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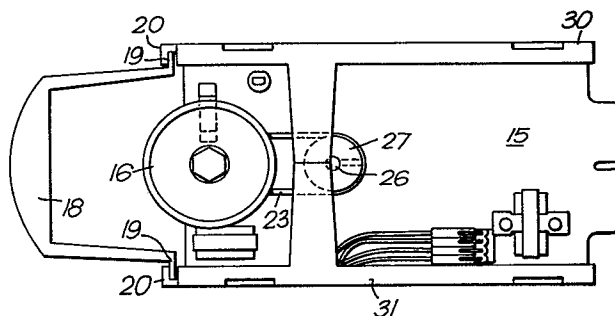
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⑤④ **Gaming machines.**

⑤⑦ The reels (16) of a gaming machine are miniaturised in order to save space and a common cylindrical magnifying lens (18) extending horizontally in front of the row of reels causes the symbols on the reels to appear to be of similar size to those on reels of normal dimensions. The visibility of the symbols can be maintained down to a reel diameter as small as 40 mm. For constructional purposes, each reel forms part of a separate module comprising a central supporting plate (15) from which the reel (16) is cantilevered, the reel being driven by a belt (23) passing around a pulley (27) driven by an electric motor on the opposite side of the supporting plate (15). The required number of modules are mounted side by side with a common lens (18) extending in front of all the modules.



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Gaming machines

5. This invention relates to gaming machines, sometimes referred to as fruit machines or amusement machines. As is well known, such machines include a mechanism comprising a number of reels marked along their circumferential edges with symbols such as fruit, the relative positions of which are determined by the rotary positions of the reels to determine whether or not a player has won. In the past, operation was usually purely mechanical, but such machines are
10. now commonly electrically operated and initiation is by means of a suitable switch such as a push-button or rocker bar.

15. The reels are commonly about 210 mm in diameter, this giving an adequate length of circumference for accommodating the required number of symbols in a size which is readily visible. To a certain extent, the size of reel dictates the general scale of the machine as a whole, and such machines are commonly made rather larger than is
20. strictly necessary from a strictly functional point of view in order to be prominently visible in a bar or other amusement space. Despite this general tendency, there is nevertheless a need for an appreciably smaller machine, particularly in some

- European countries where either tradition or local regulations require this. However, any attempt to reduce the size of reel to any appreciable extent below the dimension referred to above, leads to a
5. major reduction in the visibility of the various symbols on the reel, thus reducing the attraction of the machine as a whole.

- According to the present invention, a reel assembly for a gaming machine comprises a number of
10. modules connected together side by side and each comprising a miniature reel and a driving motor mounted on a vertical supporting plate, preferably on opposite sides, the plate extending from front to rear of the module and a common cylindrical magnifying lens
15. extending horizontally in front of the row of reels. This magnifying lens can be designed so that a complete row of symbols on the reels is visible at a glance and the effect of magnification is such that the symbols appear to be of much the same size as with a reel of
20. normal dimensions. The dimensions of the reel depend on the degree of miniaturisation required, but the visibility of the symbols can be maintained down to a reel diameter as small as 40 mm; any diameter above 70 mm requires no magnification and the term "miniature
25. reel" is therefore used to include reels having a diameter in the range 40 to 70 mm.

- It is basically only the vertical dimension of each symbol which is affected by the reduction in reel diameter since the horizontal dimension is determined
30. by the width of the rim of the reel and need not be reduced. The magnifying lens therefore operates mainly to magnify the symbols in a vertical direction and the symbols on each reel therefore need to be

modified accordingly, i.e. with considerably reduced vertical dimension but with little, if any reduction in the horizontal direction. By means of a construction in accordance with the invention, the optical effect is very much the same as with normal size reels, but the overall size of the machine as a whole can be considerably reduced.

Turning to the construction of each individual module, the vertical supporting plate preferably extends centrally of the module between upper and lower horizontal plates with the driving motor situated to the rear of the reel with its drive spindle extending through the vertical plate. The drive can then conveniently be transmitted to the reel by means of an elastic driving belt, e.g. in the form of an O-ring, engaging with pulleys on the driving and driven shafts. The upper and lower plates may be spaced apart by pillars, the supporting plate being located in respective grooves in the two plates, so that no other form of fixing is necessary. In other words, when the two plates are secured together by way of the pillars, the supporting plate is clamped between them. As a matter of convenience and economy in moulding, the upper and lower plates of each module may be identical, each pillar being moulded half on one plate and half on the other so that the ends of the two half-pillars abut against one another and are secured together to connect the two plates and clamp the vertical supporting plate.

An example of a construction in accordance with the invention will now be described in more

detail, with reference to the accompanying drawings, in which:-

5. Figure 1 is a plan view of one module with other modules shown in dotted outline and also showing a common magnifying lens;

Figure 2 is a side elevation of the module seen in Figure 1;

10. Figure 3 is a side elevation, partly in section, of the module seen from the other side; and

Figure 4 is a front view of the module.

15. Turning first to Figure 1, a single module is shown in full lines as 10 and is mounted side by side with further identical modules shown in dotted lines as 11, 12 and 13, the left hand portion of the module 13 being broken away for convenience. Each module has a vertically extending central supporting plate, the end of which is seen at 15 and a miniature reel 16 is mounted to the front of
20. this plate so as to extend laterally from the module. Projecting parts of the reels associated with the other modules are shown as 16' and a common, cylindrical magnifying lens 18 extends along the row of reels so that symbols on the reels
25. may be seen by the user of the machine as magnified in a vertical direction to a size similar to that associated with reels of normal diameter, despite the greatly reduced diameter of the reels 16.

30. The shape of the lens 18 is best seen in Figure 2, the lens being formed at each side with a narrow flange 19 fitting into a corresponding groove in a projection 20 at the front of each

module so that the lens can be slid into position from one end. The reel 16 is cantilevered from the central supporting plate 15 as seen in Figure 4 and its spindle carries a driving pulley 22 co-operating with a driving belt 23 which may be in the form of a standard O-ring. A driving motor 25 is mounted to the rear of the reel 16 on the opposite side of the plate 15 and its driving spindle extends through the plate 15 as seen at 26 in Figure 26 where it carries a pulley 27 which drives the belt 23. The motor 25 is a stepping motor of which the control circuits are carried by the supporting plate 15 which is in the form of a printed circuit board, thus avoiding the need for any separate printed circuit board. Details of the control and operation of the motor 25 form no part of the present invention.

The plate 15 together with the associated reel 16 and driving motor 25 is supported between upper and lower plates 30 and 31 which are formed as identical mouldings. The plates 30 and 31 are separated by pillars formed in two halves, the upper half 32 of each pillar being integral with the plate 30 and the lower half 33 integral with the plate 31. As seen in Figure 3, each half-pillar is hollow, the upper half-pillar 32 being formed at its end with a clearance hole for a screw 35 which screws into the end of the half-pillar 33 so as to hold the upper and lower plates 30 and 31 together. The supporting plate 15 is located in grooves (not seen) in the respective plates 30 and 31 and is thus clamped firmly in position when the screws 35 are inserted.

The four modules are identical and are held together side by side by means of clips 38, one of which is seen in Figure 1, fitting into mating recesses 39 in the edges of the plates 30.

5. Although, as mentioned above, the operation of the driving motor 25 forms no part of the present invention, one feature associated with this forms part of the construction of each reel 16. As
10. part of the operation, it is essential to determine the angular position of each reel and the number of steps through which it has turned. This is
15. commonly achieved by an optical system by means of which a beam of light is directed onto a detector by way of openings in the reel so that a pulse is
20. produced for each step of rotation of the reel. In the present construction, the equivalent result is obtained by intermittent reflection of a beam of light produced by reflecting, radially extending
25. strips 40 on the rear face of the reel 16, as seen in Figure 3. This rear face of the reel is
30. black or other dark colour and the strips 40 are of reflecting material. A beam of light is directed onto the rear face of the reel 16 by means of a
- light-emitting diode and the reflected light is received by a detector mounted alongside the diode.
- The diode and the detector are not individually illustrated, but form part of a common optical head
- 42 which emits electrical pulses as the detector receives light from the diode reflected intermittently
- from the strips 40 as the reel 16 rotates. Connections to the optical head 42 are not illustrated, but these form part of the printed circuit carried

by the plate 15, connections to which are made by way of terminal strips 44 at the rear of the plate 15.

5. The strips 40 which are visible in Figure 3 are at a regular angular pitch, but variation of this pitch at an angular position which is not visible in Figure 3 provides a corresponding variation of the pulsed output, which enables the angular position of the reel to be monitored. Although the details are not illustrated, the strips 40 may be constituted
10. by fingers forming part of an integrally moulded spider of white or other light coloured plastics. If this spider is made replaceable, e.g. by the provision of an inner sleeve which fits over the hub of the respective reel 16, it is a simple matter to
15. change a spider having, for example, twelve fingers, for one having ten fingers, so that the characteristics of the module can be altered accordingly.

Although described as an assembly of four, the modules can, of course, be used singly if required.

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C L A I M S

1. A reel module for a gaming machine including a driving motor and characterised by a miniature reel supported by a vertical plate extending from front to rear of the module between upper and lower horizontal plates and a cylindrical lens for magnifying the surface of the reel in at least the vertical direction.
5. 2. An assembly of reel modules according to claim 1 mounted side by side and with a common cylindrical magnifying lens extending horizontally in front of the row of reels.
10. 3. A reel module according to claim 1 or an assembly according to claim 2, in which the or each driving motor is mounted on the opposite side of its supporting plate from the associated reel, with its drive spindle extending through the supporting plate.
15. 4. A module or an assembly according to claim 3 in which the drive is transmitted to the or each reel by means of an elastic driving belt engaging with pulleys on the driving and driven shafts.
20. 5. A module or an assembly according to claim 3 or claim 4 in which the or each pair of upper and lower plates are spaced apart by pillars, the supporting plate being located in respective grooves in the two plates.
25. 6. A module or an assembly according to claim 5 in which the or each pair of upper and lower plates are identical, each pillar being moulded half on one plate and half on the other so that the ends of the two half-pillars abut against one another and are
- 30.

secured together to connect the two plates and clamp the vertical supporting plate.

7. A module or an assembly according to any one of claims 3 to 6 in which the or each supporting plate is in the form of a printed circuit board carrying circuitry for the control of the respective module.
5. 8. A module or an assembly according to any one of claims 3 to 7 in which an end face of the or each reel is dark-coloured and carries radially extending reflecting strips arranged at a regular angular pitch except at one angular position and a light detector is arranged to receive light reflected by the strips from a light source to generate corresponding electronic pulses at regular intervals except at the one angular position where variation of the pitch provides a datum point for monitoring the angular position of the reel.
10. 9. A module or an assembly according to claim 8 in which the reflecting strips of the or each reel are formed by the fingers of an integrally moulded spider replaceably fitted to the end of the respective reel.
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Fig. 1.

