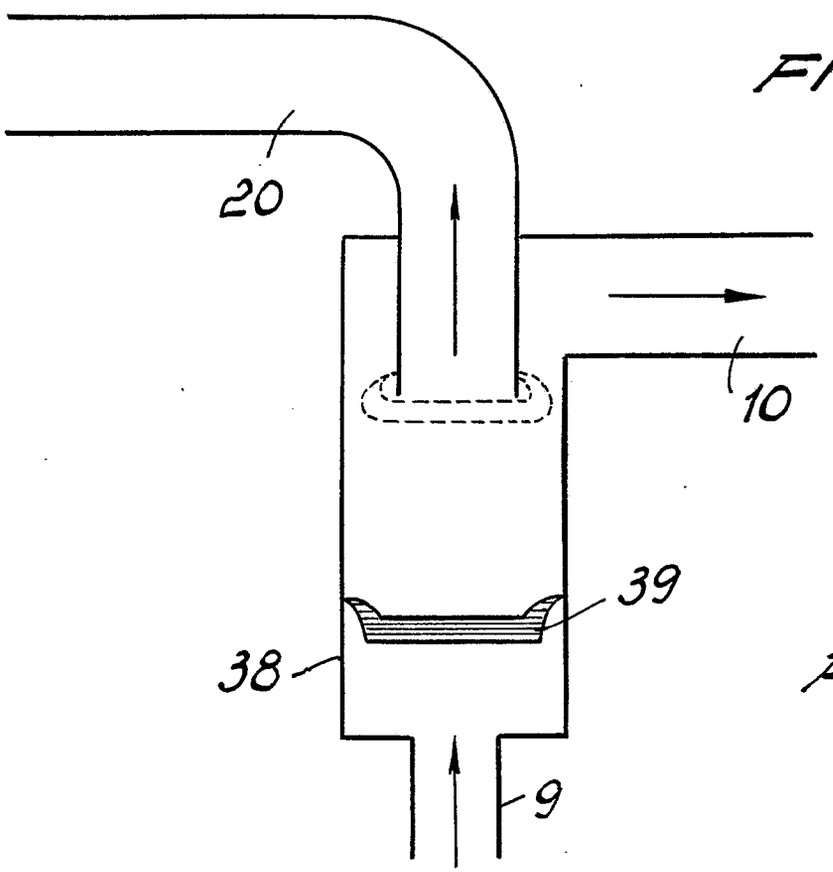

Fig.5

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EUROPEAN SEARCH REPORT

0051853
Application number
EP 81 10 9506

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
E	DE - A - 3 028 784 (PHELPS) * claims 1 and 4 *	1,4,6
A	US - A - 4 157 105 (GANSLEY) * column 1, lines 10-15 *	1,4
A	EP - A - 0 007 249 (NOTARAS) * abstract *	1
A	DE - C - 1 199 476 (STIHL) * claim 1 *	2
A	US - A - 4 192 364 (FINDLEY) * column 1, lines 47-66 *	3
A	US - A - 4 112 985 (GOSSELIN) * abstract *	5
A	US - A - 3 077 214 (BRUKNER) * claim 1 *	6
A	US - A - 4 188 987 (JAMES)	
A	US - A - 4 121 636 (JAMES)	
A	US - A - 3 197 162 (JOHANSON)	

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 27 L 7/00
B 27 B 17/00

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 27 L 7/00
B 27 B 17/00
B 27 C 9/00
B 25 F 3/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
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E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18.02.1982	DE GUSSEM

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