(12) UK Patent Application (19) GB (11) 2 212 011 (13) A

(43) Date of A publication 12.07.1989

(21) Application No 8725406.6

(22) Date of filing 29.10.1987

(51) INT CL⁴
G03B 37/02, H02P 7/28

(52) UK CL (Edition J)
H2J JKX J11VF J11VV
G2J JRB1
U1S S2227

(56) Documents cited
None

(58) Field of search
UK CL (Edition J) G2J JRB1, H2J JKPM JKX JSPV
INT CL⁴ G03B, H02P

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(54) Drive system for a camera panner

(57) Speed control of motor 16 forming part of a panning camera drive is performed by means of chopper supply 45, 43. By varying the on/off periods of multivibrator 45 using variable resistor 46, the average voltage supplied to motor 16, and hence its speed is controlled. Power is saved compared with prior art systems in which a variable resistance is used to control the motor power supply.

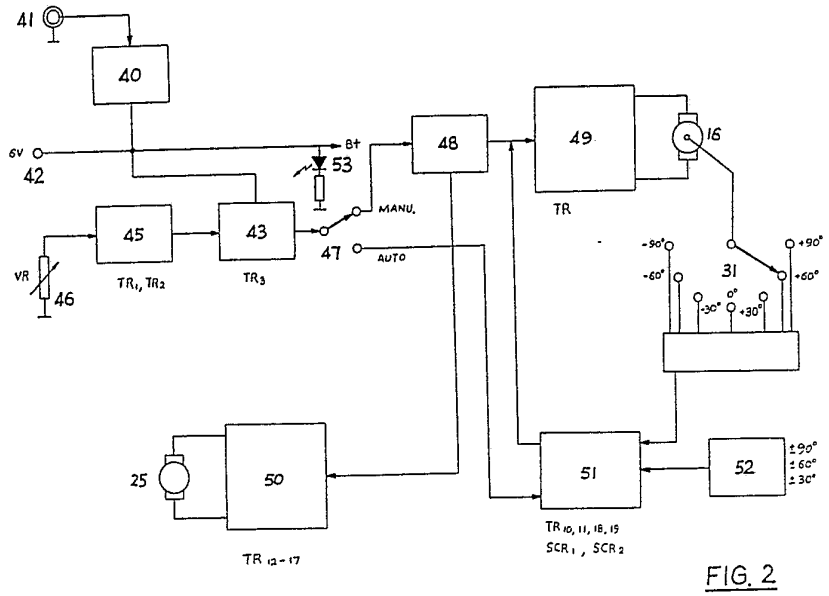

FIG. 2

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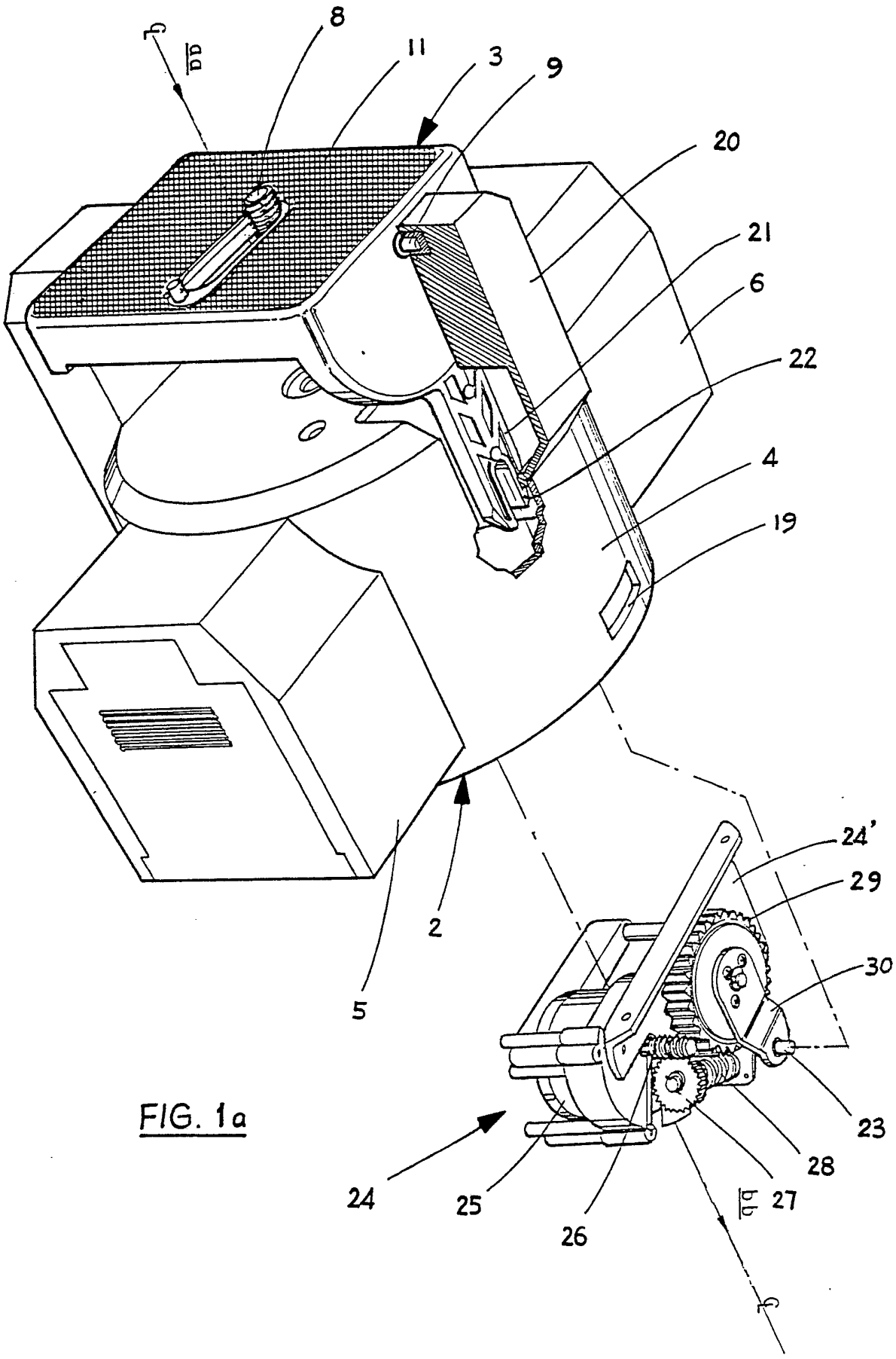

FIG. 1a

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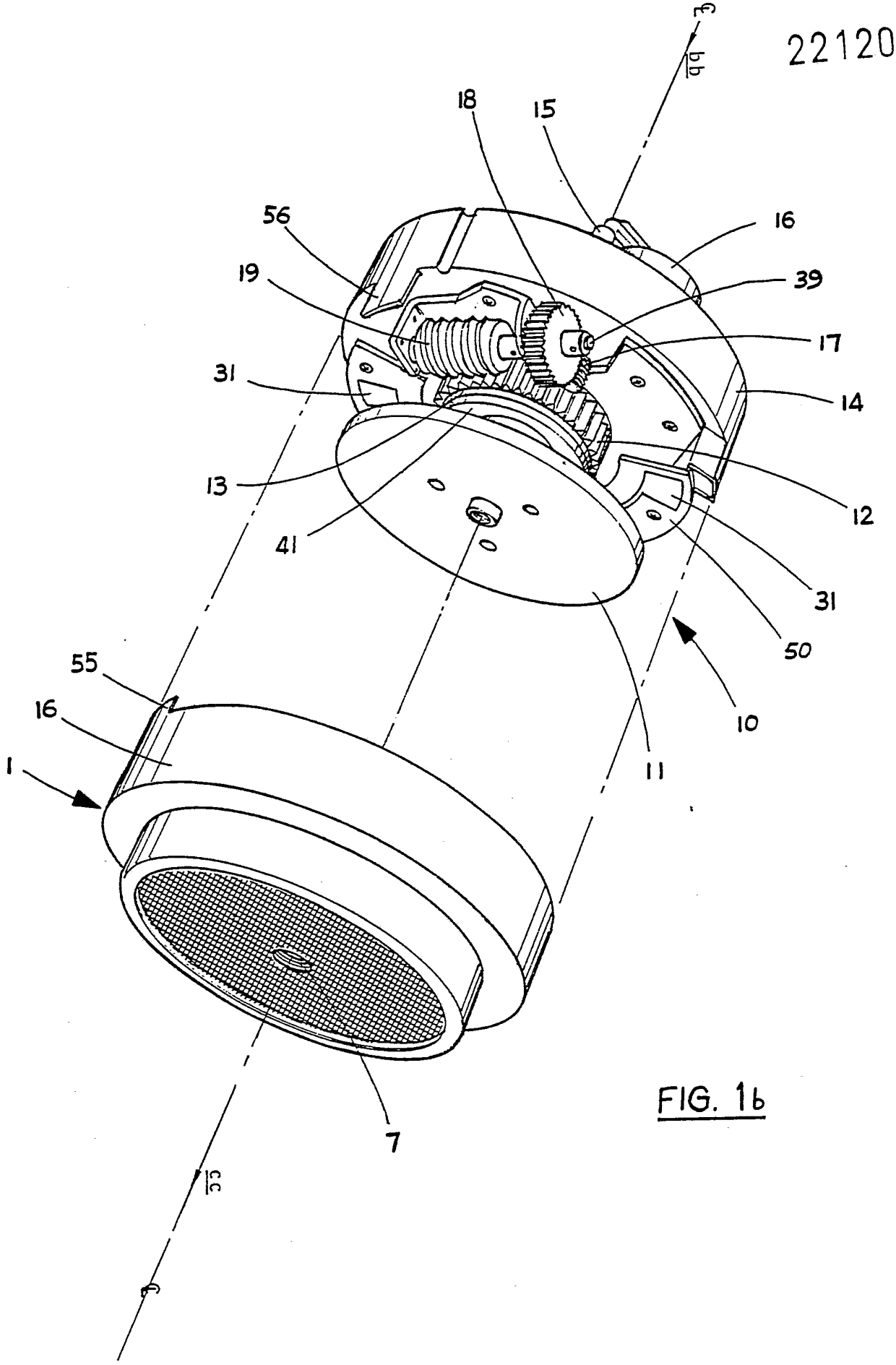

FIG. 1b

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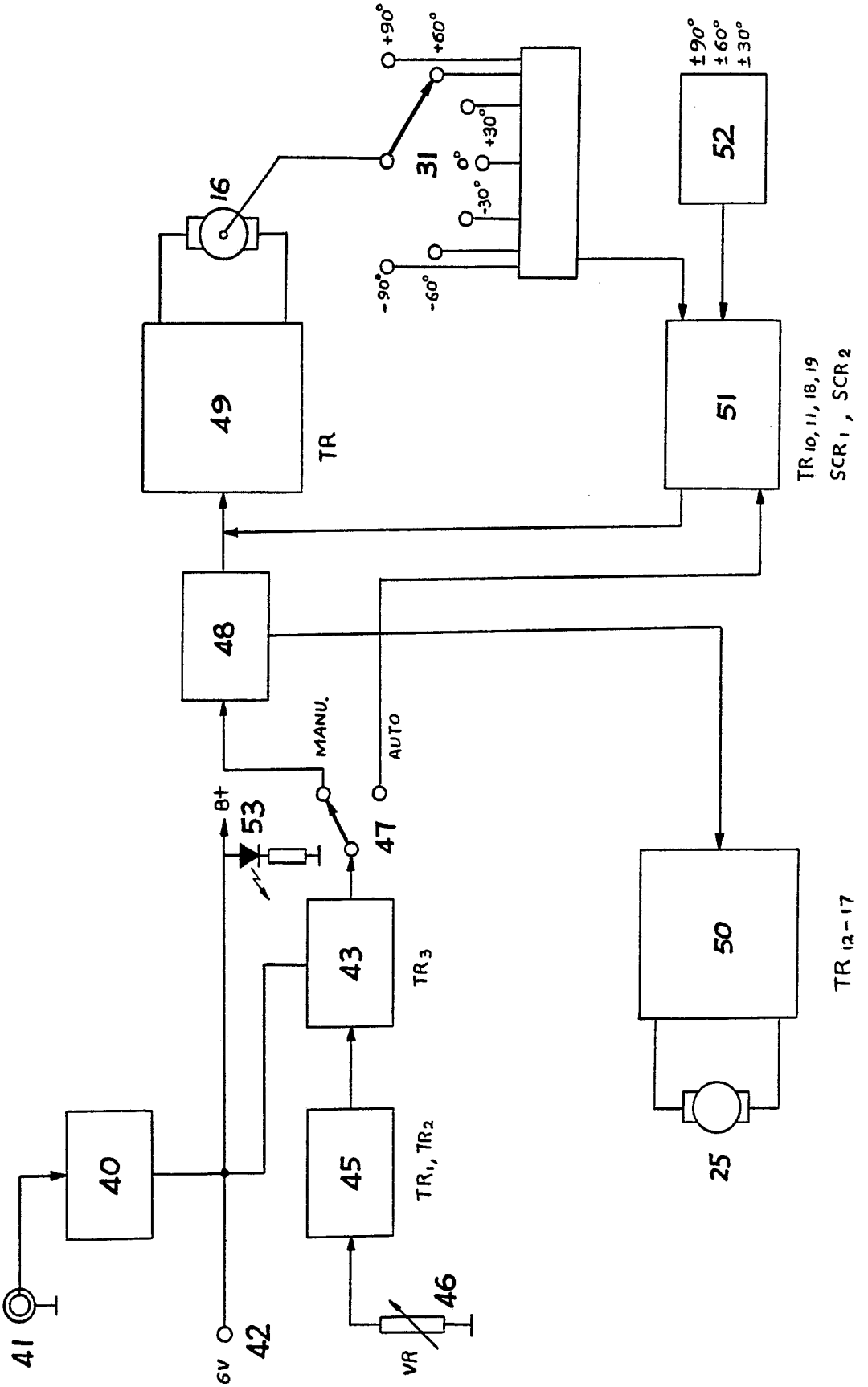

FIG. 2

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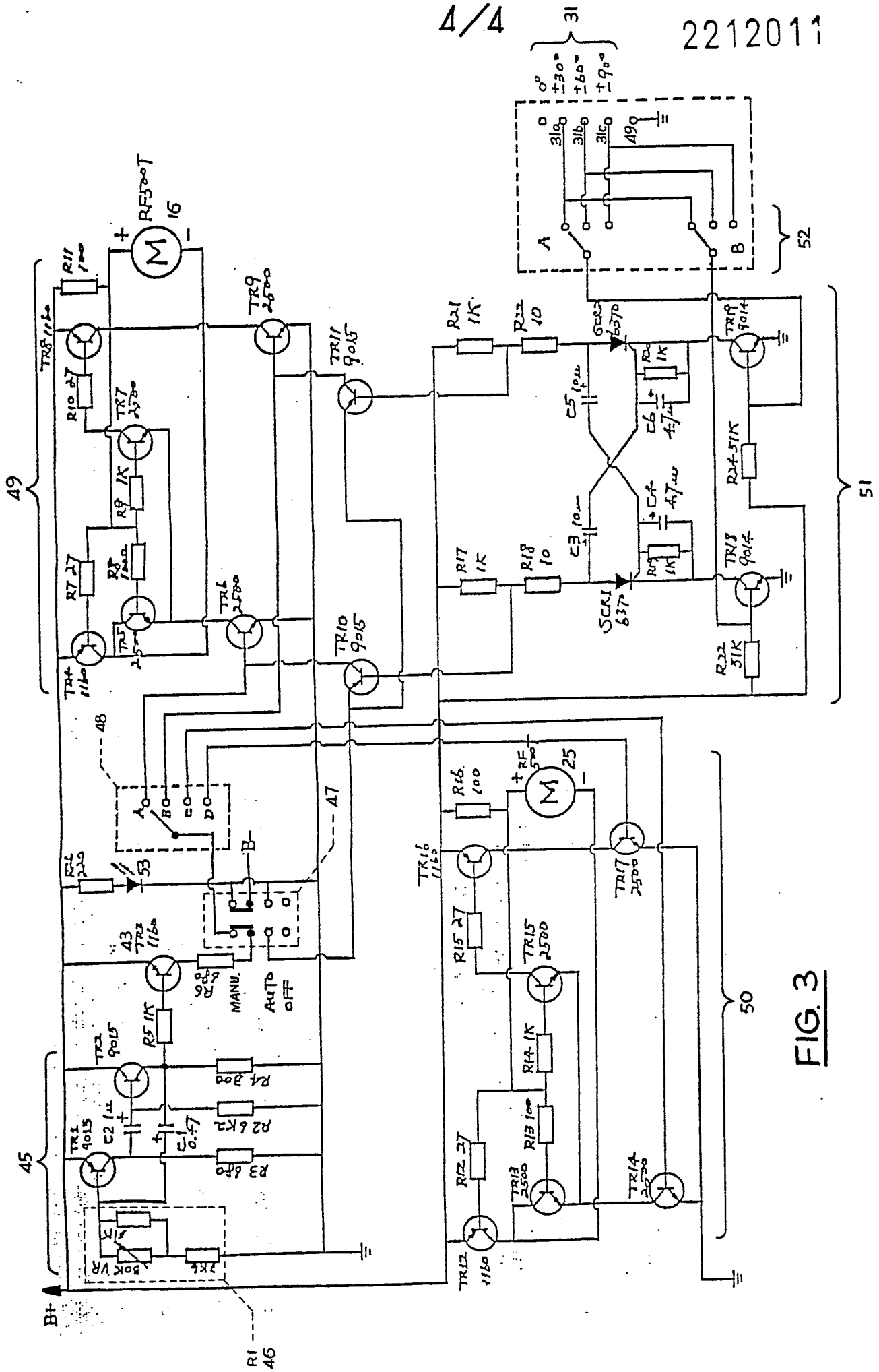

FIG. 3

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DRIVE SYSTEM FOR A CAMERA PANNER

The present invention relates to a drive system for a camera panner.

Typically such panners are driven by DC motors fed from a DC battery or rectified, external AC power supply, and the panning speeds varied by adjusting the voltage level applied to the motors. This is an inefficient use of the power supply, particularly when using batteries.

The present invention provides a camera panner having a base, a housing mounted on the base for rotation about a first axis, a camera support mounted on the housing for rotation about a second axis, and first and second drive means associated respectively with the housing and the support for rotating the housing and support, wherein a said drive means comprises a DC motor and means for supplying a variable pulsed DC power supply to the motor to drive the motor at a variable speed.

By pulsing the power supply and varying the width or frequency of the pulses it is possible to provide for efficient control of the panning speed.

Other preferred features and advantages of the invention will be apparent from the following description and the accompanying claims.

The invention will be further described by way of example with reference to the accompanying drawings, in which:-

Figure 1 is an exploded view of a camera panner in accordance with the invention;

Figure 2 is a diagram of a control system for the panner of Figure 1; and

Figure 3 shows a circuit embodying the control system of Figure 2.

Figure 1 shows a camera panner which is described fully in our European patent application No.

The panner comprises a base 1 on which is mounted a housing 2, the housing carrying a camera platform support 3, battery compartment 5 and a compartment 6 for electronic control circuitry. The base 1 has a threaded aperture 7 for mounting on a tripod or the

like and the platform 3 carries a stud 8 for attachment of a camera or the like.

Housing 2 is mounted to rotate about the centre line CL, and platform 3 pivots on two stub axles 9 perpendicular to the centre line CL.

A first drive unit 10 for rotating the housing comprises a base 11 which is attached to the base 1 and carries a wormwheel 12 which is fixed to the base via a friction clutch 13. A plastics frame 14 is rotatably mounted on a shaft 15 which is fast with the base 11. Frame 14 carries a fractional horsepower PMDC motor 16 which drives a worm 17. Worm 17 rotates a wormwheel 18 which is fast on a shaft 39 with a worm 19 engaging the wormwheel 12. As the motor is driven to rotate the worm 17, the frame 14 will rotate about the centre line CL relative to the base 11. Frame 14 is attached to the inside of the housing 2 by screws (not shown), thus causing the housing 2 to rotate relative to the base 1.

The platform 3 is mounted on stub axles 9 received in arms 20 extending up from the housing 2. An arm 21 extends down from the platform 3 and inside the housing 2. The arm 21 has a bifurcated end 22 which

receives a drive pin 23 of a second drive unit 24. Drive unit 24 comprises a pressed metal frame 24' which is carried by the plastics frame 14. A fractional horsepower PMDC motor 25 drives a worm/wormwheel/worm/wormwheel arrangement 26, 27, 28, 29 similar to that described for the unit 10. Wheel 29 carries a plate 30 supporting pin 23. The motor 25 is driven to move pin 23 through an arc, thus swinging the arm 21 and hence tilting the platform 3 on the housing.

The present invention is particularly concerned with the operation of the drive motors 16, 25. The motors are reversible to allow for movement of the housing and platform in forward and reverse directions. Limit switches 31 comprising contacts 31 mounted on the frame 14 and an earthed brush 49 (not shown in Figure 1) mounted on the base 11, allow for control of the angular movement of the housing 2.

The control system will be further described with reference to Figures 2 and 3.

The electronic circuitry is housed in compartment 6. The circuitry comprises a transformer/regulator 40 for connection of an external A.C. power supply via a

suitable socket 41. Alternatively power is fed from a 6 volt battery 42 housed in compartment 5. An L.E.D. 53 indicates when the power is on. Power is fed to a transistor switch 43 controlled by an oscillator 45 in the form of an astable multivibrator whose frequency or switching speed is controlled by a variable resistor 46. The oscillator switches transistor 44 on an off rapidly, thus controlling the supply of power to a manual/auto switch 47. The switching of the oscillator 45 is varied to control the length of time the transistor switch 43 is on, and hence the period for which power is supplied to the motors 16, 25. In this way the panning speed can be controlled efficiently without any waste of power, as occurs when the DC supply voltage is stepped down to reduce the continuous motor speed. By using an oscillator switching rapidly (typically from 50 to 150 HZ) the stop/start operation of the motor is not perceptible to the user.

Two control modes are provided, manual and automatic. In the manual mode control is via four switches 48 (forward and reverse for each motor) controlling drive circuits 49, 50 for each motor 16, 25.

The auto mode provides for automatic drive of the horizontal panning motor 16 only. A scanning control circuit 51 receives power via switch 47, and control information from selector switches 52 for selecting the angle of scan and limit switches 31 which indicate the extent of rotation of the housing 2. The selector switches 52 provide for three settings 60 degrees (+ or - 30 degrees from the mid point), 120 degrees and 180 degrees.

Figure 3, shows the electronic circuitry excluding the voltage regulator 40. The oscillator 45 comprises a standard configuration an astable multivibrator comprising PNP transistors TR1, TR2 whose "off" period is determined respectively by R1 C1 and R2 C2. Resistor R1 incorporates a variable resistor VR. Transistor switch 43 (TR3) acts as a buffer and switch for supplying power to the manual/auto switch 47. When transistor TR1 is saturated (on), transistor TR3 is saturated, transistor TR2 being off and vice versa. Variable resistor R1 is used to control the period for which

transistor TR1 is off; and hence the period for which there is no power supply to switch 47. By lengthening the 'off' period for TR1, the speed of the motors is reduced. The values of the resistors and capacitors is chosen to give a cycle frequency of from 50 to 150 HZ.

In switch 48, contacts A and B control the horizontal movement motor 16 and contacts C and D motor 25 for movement in the vertical plane. The switch may allow for simultaneous connection to one each of switch contacts A, B and C, D for simultaneous horizontal and vertical panning.

When contact A is selected, TR6 is turned on, and turns TR5, TR7 and TR8 on to deliver current to the motor through TR5 and TR6.

When contact B is selected, transitor TR9 is on and turns on TR4, which causes current to be supplied to the motor in the reverse direction.

Motor 25 is driven in the same manner through contacts C and D and transistors TR12 to TR17.

In the automatic horizontal panning mode (set by switch 47) tranistors TR10, TR11 act as two switches which respectively turn on transistors TR6, TR9 to

control motor 16 as before. TR10 and TR11 are controlled by SCR1 and SCR2 respectively. When SCR1 is on, the base current from TR10 routes through R1 , SCR1 and TR18 to ground, turning on TR6. SCR1 remains on until a reset signal is received from an angle sensing contact 31 through transistor TR18, TR18 being turned off. At this time capacitor C3 couples the high voltage anode of SCR1 to SCR2 to turn it on, thus turning on TR11 and rotating the motor 16 in the reverse direction. SCR2 remains in this state until a reset signal is applied through TR19 from sensor 31, capacitor C5 serving to turn on SCR1.

Switch 52 is used to set the required angular range, a contact 31a, b, c being ground by brush 49 to indicate that the end of the range has been reached.

Various modifications may be made to the described embodiment and it desired to include all such modifications as fall with the scope of the accompanying claims. For example, the oscillator controlled switches 43, 45 may be arranged to only reduce the voltage level to a level above zero so that there is continuous drive to the motors, the supply voltage fluctuating.

CLAIMS

1. A camera panner having a base, a housing mounted on the base for rotation about a first axis, a camera support mounted on the housing for rotation about a second axis, and first and second drive means associated respectively with the housing and the support for rotating the housing and support, wherein said drive means each comprise a DC motor and speed control means is provided for supplying a variable pulsed DC power supply to at least one of said motors to drive the motor at a variable speed.

2. A panner as claimed in claim 1, wherein the DC motor drives the respective housing or support via worm/wormwheel gearing.

3. A panner as claimed in claim 1 or 2, wherein the platform comprises an arm extending within the housing, the second drive means reciprocating the arm to rotate the platform.

4. A panner as claimed in claim 1, 2 or 3, wherein said speed control means comprises an electrode switch controlled by an oscillator, said switch controlling the DC supply to the motor.

5. A panner as claimed in claim 4, wherein said oscillator is an astable multivibrator.

6. A panner as claimed in claim 5, wherein said astable multivibrator includes a variable RC circuit.

7. A panner as claimed in claim 4, 5 or 6, wherein said switch turns the DC supply to the motor on and off.

8. A panner as claimed in claim 7, wherein the duration of a pulse during which the switch is on is variable.

9. A panner as claimed in any one of claims 1 to 8, wherein the power supply is pulsed at a rate of from about 50 to 150 HZ.

10. A panner substantially as hereinbefore described with reference to the accompanying drawings.

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