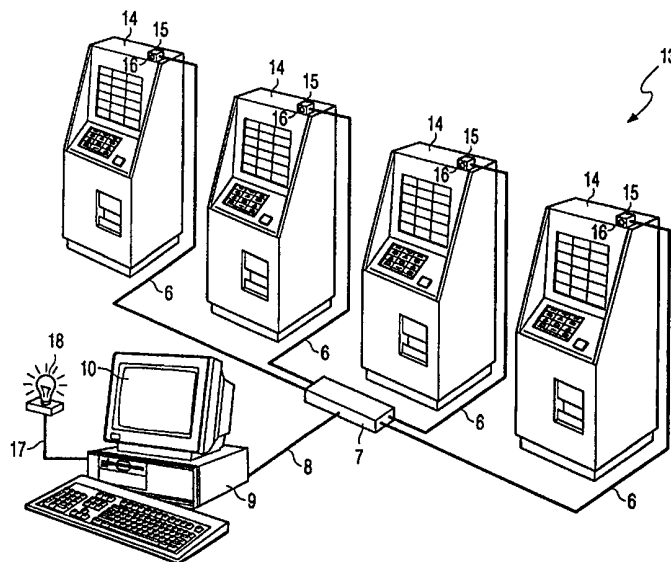


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: APPARATUS AND METHOD FOR DETERMINING A SHORTEST RESPONSE TIME AND GAME DEVICE



## (57) Abstract

The invention relates to an apparatus for determining a shortest response time from a plurality of response times of different respondents by means of signal generators preferably disposed in an amusement arcade, comprising: a number of signal generators to be activated by the respondents; a central computer coupled to at least one multiple switch; connections between the individual signal generators and the multiple switch; at least one signal output for providing a starting signal to the respondents; and at least one information output for providing the identity of a first signal generator activated after a starting signal. The invention also relates to a game device adapted for assembly with such an apparatus and a method for determining a short response time.

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**Apparatus and method for determining a shortest response time and game device**

The invention relates to an apparatus and method for determining a shortest response time from a plurality of response times of different respondents by means of signal generators preferably placed in an amusement arcade. The invention also comprises a slot machine for use in the apparatus.

Game devices, such as for instance fruit machines, are placed inter alia in amusement arcades. The turnover and profit of such a collection of game devices is co-determined by the attraction exerted by a playing location. In order to increase turnover an additional attraction is therefore sought whereby the playing location will be better frequented. It is already known to devote much attention to the interior and/or to provide food and drinks free or at low cost. All this already happens on a large scale so that one particular arcade does not thereby distinguish itself from others. The present invention has for its object to provide an apparatus, method and game device with which an additional game can be played in a space with a plurality of game devices and wherein chance of winning is available for the players. It is a particular objective that this does not fall under the restrictive regulations of local legislators, an example hereof being the Dutch Betting and Gaming Act.

The present invention provides for this purpose an apparatus for determining a shortest response time from a plurality of response times of different respondents by means of signal generators preferably placed in an amusement arcade, comprising:

- a number of signal generators to be activated by the respondents,
- a central computer coupled to at least one multiple switch,
- connections between the individual signal generators and the multiple switch,
- at least one signal output for providing a starting signal to the respondents, and
- at least one information output for providing the identity of a first signal generator activated after a starting signal. The signal generator can for instance consist of a push-button and the central computer preferably comprises a random generator for activating the apparatus within a determined time frame. Using such an apparatus a game of skill can be played at a determined point in time, wherein which respondent is first to activate an associated signal generator is measured after a starting signal. This activation of the signal generator can for instance take place by depressing a press-button, which is

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a simple operation. Once the game has been played it must be apparent who was first to react and this is indicated by the information output. In order to prevent the respondents knowing when the game starts, the apparatus is preferably provided with a random generator so that the exact moment at which the game begins is not known. It is also possible herein to use the signal output to request attention. The game will then begin within a short time. A second signal from the signal output can then be used as the actual starting signal for the game.

The switch can be embodied as parallel circuit or as serial circuit. The advantage of a serial circuit is that it is easily obtainable and costs little. The advantage of a parallel circuit is that all signal generators can be monitored simultaneously, this not being possible with a serial circuit. It should however be noted here that the switching times of existing serial circuits are so short that they will not, or practically not, distort the progress of the game.

The signal output can comprise at least one lamp and/or at least one loudspeaker. It is also possible for the signal output to take a multiple form and to be assembled with the signal generators. In this latter case it is possible to envisage signal generators in the form of push-buttons in which at least one lamp is arranged in each case. The lamps going on or off can then be used as starting signal. The sounding of the buzzer or a combination of both options can however also form the starting signal.

In a preferred embodiment the information output comprises at least one display. It is also possible for the information output to take a multiple form and to be assembled with the signal generators. Depending on the embodiment, a central display can indicate which signal generator is first to be activated, but it is also possible for a plurality of displays to be arranged so that it can be seen at diverse locations which respondent has won. Information output is also possible by means of a signal generator adapted for that purpose. It is possible here to envisage the signal generators already described above in the form of push-buttons incorporating lamps, wherein for instance lighting up of a determined signal generator after playing of the game indicates that the relevant signal generator is first to be activated.

The invention likewise comprises a game device provided with at least one signal generator and an output connected to the signal generator for integrating the game device in an apparatus as described in the foregoing. No additional measures thus need be taken in an amusement arcade to arrange signal generators, since these can be  
5 integrated into the game device. Since legislators generally impose strict requirements for game devices, such a provision can generally be applied only after it has been approved. It is therefore recommended to provide game devices with a signal generator and output according to the invention prior to approval. The output of each game device can then be coupled to the apparatus as described.

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In the preferred embodiment the game device also contains a deactivating circuit for deactivation thereof, which deactivating circuit is connected to an output for connecting to the described apparatus. It is thus possible to temporarily pause the game device during playing of the game. The normal game on a game device cannot thereby be  
15 obstructed by the present game.

It is also possible to connect a counter for updating a credit position of a game device to an output for connecting to an apparatus as described above. The score of the relevant game device can be modified subject to the game result. The winner of the game can  
20 thus have extra points awarded and/or the credit position of players who have not won can be reduced.

The invention also provides a method for determining a shortest response time from a plurality of response times of different respondents by means of signal generators preferably placed in an amusement arcade, comprising the successive steps of:  
25 A) monitoring whether or not a plurality of signal generators have been activated,  
B) storing the identification of the information obtained during step A),  
C) providing the respondents with a starting signal,  
D) monitoring whether or not the signal generators have been activated,  
30 E) comparing the information obtained during step D) with the information stored during step B), and

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F) repeating steps D) and E) until an activated signal generator detected in step D) is newly activated relative to the activated signal generators detected during step B) and making known the newly activated signal generator. It is of great importance for the integrity of the game that the time between the check according to step A) and the start  
5 of the game during step C) is kept as short as possible. This is no problem in view of the very rapid switching times of existing circuits. As already stated above however, it is recommended to have the check take place in parallel manner, since in the case of a serial check the times between the check according to step A) and beginning of the game as according to step C) differ to some extent. Before starting of the game, i.e.  
10 before step A), an additional signal can be given to draw the attention of respondents to the fact that the game will be played very shortly. The check according to steps A) and B) is desirable so as to prevent a signal generator already being activated before the starting signal so that immediately after the starting signal this signal generator is designated as the signal generator with the quickest reacting respondent. Such abuse can  
15 be prevented by means of the method according to the invention. After the most quickly activated signal generator has been made known, the associated respondent can be rewarded. The chance of winning of individual respondents will thus increase when fewer respondents take part in the game. Particularly as a result hereof it becomes more attractive to visit an arcade in which the device according to the invention is placed at  
20 times when there are few visitors. The attraction of an amusement arcade will hereby increase precisely during less busy periods, which will contribute towards an increased turnover of the arcade.

As already stated above, it is recommended during checking of the signal generators  
25 during step A) and/or step D) to check all signal generators simultaneously. It is hereby possible to determine exactly which signal generator is activated first and the check of activated signal generators can also take place for all signal generators the shortest possible time before the starting signal. In view of the importance of the short monitoring times during particularly steps A) and D), it is desirable to control the  
30 method with a central computer.

Depending on the location at which the method is applied, a central location can be chosen where the most quickly activated signal generator is made known, for instance a host which awards a prize. It is also possible however to make this known close to the signal generator so that a respondent can see for himself whether he has won  
5 immediately after playing the game.

The present invention will be further elucidated with reference to the non-limitative embodiments shown in the annexed figures, wherein:

fig. 1 shows a schematic view of the apparatus according to the invention which  
10 incorporates game devices,

fig. 2 likewise shows a schematic view of an alternatively embodied apparatus according to the invention incorporating game devices, and

fig. 3 shows a flow diagram of the method according to the invention.

15 Fig. 1 shows an apparatus 1 incorporating game devices 2. Each game device 2 comprises a start button 3 which is coupled by means of a connection 4 to an output, for instance a plug contact (not shown). Into these outputs of game devices 2 are inserted plugs 5 which are connected via cables 6 to a switch 7. This latter is connected to a computer 9 via a line 8.

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The game can be activated by means of computer 9, wherein a check is made by means of switch 7, serial or parallel, whether start-buttons 3 of the individual game devices 2 are activated. The game is played shortly after such a check. The result of the game can be displayed for instance by means of output on a terminal 10 forming part of a  
25 computer 9. In order to make clear to the respondents that the game is about to be played, the apparatus 1 shown in this figure is provided with a loudspeaker 11 which is connected to a computer 9 via a cable 12. A sound signal can be given by means of loudspeaker 11 which will indicate to the respondent that the game will be played shortly. It is also possible to use loudspeaker 11 for the actual start of the game.

30 Reference is made to figure 3 for a further description of the game.

Figure 2 shows an apparatus 13, of which game devices 14 essentially form no part. Placed on each game device is a signal generator 15 in the form of a separately mounted box. Each signal generator 15 is provided with a push-button 16 with which the game can be played.

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As in the apparatus 1 shown in figure 1, signal generators 15 are connected by means of cables 6 to a switch 7. This switch 7 is in turn connected to computer 9 by means of a line 8. Also connected to computer 9 via a cable 17 is a lamp 18 with which a starting signal for the game can be given and/or a signal indicating that the game will be played shortly. Apparatus 13 shows a great resemblance to apparatus 1 as shown in figure 1, except for the fact that signal generators 15 are not integrated with game devices 14. It is thus possible to provide existing amusement arcades in which game devices 14 are placed with an apparatus 13 without considerable intervention in game devices 14 being necessary for this purpose. Intervention in game devices 14 is particularly undesirable because, depending on the local legislator, this usually necessitates re-approval of the machines 14.

15

Figure 3 shows a flow diagram of the method in which after random or non-random starting of the game (S) a check takes place as to whether or not the signal generators (A) potentially taking part in the game are activated. During a step (B) the results of the check in step (A) are subsequently stored in a database 19. It is then made known to the respondents during step (C) that the game is beginning. A signal is thus given during step (C), for instance by means of a lamp 18. It is of great importance that the time between steps (A) and (C) is kept as short as possible in order to prevent respondents who activate a signal generator during these steps from later being designated as winner. Using standard switching equipment and control equipment which is commercially available it is no problem whatsoever to limit this time to a few milliseconds.

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After the starting signal given during step (C) a check is made in step (D) as to which signal generators are activated. In combination with the information from database 19 a check is then made during step (E) whether a new signal generator has been activated after the starting signal of step (C). If this is not the case, a check is again made during

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step (D) as to which signal generators are activated. Step (D) will thus be repeated at very short intervals (milliseconds) until it is determined during step (E) that a new signal generator has been activated. This newly activated signal generator is then outputted as winner (step (W)). This ends the game.

5

Although the invention has been elucidated with reference to only a few embodiments, it will be apparent to all that the invention is in no way limited to the described and shown embodiments. On the contrary, many variations are still possible for the skilled person within the scope of the invention.

## Claims

1. Apparatus for determining a shortest response time from a plurality of response times of different respondents by means of signal generators preferably placed in an amusement arcade, comprising:
- 5
- a number of signal generators to be activated by the respondents,
  - a central computer coupled to at least one multiple switch,
  - connections between the individual signal generators and the multiple switch,
  - at least one signal output for providing a starting signal to the respondents, and
  - 10 - at least one information output for providing the identity of a first signal generator activated after a starting signal.
2. Apparatus as claimed in claim 1, wherein the signal generator is a push-button.
- 15 3. Apparatus as claimed in claim 1 or 2, wherein the central computer comprises a random generator for activating the apparatus within a determined time frame.
4. Apparatus as claimed in any of the foregoing claims, wherein the switch is a parallel circuit for simultaneous connection of the central computer to a plurality of
- 20 signal generators.
5. Apparatus as claimed in any of the foregoing claims, wherein the switch is a serial circuit for a sequential connection of the central computer to individual signal generators.
- 25
6. Apparatus as claimed in any of the foregoing claims, wherein the signal output comprises at least one lamp.
7. Apparatus as claimed in any of the foregoing claims, wherein the signal output
- 30 comprises at least one loudspeaker.

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8. Apparatus as claimed in any of the foregoing claims, wherein the signal output takes a multiple form and is assembled with the signal generators.
9. Apparatus as claimed in any of the foregoing claims, wherein the information  
5 output comprises at least one display.
10. Apparatus as claimed in any of the foregoing claims, wherein the information output takes a multiple form and is assembled with the signal generators.
- 10 11. Game device provided with at least one signal generator and an output connected to the signal generator for integrating the game device in an apparatus as claimed in any of the foregoing claims.
12. Game device as claimed in claim 11, which contains a deactivating circuit for  
15 deactivation thereof, which deactivating circuit is connected to an output for connection to the central computer.
13. Game device as claimed in claim 11 or 12, wherein a counter for updating a credit position is connected to an output for connection to the central computer.
- 20 14. Method for determining a shortest response time from a plurality of response times of different respondents by means of signal generators preferably placed in an amusement arcade, comprising the successive steps of:
- A) monitoring whether or not a plurality of signal generators have been activated,  
25 B) storing the identification of the information obtained during step A),  
C) providing the respondents with a starting signal,  
D) monitoring whether or not the signal generators have been activated,  
E) comparing the information obtained during step D) with the information stored during step B), and  
30 F) repeating steps D) and E) until an activated signal generator detected in step D) is newly activated relative to the activated signal generators detected during step B) and making known the newly activated signal generator.

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15. Method as claimed in claim 14, wherein during checking of the signal generators during step A) and/or step D) all signal generators are checked simultaneously.
16. Method as claimed in claim 14 or 15, wherein steps A) to F) are controlled by a  
5 central computer.
17. Method as claimed in any of the claims 14-16, wherein the newly activated signal generator is made known at a central location.
- 10 18. Method as claimed in any of the claims 14-17, wherein the newly activated signal generator is made known close to this signal generator.

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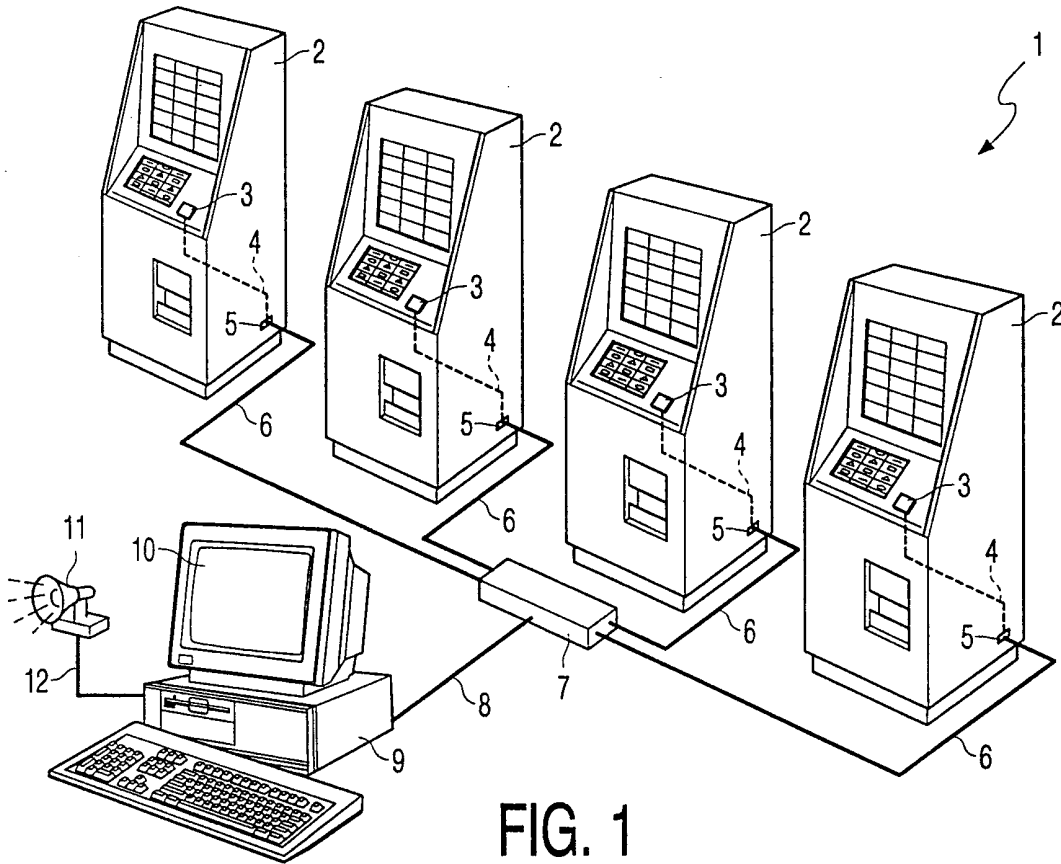


FIG. 1

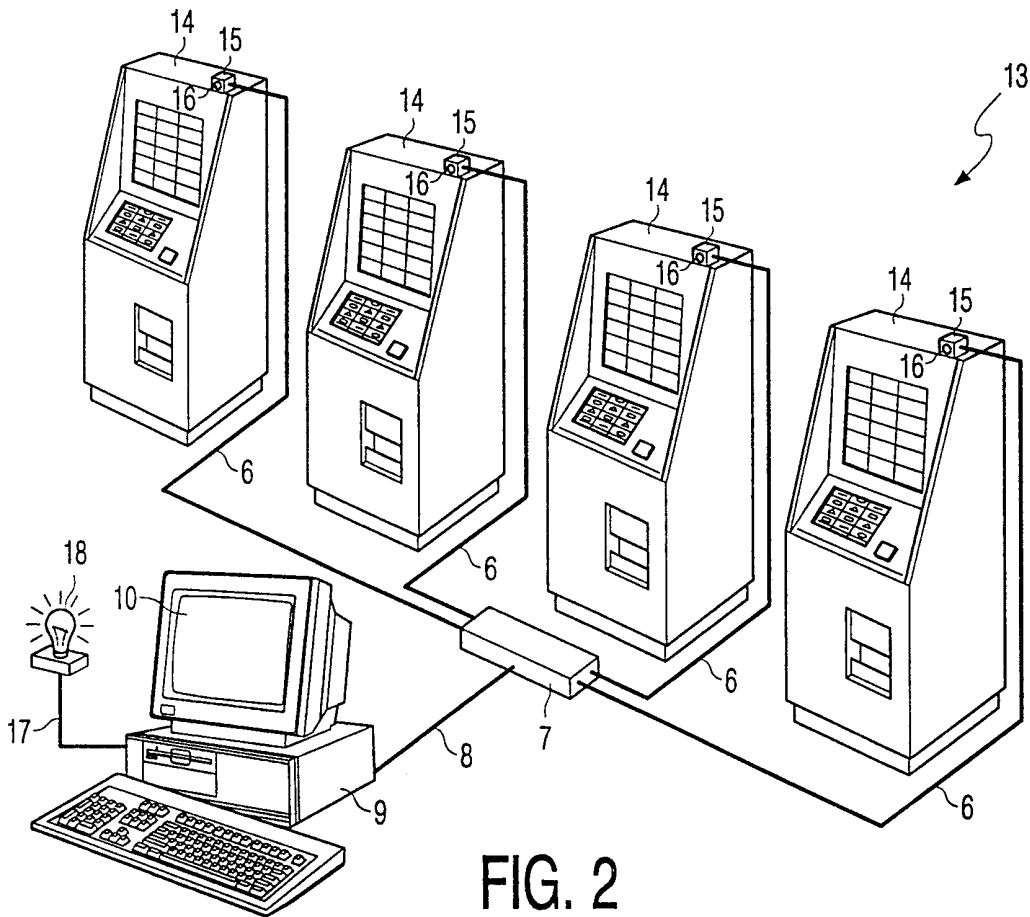


FIG. 2

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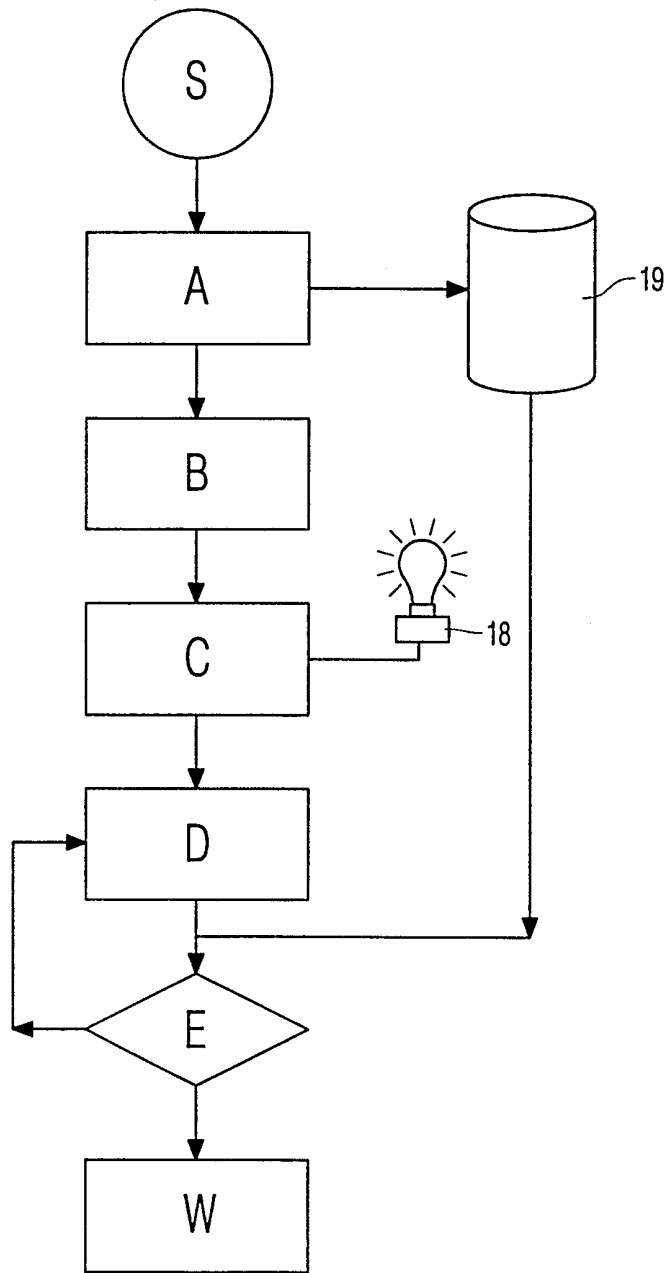


FIG. 3

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/NL 99/00392

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 6 G07F17/32				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) IPC 6 G07F				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 86 02753 A (VIDEODROME) 9 May 1986 (1986-05-09)  page 3, line 7 - line 15 page 7, line 35 -page 8, line 7 page 10, line 19 -page 11, line 3 page 13, line 10 - line 19 page 14, line 1 - line 15 page 23, line 32 -page 24, line 16; figures	1-6, 8-11, 14-18		
X	GB 2 184 029 A (JPM (AUTOMATIC MACHINES)) 17 June 1987 (1987-06-17)  page 1, line 118 -page 2, line 5 page 2, line 118 -page 3, line 8 abstract; figure	1,2,4-6, 8-11, 14-18		
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
<input checked="" type="checkbox"/> Patent family members are listed in annex.				
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<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">                     "A" document defining the general state of the art which is not considered to be of particular relevance                      "E" earlier document but published on or after the international filing date                      "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      "O" document referring to an oral disclosure, use, exhibition or other means                      "P" document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                      "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.                      "&amp;" document member of the same patent family                 </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
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Date of the actual completion of the international search  <h2 style="text-align: center;">12 October 1999</h2>		Date of mailing of the international search report  <h2 style="text-align: center;">18/10/1999</h2>		
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  <h2 style="text-align: center;">Neville, D</h2>		

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International Application No  
PCT/NL 99/00392

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 593 904 A (GRAVES) 10 June 1986 (1986-06-10)  column 5, line 7 - line 14 abstract; figures -----	1,2, 4-11, 14-18
A	GB 2 167 676 A (JPM (AUTOMATIC MACHINES)) 4 June 1986 (1986-06-04)  page 1, line 66 - line 81 -----	1,2, 4-11, 14-18



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 99/00392

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 8602753 A	09-05-1986	EP 0198045 A	22-10-1986
GB 2184029 A	17-06-1987	NONE	
US 4593904 A	10-06-1986	NONE	
GB 2167676 A	04-06-1986	NONE	