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FOCKE - ACHGELIS ROTARY WING KITE

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FOCKE-ACHGELIS ROTARY WING KITE
(Division of Weser Flugzeugwerke)

BY

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Technical Industrial Intelligence Committee

FIELD INFORMATION AGENCY, TECHNICAL

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SUBJECT: Focke-Achgelis Fa-330 Rotary Wing Kite.

TARGET: Focke-Achgelis Flugzeugbau,
Division of Weser Flugzeugwerke,
Hoykenkamp (near Delmenhorst), Germany

Coordinates: 577970

GENERAL: This plant previously manufactured Focke-Achgelis helicopters, the last of which, type FR-223, was reported made in 1942. As the FR-223 is believed to be generally known and this plant did not engage in any designing activities, that model was not investigated by this team.

In September 1944, this plant became a manufacturing division of Weser Flugzeugwerke, whose head offices are in the Lloyd Building, Bremen. This company proceeded to produce FW-190 fuselages, including the installation of some parts such as the electrical and oxygen systems. They also produced about 200 complete one man, rotating wing kites for use as observation platforms to be towed from submarines. The engineering of these projects was carried on at the Laupheim offices of Focke-Achgelis, Weser Flugzeugwerke being only the manufacturing contractor. No drawings of importance were found at this Hoykenkamp factory at this date (July 6, 1945), as it had been looted and overrun by refugees released from a large nearby camp.

In the final assembly building, three rather complete kites were found in shipping boxes. Upon request, one was assembled and its manufacture and operation explained by Mr. Fritz Klunner, plant Superintendent, and the few shop men remaining. Assembly, disassembly and boxing of this kite was quite rapid--a matter of a few minutes--and the best remaining sample was boxed and tagged for shipment to the C.I.O.S. Secretariat, London, through the British 21st Army Headquarters Air Intelligence Office at Bad Eilsen, this plant being British occupied territory. The sample chosen is a composite of the best of the remaining parts of a late model, and appears in good working order with the exception of one small break in the trailing

edge of one rotor blade. It is understood that additional examples of these kites have been recovered from captured submarines, but it is not known if their blades are the small or the large span models, the latter (the latest) being described below.

DESCRIPTION: The Fa-330 is a three-bladed rotating wing type kite operating on the autogiro principle. Its purpose is to provide an elevated observation platform for one man. The example inspected was made for towing from a submarine deck to which it is attached by a steel cable working from a winch on the submarine.

As seen from Fig. 1 to Fig. 4, the body consists of a single longitudinal steel tube or boom forming the main structural member to which all parts are attached. At the extreme front end is mounted a small instrument panel and, working rearward, at the nose of the boom are mounted the rudder pedals and control stick at conventional distances ahead of the pilot's seat. Out-rigger tubes support short oval section steel tubes on each side to serve as skids when landing on the sub's deck. Immediately behind the pilot's seat is a vertical tube which acts as pylon for the rotor whose blades rotate in a plane roughly two feet above the pilot's head. At the rear end of the boom are attached flat plate type fin with hinged rudder and a horizontal one-piece stabilizer. The vertical surfaces are detachable by simply pulling the fin's steel tube beam extensions out of tubular sockets welded onto the boom; the horizontal surface is pinned through matching lugs.

The three rotor blades rotate freely about a vertical axis (offset from the center line of the pylon in a forward direction) about through the pilot's c.g. Lateral and longitudinal control is achieved through tilting the rotor disc by means of linkages to the pilot's control column. (See Fig. 4) An inverted tripod extending upward from the rotor hub supplies the anchor points for the inboard ends of cables supporting the blades from an attachment point about 25% of the span from the hub on each blade. Interblade cables between each blade in the plane of rotation were attached to the same blade

fittings and were slack enough to permit appreciable regression and progression of the blades about their vertical hinge. Such motion, however, is snubbed by a pancake-type friction dampener connected to each blade by a linkage of two hinged arms, as shown in Fig. 5. Upward angular travel of the rotor's root fitting about its horizontal hinge is limited by contact with a rubber block on the underside of each top tripod leg.

Attached to the rotor hub, directly below the root fittings, is a wheel with grooved periphery to receive a rope pull for starting rotation of the blades. Next below this wheel is an emergency release handle, easily accessible to the pilot, by means of which the blades and hub may be released to fly off free, the descent of the pilot and remainder of the machine being arrested by a parachute which is slung to the pylon and is automatically pulled open by the departing rotor. The pilot may then release his belt and allow the machine to drop away from him, and float to the water, apparently to be picked up by the sub after the emergency has passed.

In normal return to the sub, the winch winds in the towing cable, although the pilot may also disconnect this at will through a quick release at the nose. While aloft, he is also connected to the sub by a direct line telephone cable.

Each original rotor blade was 10 ft. 4 in. long (airfoil span) with constant chord of 12 in. In the later models, airfoil span was increased to 12 ft. 5 in., making the disc diameter about 28 ft. with inclusion of the blade root extension and hub fittings. The airfoil section appeared close to symmetrical with but slight excess of camber on the top nose surface as compared with the bottom. Each blade consisted of a single steel tube spar with wooden main ribs spaced 15 in. apart with two intermediate light plywood former ribs between each. In the nose, additional half ribs were inserted, making the spacing here $2\frac{1}{2}$ in. A thin plywood sheet covered the nose to the spar and extended rearward a few inches in a scalloped edge, longer between ribs than at the ribs, with the apparent intent to provide some spring support to reduce sag of the fabric covering between the ribs.

The tip of each blade was a single, formed metal cup fabricated from two halves of very light magnesium sheet welded with the bead smoothed outside. Samples of this welding flux and wire used are available. (Magnesium welding on thin sheets was carried on in this plant on a production basis.

Upon returning to the sub's deck and alighting on its outrigger skids, the rotation of the blades is slowed and stopped by means of a small hand brake below the rotor hub. For quick disassembly, the hinge pins of each rotor are pulled and cables disconnected at the small loop fitting on each blade. Tail surfaces are unlatched and pulled out. By unlatching the pylon at its base, pylon and pilot's seat hinge at the boom and fold back onto the boom to latched secured position. Outriggers fold laterally against the boom to result in a compact and narrow package for easy stowage through a hatch. Disassembly was not timed, but seems extremely short even with inexperienced men. Weight of the 24 ft. diameter model was 180 pounds complete without pilot.

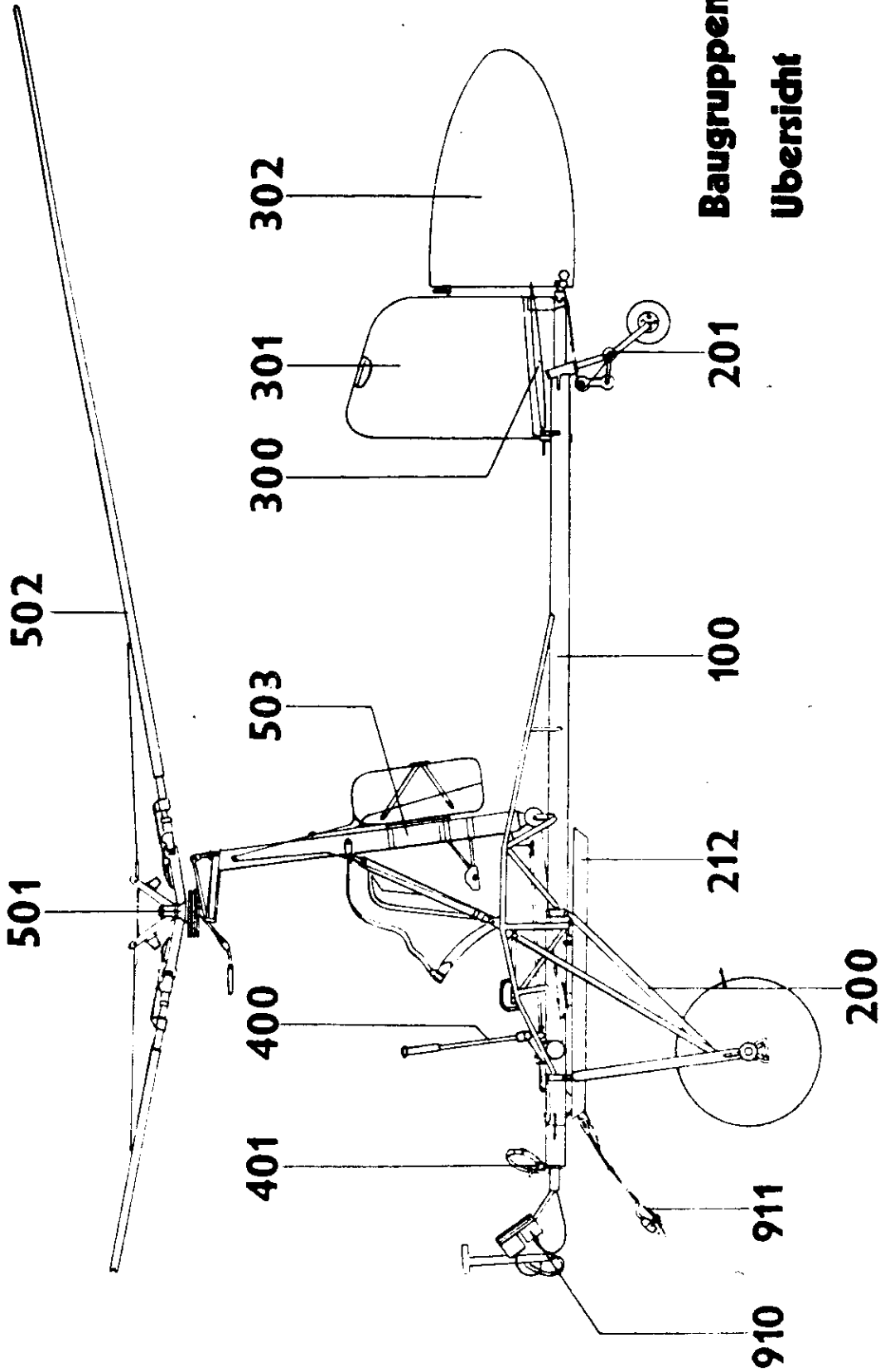
Although not viewed at this plant, specifications also showed a version of this kite with landing wheels. Such landing gear could apparently be added to the skid version by means of collars and clamps. (See Fig.1)

While this machine is small and embodies few, if any, inventive features, its attraction lies in the extreme simplicity of its design and execution.

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**Baugruppen-
Übersicht**

FIG. I FA-330

Unbefugte Verwendung ist strafbar und macht Schadensersatzpflichtig

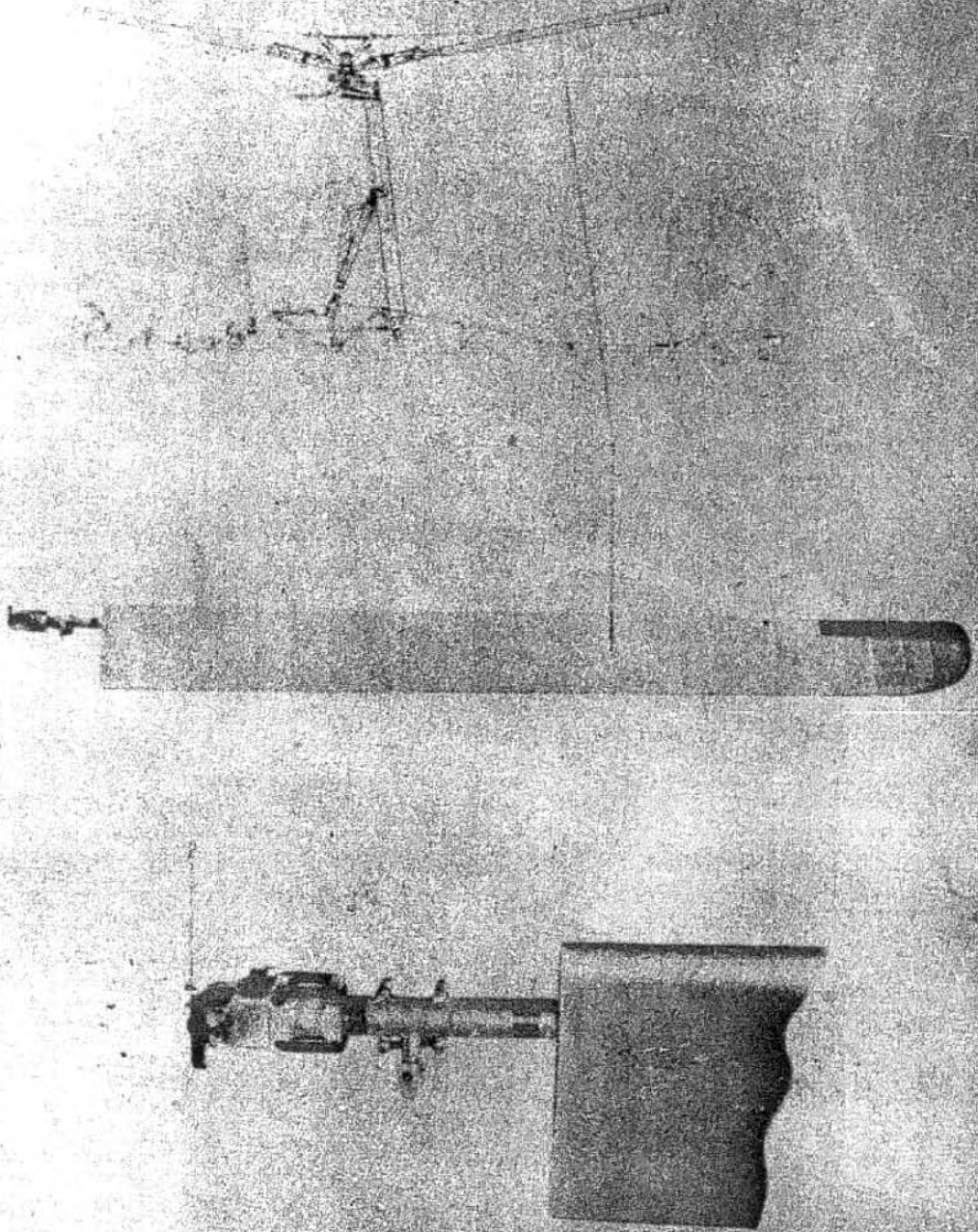
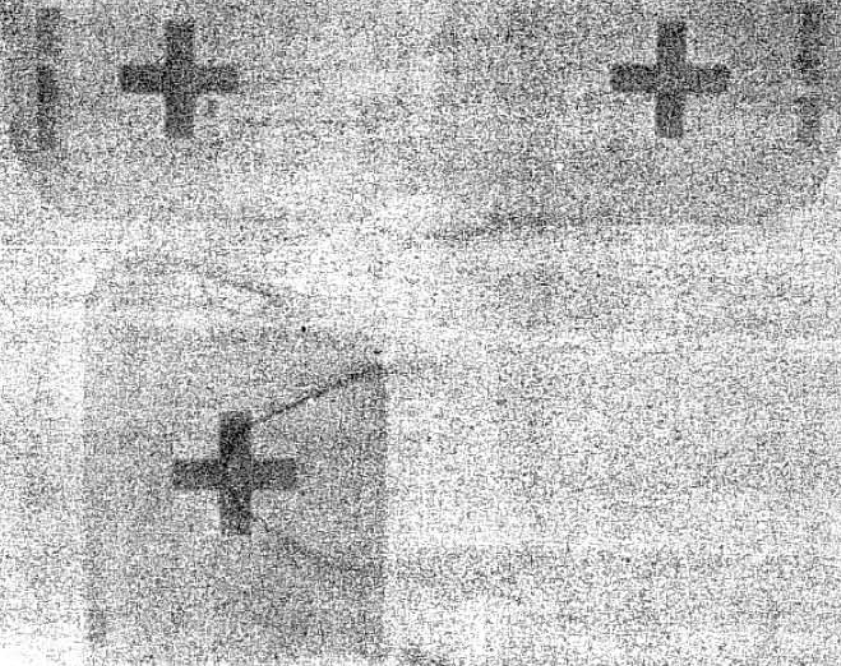


FIG 2 PA-339

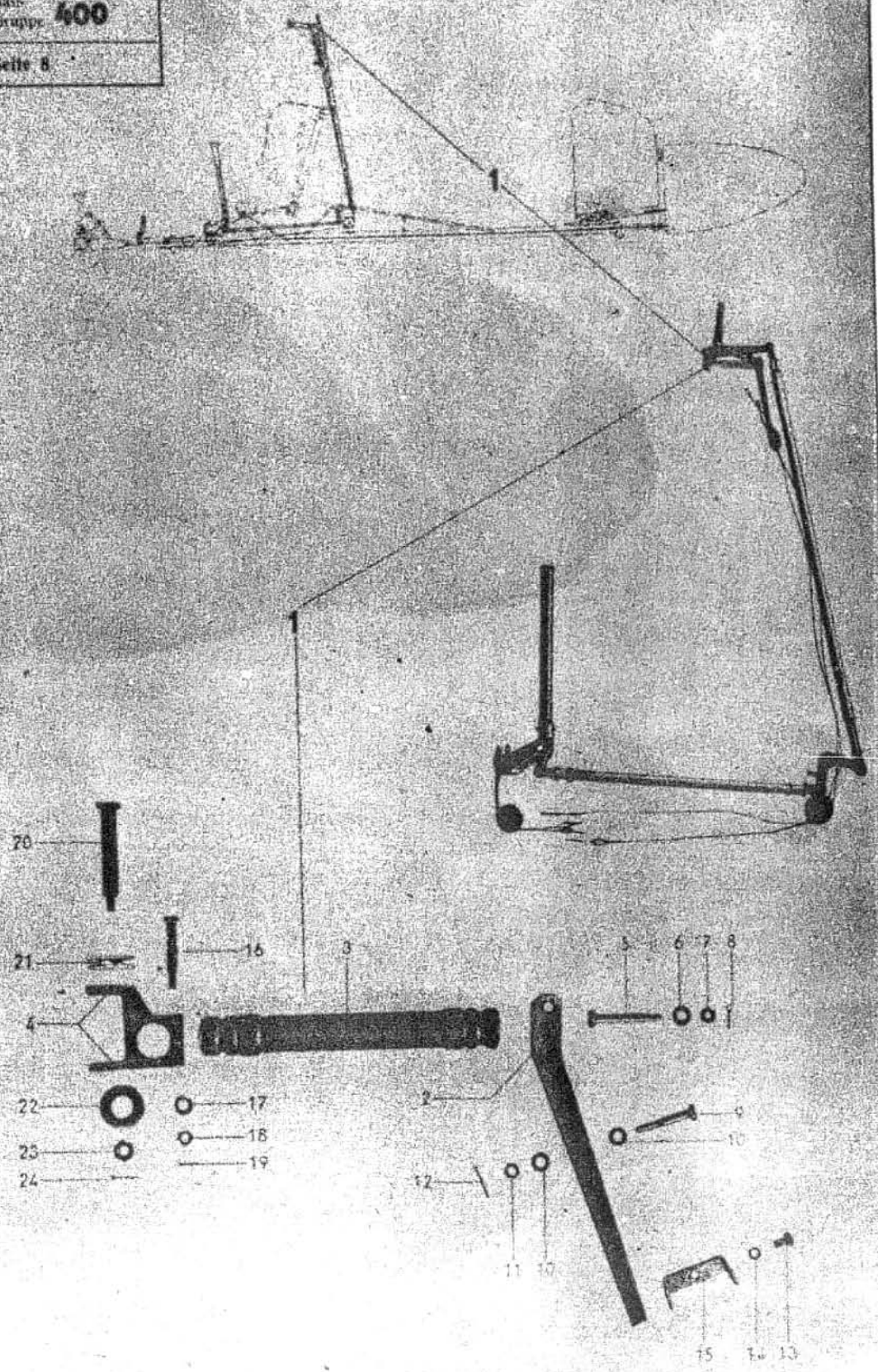
Unbefugte Verwendung ist strafbar und macht Schadenersatzpflichtig



Unbedingte Verwendung ist strafbar und macht schadenlosigkeits

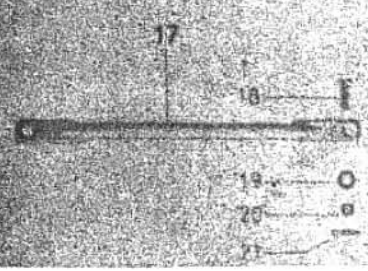
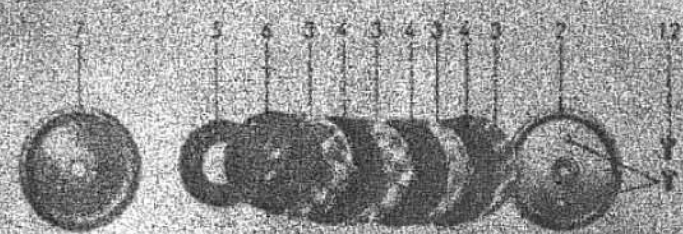
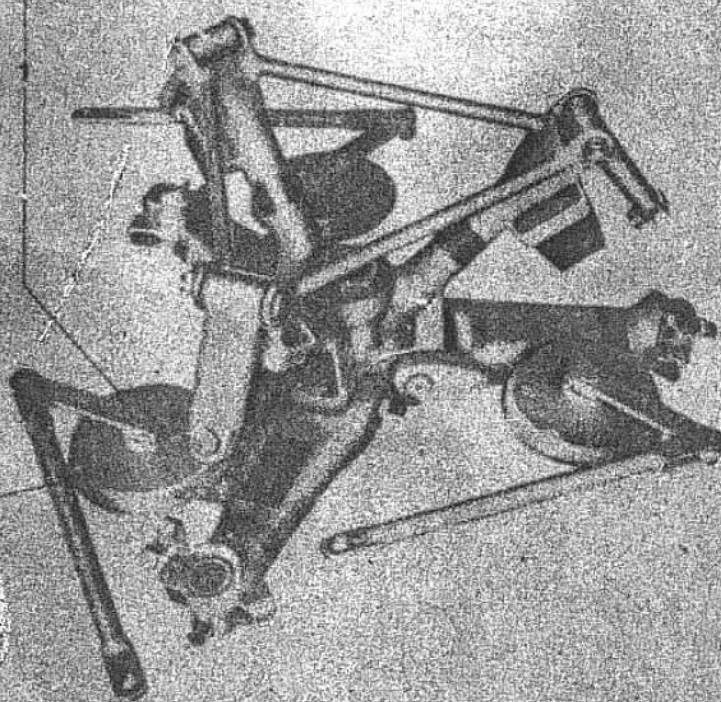
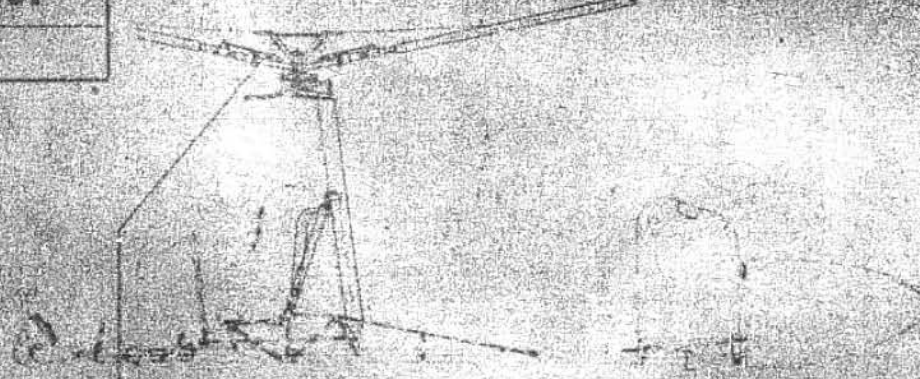
FA-33

FA-33

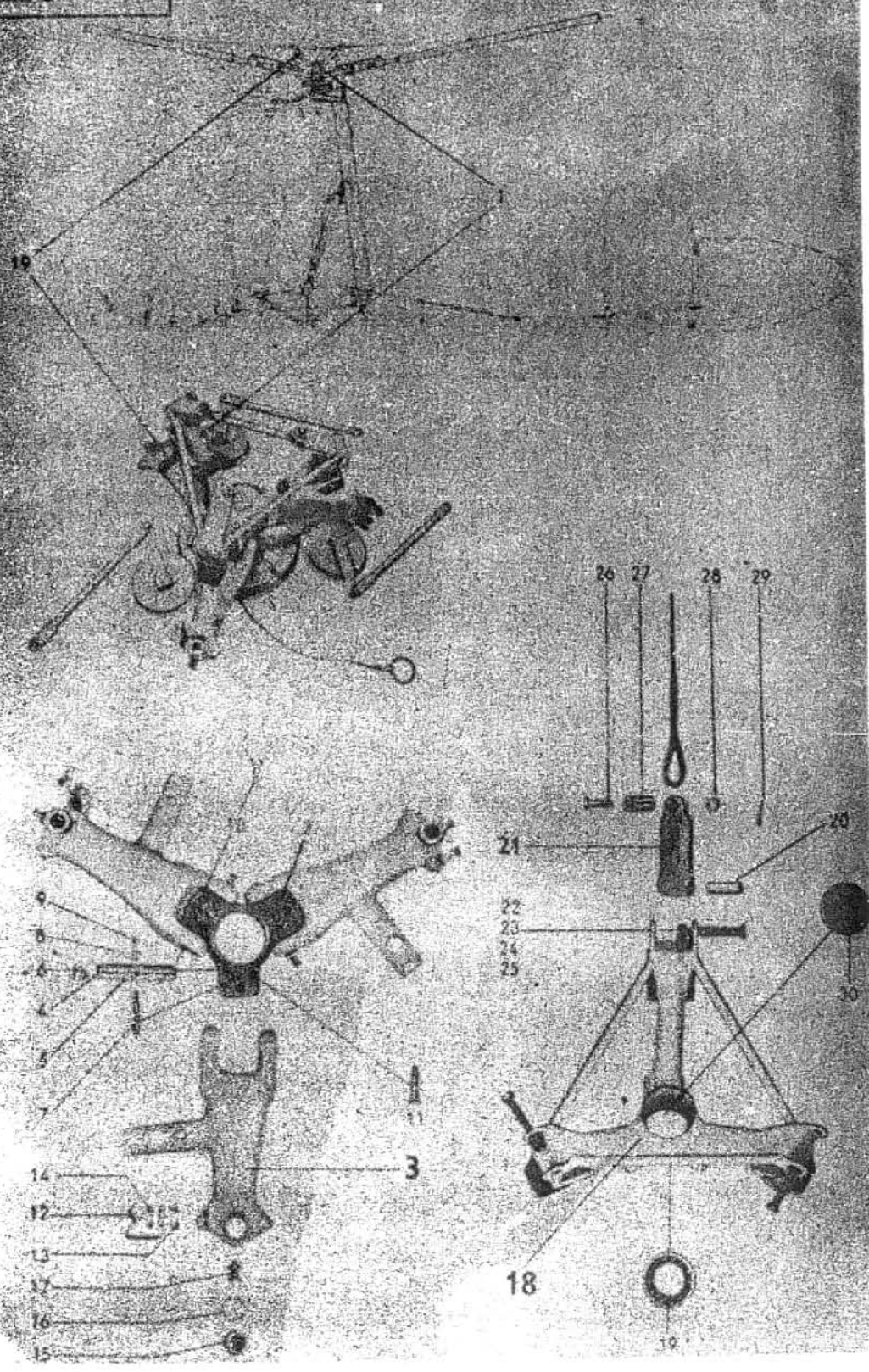


Unbefugte erwidung ist strafbar und macht schadenersatzpflichtig

FIG. 4 PA-530



Unbedingte Verwendung ist strafbar und macht schadenhaftig



Unabhängige Verwendbarkeit ist straffer und macht sich ausserordentlich