No. 626,209. Patented May 30, 1899.

C. B. NICHOLS & C. A. ERDIN.

ELECTRIC FAN.

(Application filed Feb. 11, 1899.)

(No Model.)

Fig. 1.

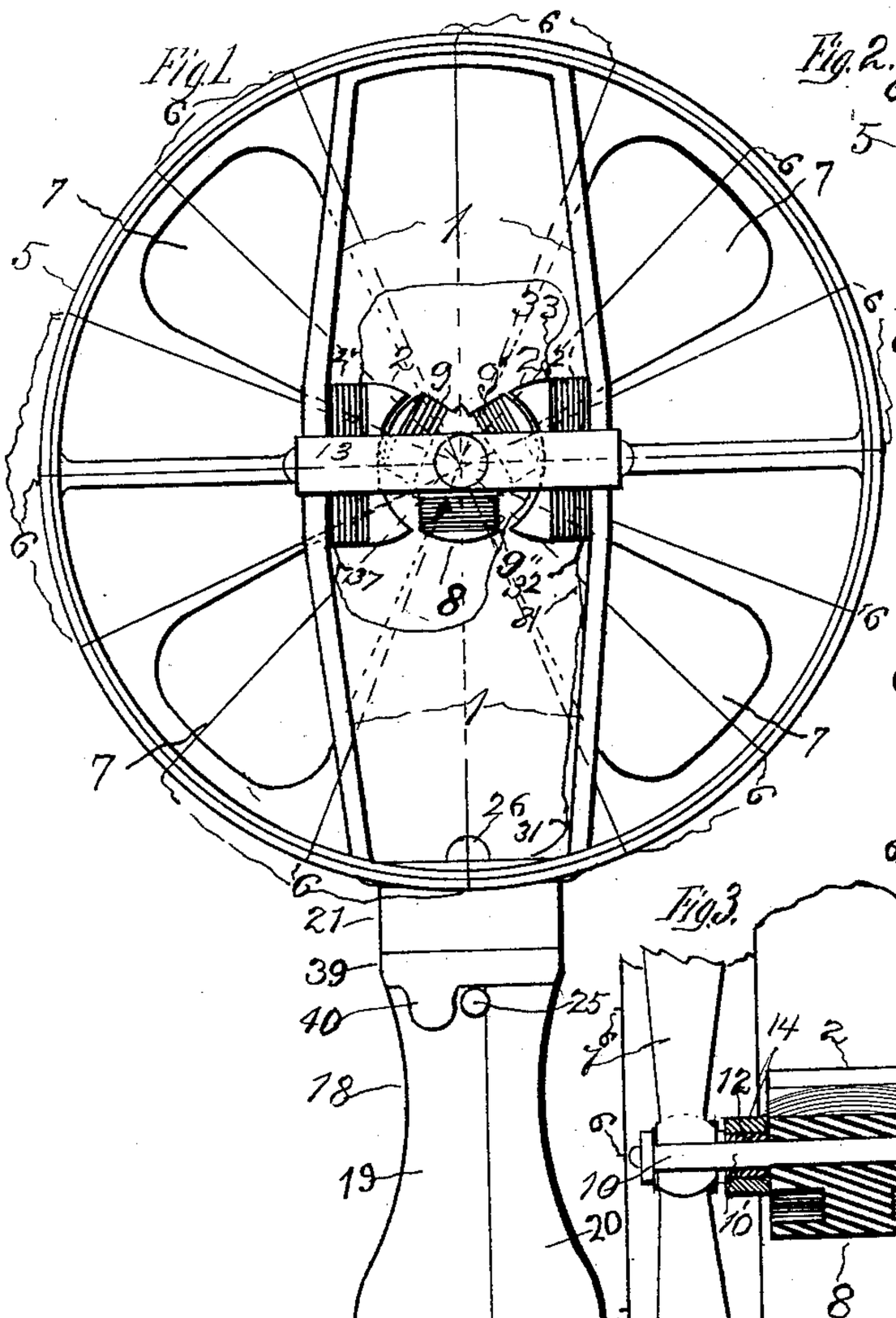


Fig. 2.

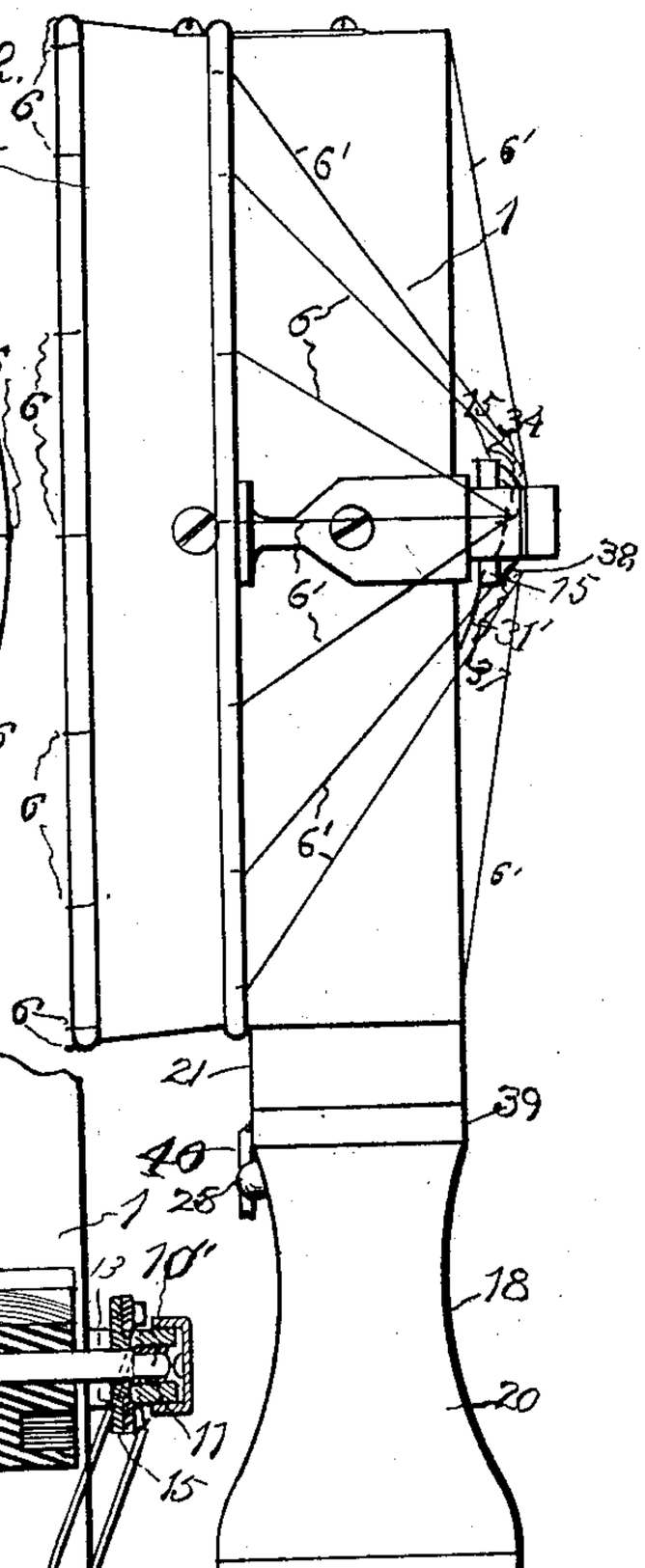


Fig. 3.

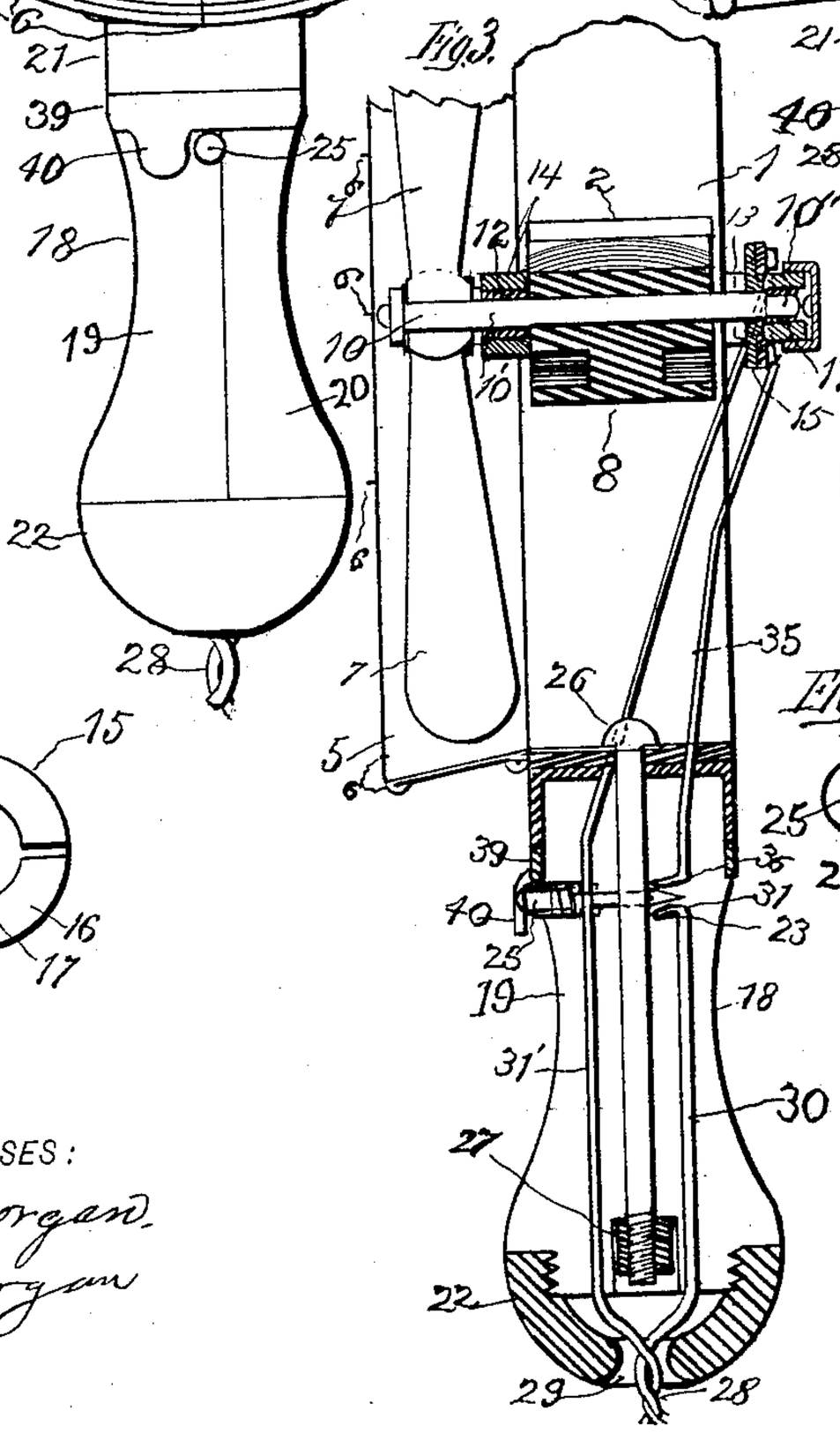


Fig. 4.

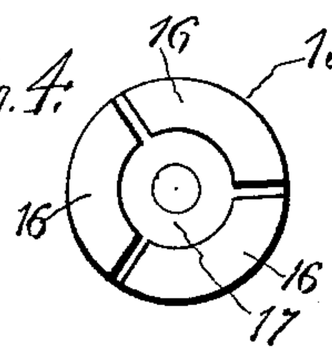
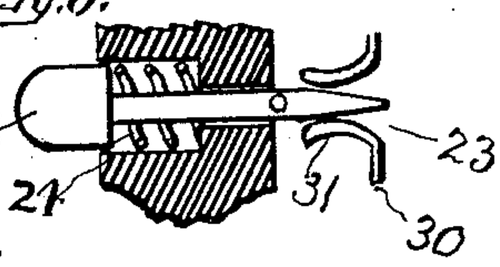


Fig. 5.



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ELECTRIC FAN.

SPECIFICATION forming part of Letters Patent No. 626,209, dated May 30, 1899.

Application filed February 11, 1899. Serial No. 705,262. (No model.)

To all whom it may concern:

Be it known that we, CHESTER B. NICHOLS and CHARLES A. ERDIN, citizens of the United States, residing at Philadelphia, Pennsylvania, have invented a new and useful Improvement in Fans for Ventilating, Cooling, and Drying Purposes, of which the following is a specification.

This invention relates to rotating fans propelled by an electric motor, and particularly to that class which are easily portable, and has for its object the making of said fans of such strong and light construction and so guarding the fans from injury that they may be used closely about the person without danger of entangling the hair or the clothing, and thus doing injury to either the fans or the person, and can be adjusted to stop automatically or to run continuously at the option of the user. Such fans are specially useful in hair-dressing establishments, to dry the hair and to cool the person, and in sick-chambers to promote the comfort of invalids. To effect these desiderata, this invention consists in a construction of combined motor-frame and fan-guards and of a handle containing an automatic-opening switch and means of adjusting the switch, arranged as hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 shows a front elevation of a fan embodying this invention; Fig. 2, a side view thereof; Fig. 3, a sectional partial elevation thereof. Fig. 4 shows a detached enlarged view of the commutator, and Fig. 5 a detached view of the switch.

Referring to the drawings, 1 represents the field-frame of the motor, and 2 the field-poles. The field-frame 1 is made of such length and form as to afford a firm bracing and support to a hoop or ring 5, forming the support of grills or screens 6 and 6′, which protect the fan 7, revolving in it, from contacting with any solid matter. In Fig. 1 the central parts of the fan 7 and of the grill 6 are drawn in dotted lines to permit a showing of the motor.

The armature 8, having helices 9, 9′, and 9″, rotates between the field-poles 2, with an arbor 10, having journals 10′ and 10″, turning in bearings 11 and 12, formed in cross-frames 13 and 14, attached to the field-frame 1, the field-poles 2 and the ring 5 securely bracing these several parts to each other in lateral direction.

15 is a commutator (shown enlarged in Fig. 4) secured to rotate with the arbor 10 and the armature 8 and having conducting-segments 16, secured to an insulating-disk 17. Each segment is electrically connected to one of the armature-helices. A handle 18, divided lengthwise, preferably, in two parts 19 and 20, united by a cup 21, attached to the field-frame 1, and by a screw-cap 22, contains a switch 23. (Shown enlarged in Fig. 5.) This is normally held open by the spring 24, but can be closed by pressure upon the button 25. A collar 39 is fitted to turn upon the handle 18 and provided with an ear or projection 40, arranged in one position so as to cover the button 25 and hold the switch 23 in continuously-closed position and in another to clear the button 25 and permit the spring 24 to react and open the switch when the pressure of the finger is relieved from the button 25. This provision enables the users at their option to make the fan either automatically stop when released or to run continuously.

The handle 18 is firmly secured to the field-frame 1 and cup 21 by a screw 26 and nut 27.

Electric current is supplied through a twin conductor 28 (such as a lamp-cord) from any source. The conductor 28 passes through the central aperture 29 in the cap 22. The two conducting-wires are separated inside the cap 22. One (marked 30) is attached to one spring 31 of the switch 23, and the other, 31′, with proper insulating-covering, is led through the handle 18, and inside of the frame 1 is connected to a brush 34, bearing on the commutator 15. A conductor 35 leads from the other spring 36 of the switch 23, with proper insulation inside of the frame 1, to the terminal 32 of the field-helix 2′. The other terminal 33 of this helix is connected electrically to one end of the opposite helix 2″, and the circuit is completed by a conductor 37, leading from the other end of the helix 9′ to the other brush 38, bearing on the commutator 15.

The grills or screens 6 and 6′ are preferably of fine wires strained tightly, so that they oppose the least obstruction to the air entering and leaving the fan 7. The fan 7 and the rims

5, as well as the frames 13 and 14, are preferably made of light material, such as aluminium. From their form they act as a firm bracing to support the grills 6 and 6′, which in turn are drawn tightly on the ring 5 and brace it. The only part of the frame subject to compressive strain is the field-frame. This to perform its magnetic functions must have weight and stiffness, excepting the ring, which from its form is light and strong and stiff when braced diametrically. The other parts are subject to only tensile stress and are efficient and light braces.

The entire structure utilizes the field-frame for the attachment and support of the handle 18 and the ring 5, and the frames 13 and 14 and grills 6 and 6′ thus all contribute to brace and strengthen each other and form as combined an extremely light and efficient fan. The convenience with which it can be started by pressure upon the button 25 by the same hand which holds the fan and stop automatically when released or adjusted to run continuously renders it a very efficient and serviceable fan for hair-dressers' and invalids' use.

Having described our invention, what we claim is—

1. A new article of manufacture, an electrically-operated hand-fan, embracing an electric motor and fan and protecting-grills, having a frame stiffened by the field-frame of the motor, and braced by the protecting-grills, in combination with a handle and switch, combined within the handle, arranged to operate substantially as set forth.

2. In a frame for an electrically-operated hand-fan, a field-magnet frame, a connected guard-ring, braced thereby against strains of compression, transverse bearing-frames arranged to brace said ring, and connected grills arranged to brace said ring by tension, and guard parts within the frame from intrusion of solids as and for the purpose set forth.

3. An electrically-operated hand-fan, an electric motor and fan and protecting-grills, having a frame stiffened by the field-frame of the motor, and braced by the protecting-grills, in combination with a handle, and a switch located in the handle, and means of adjusting said switch to open automatically, or remain continuously closed, and arranged to operate substantially as set forth.

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