

Description

Brake Device for a Drive Machine of an Elevator

5 The invention relates to a brake device for a drive machine of an elevator, comprising brake arms which are supported in swiveling manner on a bearing pedestal and have brake shoes which act on a brake drum, the brake arms being guided at their free ends by means of a fixed guide
10 element and pressed against by compression springs acting in the direction of the guide element, magnets being provided which act in opposition to the compression springs to release the brake shoes.

15 From patent specification EP 0 603 644 a brake device has become known with a brake drum which is fastened to a traction sheave and against which brake shoes held in swiveling manner on brake arms rest. The brake arms are arranged at one end to pivot on axles. At the other end, a
20 tie rod is provided which passes through the brake arms, a compression spring being arranged at each end of the tie rod. The compression spring presses at one end against an end stop of the tie rod, and at the other end against the brake arm. The end stop can be moved by means of an
25 adjusting screw, causing the brake shoe to be pressed to a greater or lesser degree against the brake drum. An actuating bolt passes through the free end of each brake arm. Both actuating bolts are acted on by a force originating in each case from a magnet, and acting in
30 opposition to the spring force of the compression springs, so that the brake shoes are raised from the brake drum.

A disadvantage of the known device is that with brake devices for larger drive machines, the transmission of large braking forces onto the brake drum is not possible without additional measures, for reasons of material deformation. Furthermore, monitoring the position of the brake shoes requires substantial outlay.

It is here that the invention sets out to provide a remedy. The invention as characterized in Claim 1 provides a solution to avoiding the disadvantages of the known invention and creating a brake device with which larger drive units can be reliably braked.

The advantages achieved by the invention are mainly to be seen in that with a simple construction of the brake device, and of the bearing pedestal supporting the brake device, a rigid brake device can be made with which, especially, greater braking forces can be transmitted onto the brake drum without problem. Furthermore, the stability of form, and the function, of the brake release system can be improved at the same time as the material outlay and weight are reduced. With the device according to the invention, the accuracy of the instant at which the brake is released can be improved, which again has a positive effect on the ride comfort of the elevator car. Arranging the sensors to monitor the brake arms, and wiring the brake magnets, is possible without great outlay.

The invention is explained in greater detail below by reference to drawings of an exemplary embodiment.

The drawings show:

Fig. 1 A drive machine with the brake device according to
5 the invention; and

Fig. 2 Details of the brake device.

Fig. 1 shows a gearless drive machine 1 with a motor 2
10 which consists of a stator and rotor and drives a traction
sheave 3. Guided over the traction sheave 3 and a return
pulley 4 are ropes (not shown) which support and drive an
elevator car (not shown) and a counterweight (not shown).
The traction sheave 3 is held on a motor shaft 2.1 which
15 at one end is supported in a bearing endplate (not shown)
and at the other end in a bearing pedestal 5. Motor 2,
endplate, bearing pedestal 5, and return pulley 4 are
supported by a machine support structure 6.

20 The drive machine includes a brake device 7 with a first
brake arm 8 and a second brake arm 9, on each of which is
arranged a brake shoe which acts on a brake drum (not
shown). The brake drum takes the form of, for example, a
collar of the traction sheave 3. The brake arms 8,9 are
25 held below in pivoting manner on the bearing pedestal 5,
and above they are guided on a rod 10. The rod 10, which
serves as a guide element, is arranged centrally on a
support 11 fastened to the bearing pedestal 5. To actuate
the brake shoes, a compression spring 12,13 is provided on
30 each brake arm 8,9. To release the brake shoes, each brake
arm 8,9 is provided with a magnet which acts in opposition

to the compression spring. The magnets are arranged on a frame 14 which is fastened to the bearing pedestal 5.

A guard 15 covers the ropes between the traction sheave 3 and the return pulley 4. A further guard (not shown) behind the drive machine 1 covers the ropes between the traction sheave 3 and the machine support structure 6. To cool the drive unit 1, a ventilating fan 16 is provided. A terminal box 17 serves as interface for power supply cables and as interface for control wiring.

For emergency operation of the elevator a hand drive 18 is provided, which can be connected to the motor shaft 2.1 without tools. A cover plate 19 of the bearing pedestal 5 has an opening 20 through which the hand drive 18 can be connected to the motor drive 2.1. The hand drive 18 can be driven by means of a handwheel 18.1. In an emergency the elevator car is moved manually, in either an upward or downward direction depending on the load, to the next stop and the passengers evacuated. By actuating the handwheel 18.1, and simultaneously releasing the brake shoes by means of a brake release lever 21, the motor shaft 2.1 is moved manually, thereby lowering or raising the elevator car. The brake release lever 21 consists of a yoke 22 with a first claw 23, and of a handle 24 with a second claw 25, the yoke 22 being fastened by a swiveling joint 26 to the handle 24. To release the brake shoes, or specifically the brake arms 8,9, the brake release lever 21 is placed on the rod 10 and the handle 24 moved forward, as a result of which a force opposed to the spring force of the

compression springs 12,13 acts by means of the claws 23,25 on the brake arms 8,9 and releases the brake shoes.

Fig. 2 shows the construction of the brake device 7. The
5 brake arms 8,9 are arranged at one end to pivot on lever axles 49,50, the lever axles 49,50 being fastened to the bearing pedestal 5. Arranged on each brake arm 8,9 to pivot on a shoe axle 53,54 is a brake shoe 51,52 which acts on the brake drum. Each brake arm 8,9 is guided at
10 its other end by means of a rod 10, which is fastened to the holder 11 of the bearing pedestal 5. The compression springs 12, 13, which act in the direction of the rod's axis, press the rod ends of the arms in the direction of the holder 11, causing the brake shoes 51,52 to brake the
15 brake drum and/or hold it fast. At the guided end of the arm, each brake arm 8,9 has a wider part 55,56 which serves as a bearing surface for a disk armature 57,58. The disk armature 57,58 is pulled by the magnetic force of an electromagnet 59,60 against the spring force of the
20 compression spring 12,13, causing the brake shoe 51,52 to be raised from the brake drum, and the brake to be released. The electromagnet 59,60 is arranged on a magnet carrier 61,62. Together with stabilizers 63,64, the magnet carriers 61,62 form the frame 14, the magnet carriers
25 61,62 being immovably fastened on their underside to the bearing pedestal 5. The rigid frame 14 absorbs the forces which arise when the brake is released. Arranged on the inner side of each magnet carrier 61,62 with fastening angles 66 is a microswitch 65. A plunger 67 of the
30 microswitch 65 is actuated by a cam 68 arranged on the disk armature 57. The switching status of the microswitch

65 indicates to the control of the elevator whether the brake is activated or released. Instead of the microswitch 65, other sensors, for example proximity switches, can be used. The inner side of the magnet carrier 61, 62 is
5 covered by means of a cover 70 fastened to the magnet carrier 61,62 with a fastening plate 69, there being provided on the cover 70, which serves as a guard, recesses 71 for the plunger 67 of the microswitch 65 and for electric wires.

Patent Claims

1. Brake device for a drive machine (1) of an elevator,
comprising brake arms (8,9) which are supported in
5 swiveling manner on a bearing pedestal (5) supporting one
end of a motor shaft (2.1) and have brake shoes (51,52)
which act on a brake drum, the brake arms (8,9) being
guided at their free ends by means of a fixed guide element
(10), and pressed against by compression springs (12,13)
10 acting in the direction of the guide element (10), magnets
(59,60) being provided to release the brake shoes (51,52)
by acting in opposition to the compression springs (12,13),
characterized in that,
the magnets (59,60) are arranged on magnet carriers (61,62)
which together with stabilizers (63,64) form a box-like
frame (14) enclosing the upper end of the bearing pedestal
15 (5), whereas the magnet carriers (61,62) are immovably
fastened to the bearing pedestal (5).
2. Brake device according to Claim 1,
characterized in that
the magnets (59,60) are arranged on magnet carriers
20 (61,62) which together with stabilizers (63,64) form the
frame (14).
3. Brake device according to Claim 1 or 2,
characterized in that
25 the magnets (59,60) act on disk armatures (57,58) which
are arranged on the brake arms (8,9).
4. Brake device according to Claim 3,
characterized in that
30 arranged on the magnet carriers (61,62) are switches
(65) for monitoring the brake status which can be

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actuated by means of cams (68) of the disk armatures
(57,58).