MANUFACTURING FACILITIES

FOR THE PRODUCTION OF

REDSTONE

AND

JUPITER

BALLISTIC MISSILES

OCTOBER, 1958

CHRYSLER CORPORATION
MISSILE DIVISION

FROM THE
FILES OF
C. W. WILLIAMS
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CHRYSLER CORPORATION MISSILE DIVISION

This is the vast Chrysler-operated Michigan Missile Plant near Detroit, Michigan. Under this roof, the skill and experience of thousands of men and women are devoted to a single ultimate purpose -- producing reliable ballistic missiles.

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To deliver completed, dependable missile weapons requires hundreds of proficient engineers. This photo reveals the engineering force responsible for product design (neg. 31538).

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This view shows the plant's Master Mechanic's Office, together with Planning and Plant Engineering personnel (neg. 31537).

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Up-to-date office equipment and efficient personnel are constantly on the job to keep this large operation functioning smoothly (neg. 31567).

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Modern equipment in the Materials Control Laboratory exemplifies the intricate mechanisms vital to this highly-specialized missile manufacturing facility (neg. 31529).

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Pictured here are some of the large force of toolmakers available to plant operations (neg. 31524).

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Important to the success of missile production is this group of inspectors in the large Receiving area. Here, incoming component parts are checked with precision instruments before acceptance (neg. 31527).

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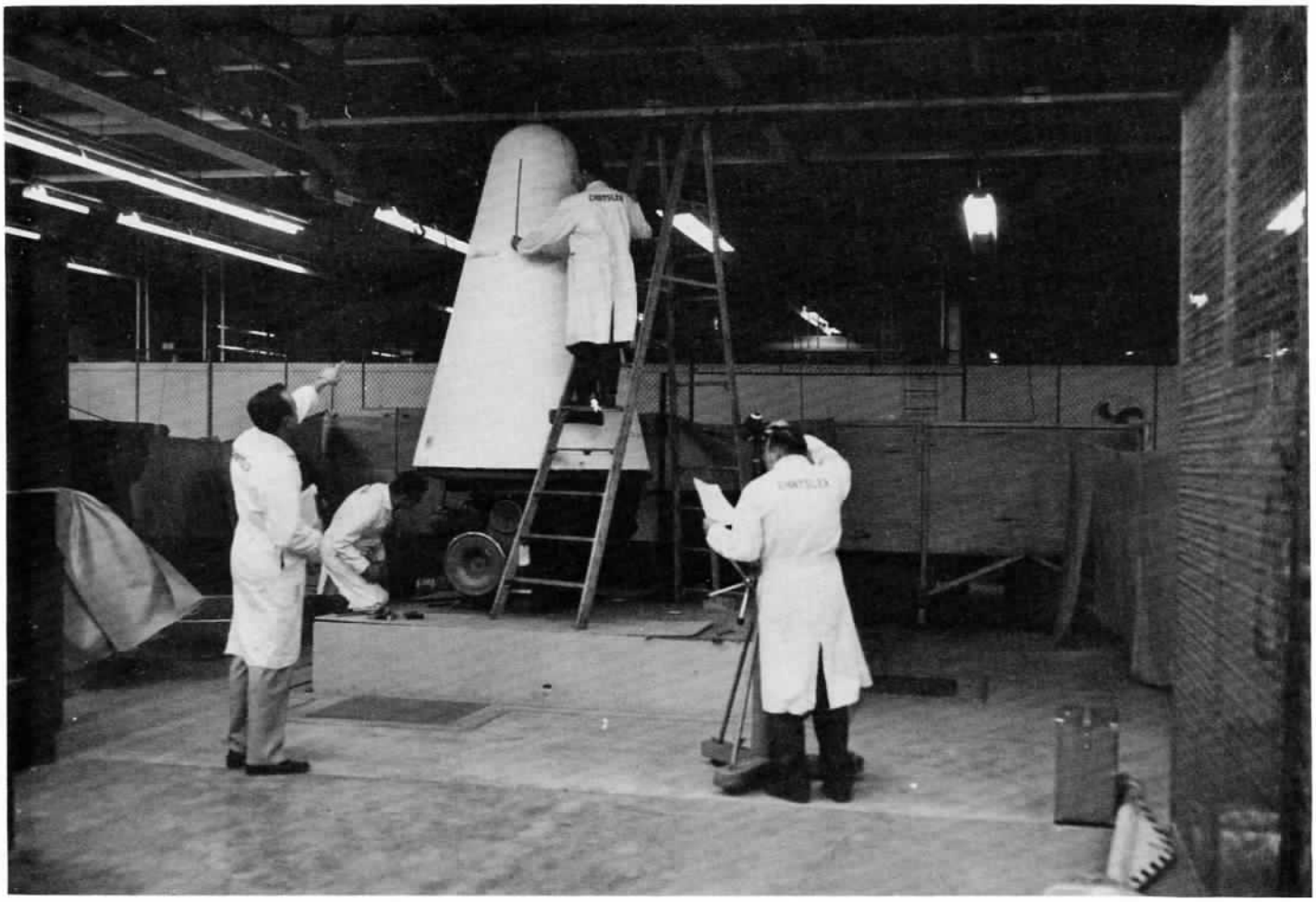

Prefabricated nose cones are inspected thoroughly by Receiving personnel (neg. 31526).

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Another example of Missile Division's special facilities is the X-ray Room. Complete testing of the missile's metal structure is conducted here (neg. 31500).

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Pneumatic systems of JUPITER are checked out in this facility in a solidly-built, completely-equipped, enclosed area (neg. 31523).

CHRYSLER CORPORATION MISSILE DIVISION

An important operation is the hydrostatic testing of every missile shell. With this special rig, each shell is checked for tightness under heavy water pressure (neg. 31577).

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Chrysler Missile Division has a well-equipped Machine Shop, complete with mills, drills, lathes, grinders, planers, and shapers. In the foreground are some of the various parts fabricated in the shop (neg. 31496).

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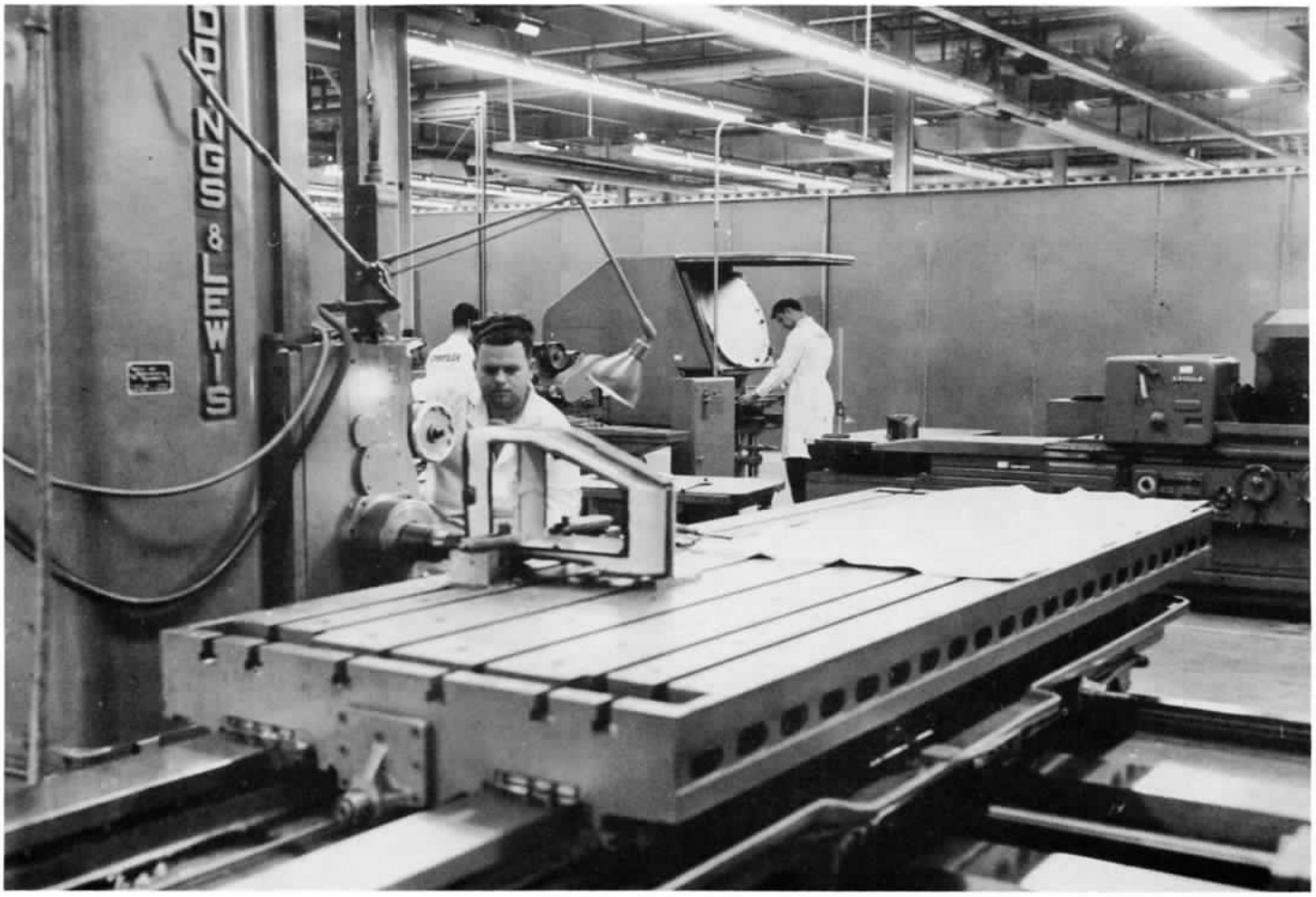

One of the outstanding machines is the large Giddings and Lewis milling machine, shown here working a valve box (neg. 31495).

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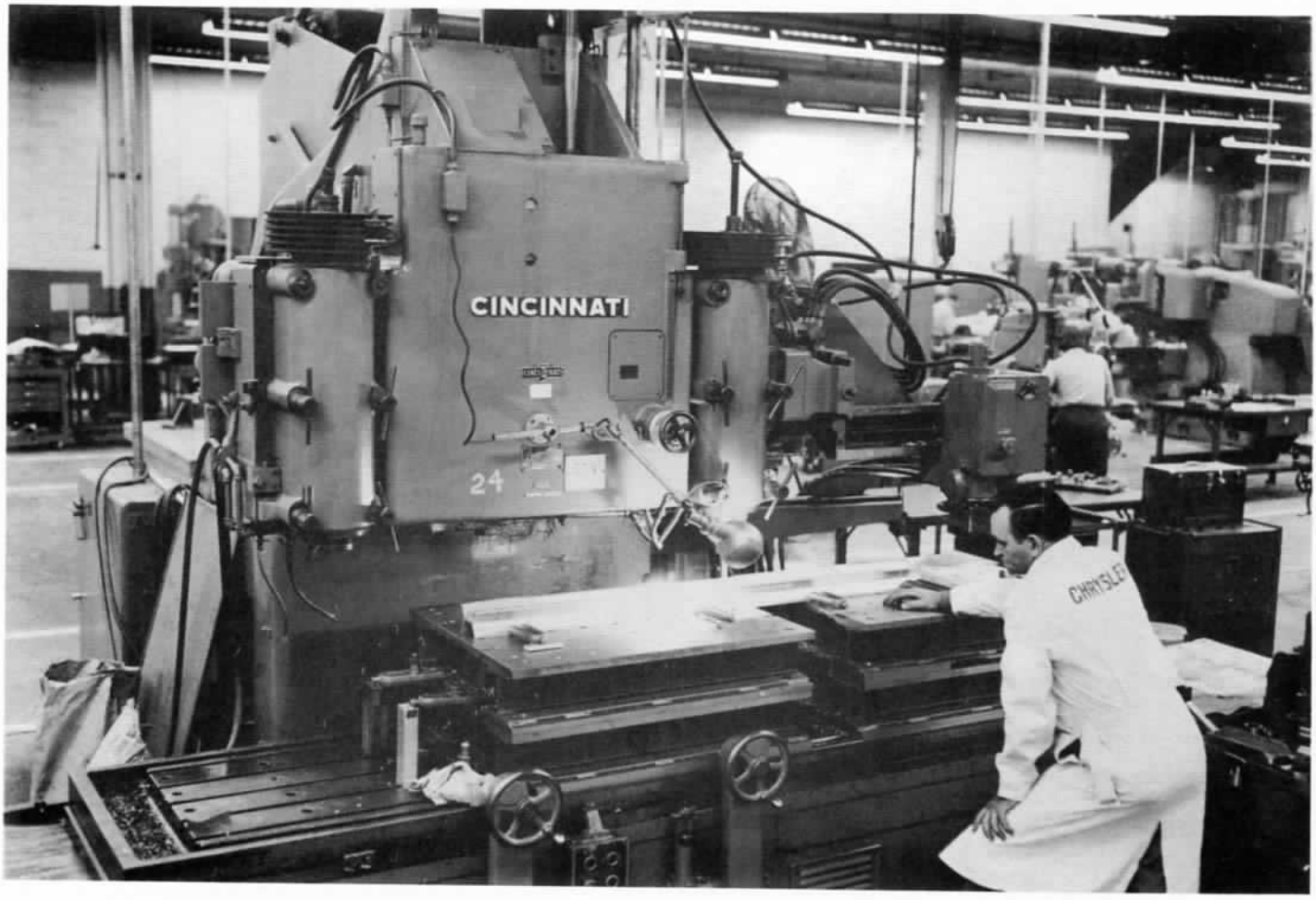

Another excellent machine tool is the Hydro-Tel, a profile mill which accurately follows a template (neg. 31584).

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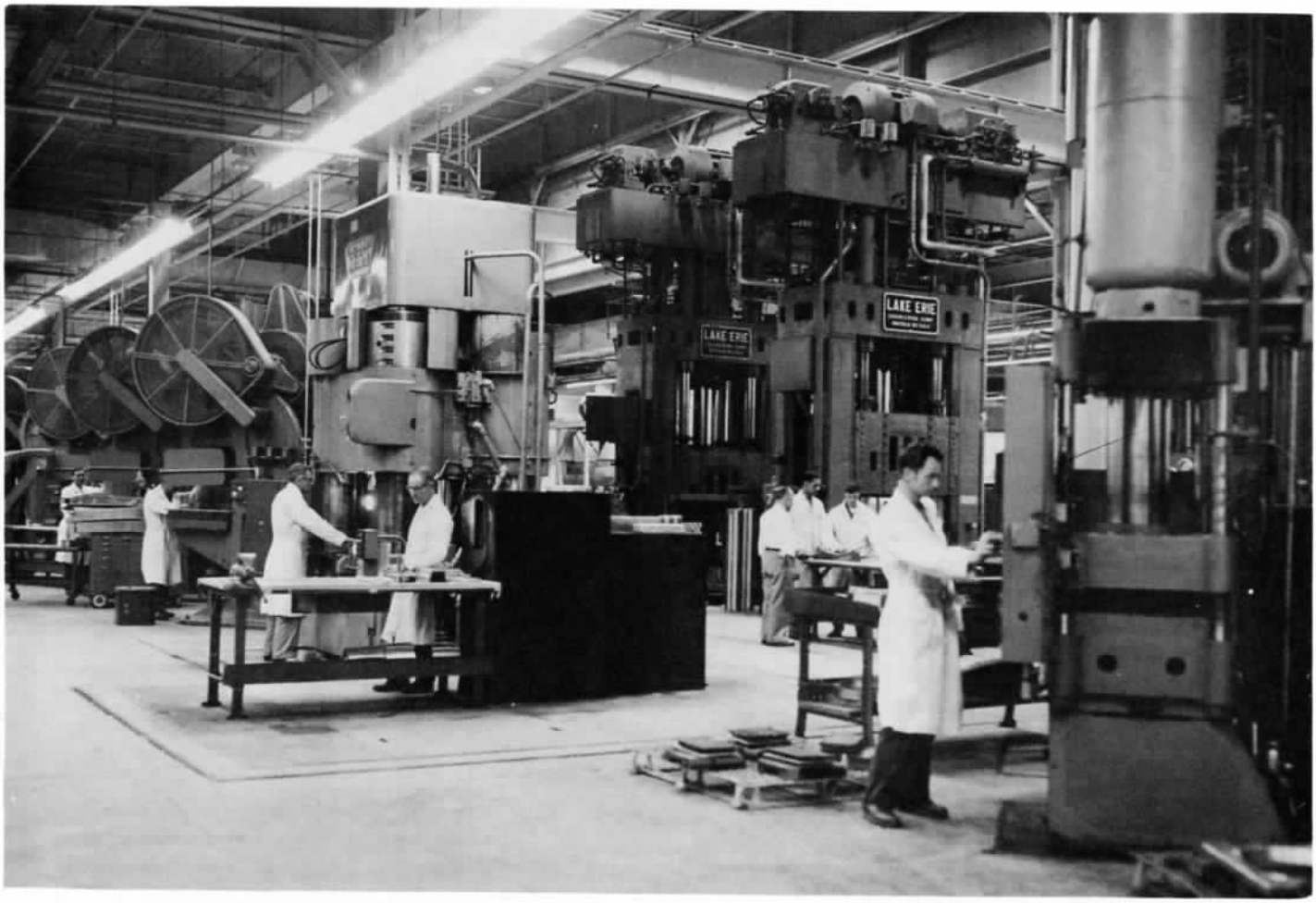

This view shows some of the huge presses available for parts work (neg. 31519).

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Here are a few of the many types of welding equipment at the Michigan Missile Plant (neg. 31521).

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This picture shows part of the large crew of sheet metal men who have hydraulic and drill presses, punches, shears, and hand formers at their disposal (neg. 31520).

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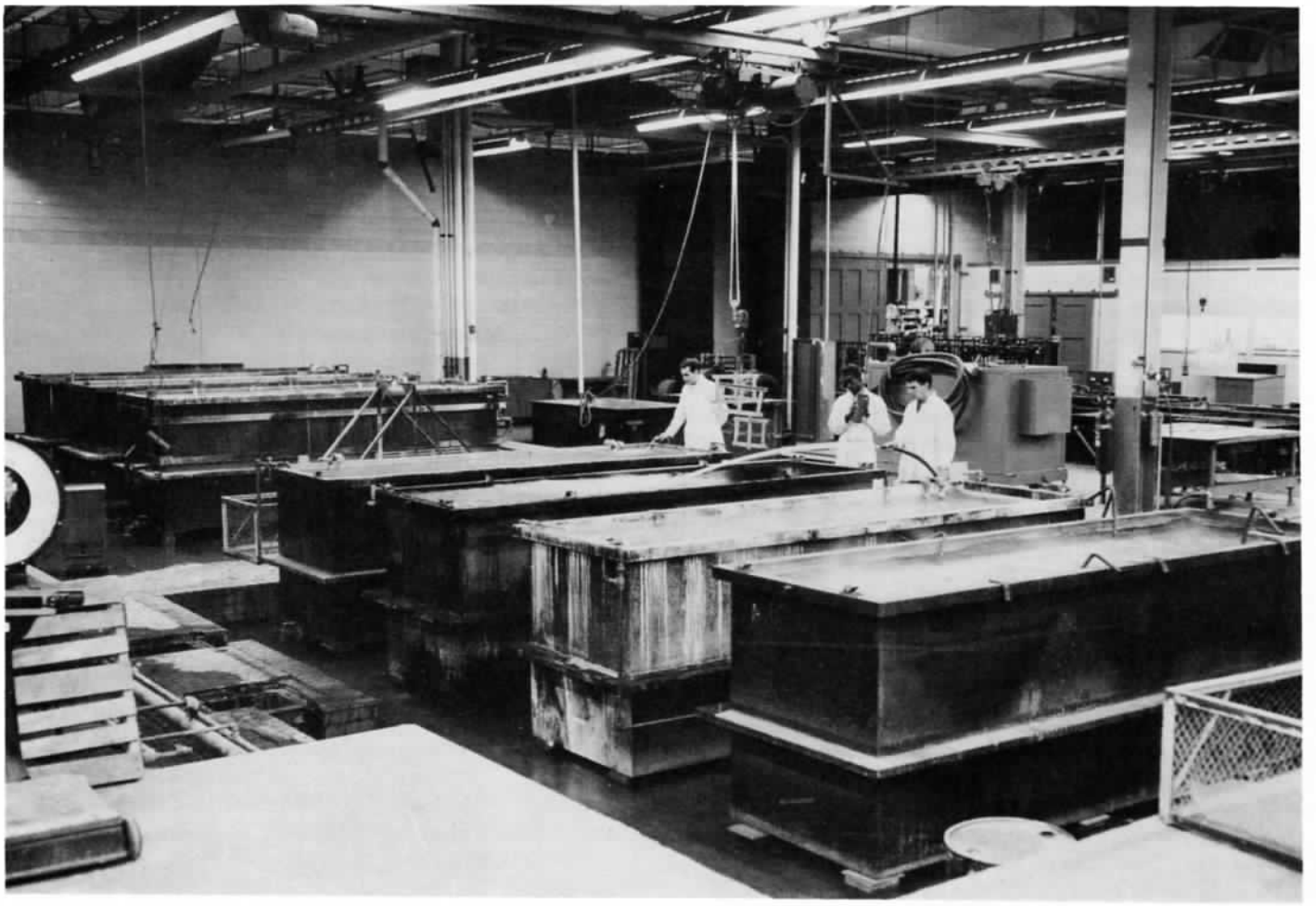

Most missile parts are plated or coated with a protective finish in this facility (neg. 31518).

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In addition to plating tanks, the plant has recently installed complete tank equipment for degreasing, as well as aluminum anodizing tanks (neg. 31570).

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Another tank-type treatment available is chemical milling. With this equipment, selective etching of aluminum is achieved, as shown by this sample part (neg. 31552).

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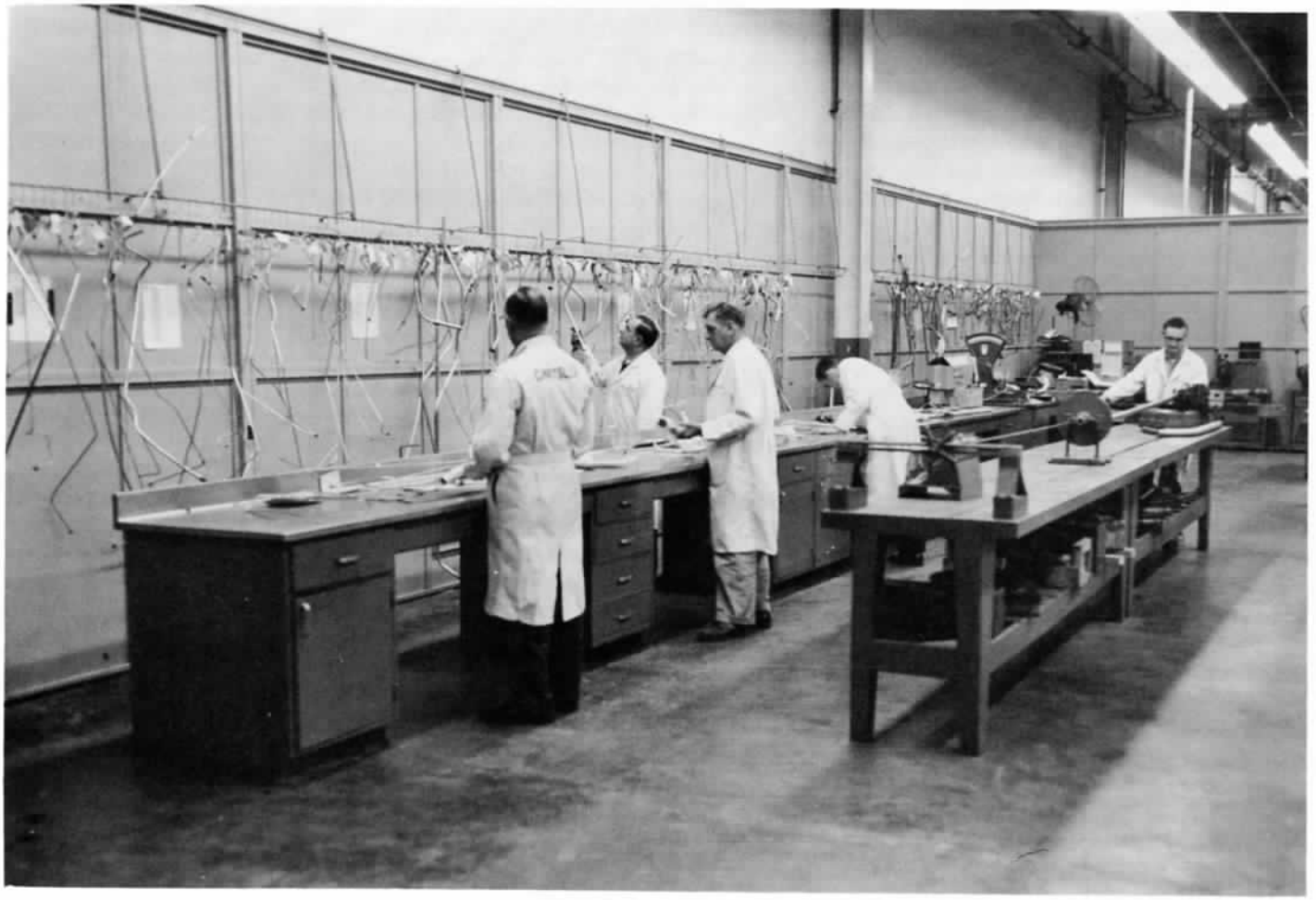

This department contains bending, forming, and other necessary equipment for fabricating all tubing for the missiles (neg. 31553).

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In the Electrical Fabrication area, hundreds more skilled technicians are available for handling electrical sub-assemblies (neg. 31548).

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Here is a representative group of assemblies completed by Electrical Fabrication personnel (neg. 31549).

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This area, fully equipped with test instruments, checks out the electrical assemblies before they are installed as missile components (neg. 31550).

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Another part of the Electrical Fabrication area is the cable fabrication group pictured here (neg. 31551).

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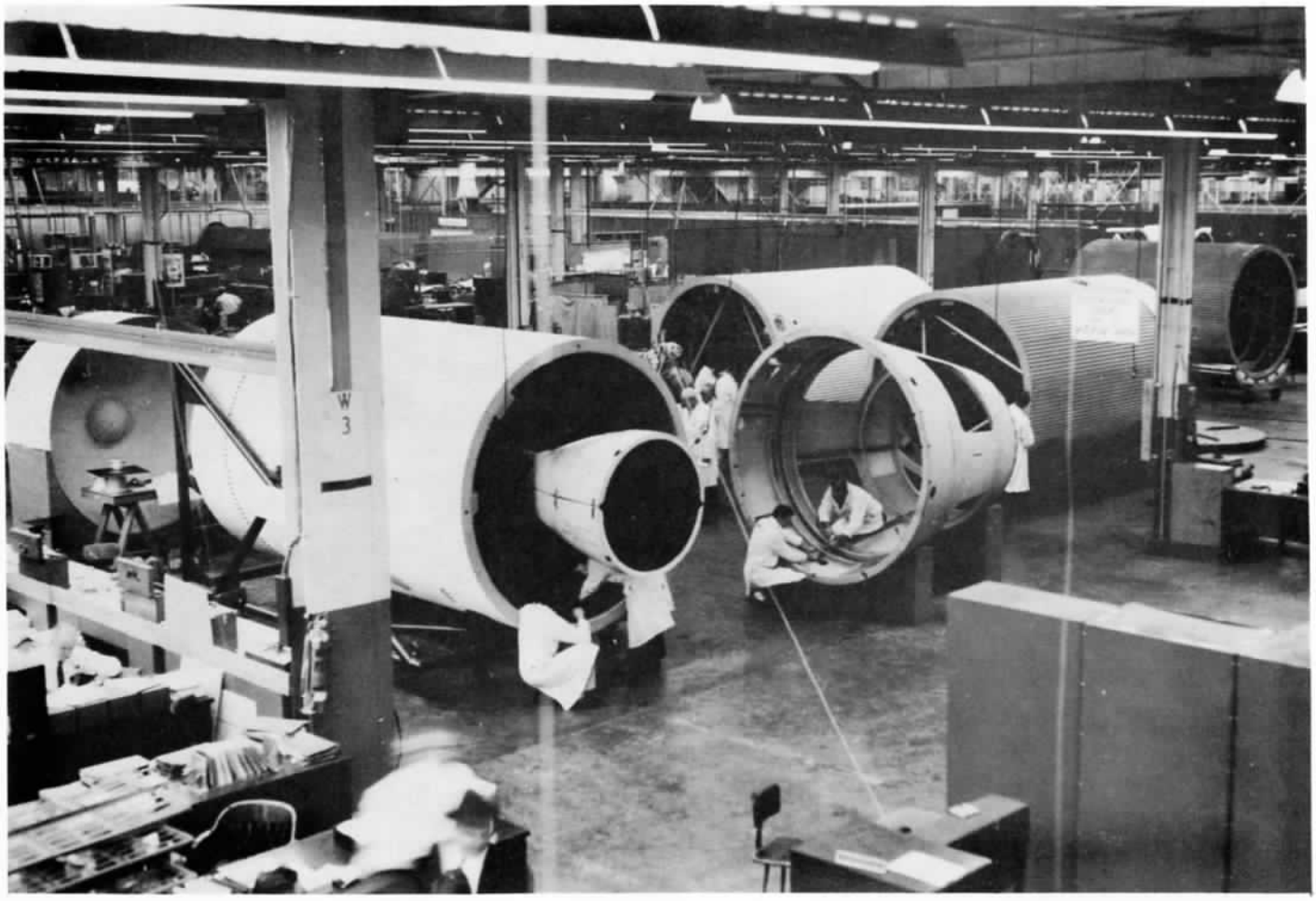

The Engineering Shops and Prototype Laboratories constitute one of six engineering laboratory sections. In this area, prototype and full scale mockup missiles, assemblies, and parts are fabricated and tested.

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In the Electrical Laboratories, engineers, physicists, and technicians are well versed in the areas of radio frequency, telemetry, instrumentation, and calibration (neg. 31575).

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In this high-pressure test room – one of the many facilities of the Mechanical Laboratories – pneumatic systems of all missile components are checked out (neg. 31578).

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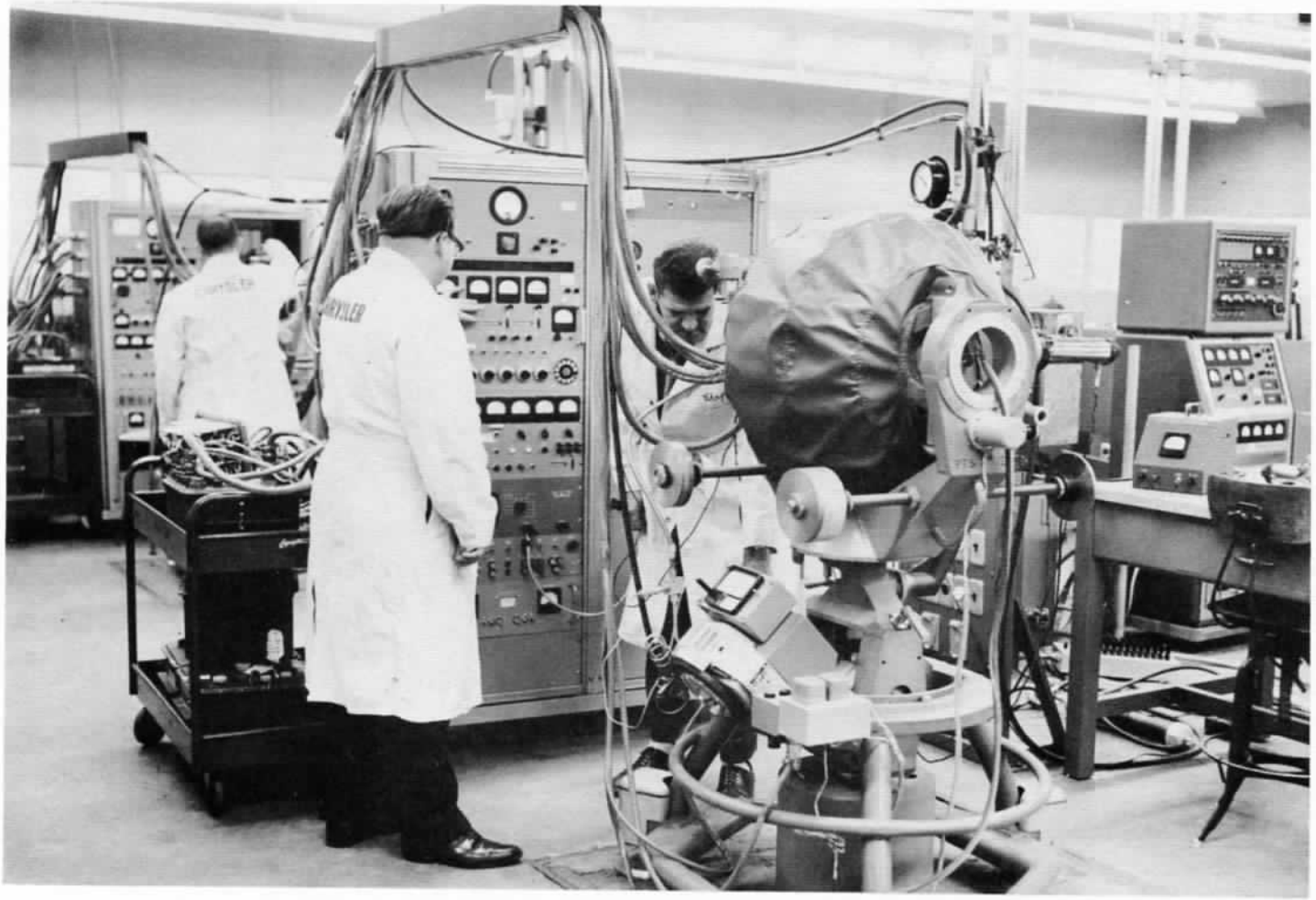

Specialists calibrate a gyro-stabilized platform on a planetary test stand in one area of Guidance and Control Laboratories. Here, hand-picked engineer-technician teams develop systems for delivering the "punch" on target (neg. 31579).

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To insure maximum product reliability the Materials Laboratories perform qualification testing of all materials used in missiles and ground support equipment (neg. 31580).

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Structure checks under simulated flight conditions are carried on with this launching pad built for Structures Laboratories. With other special facilities, testing of shock, vibration and temperature effect is also regularly performed by the hundreds of trained men in this section (neg. 31581).

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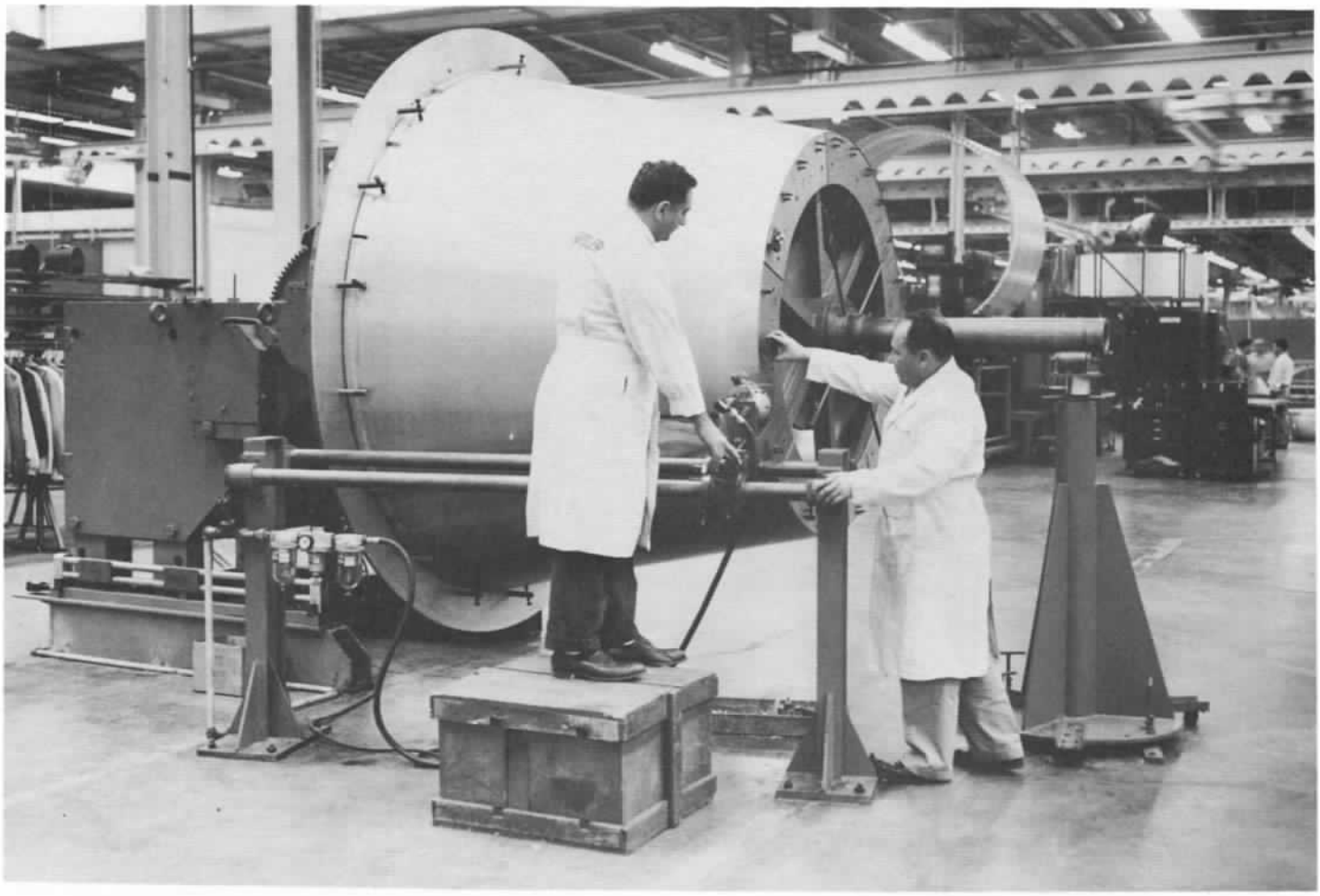
Assembly Operations--JUPITER



JUPITER IS BUILT UP AS THREE MAIN PARTS. On the aft or top section, the first step – after the half-round sheet metal pieces are welded into a cone – is to trim the "skins" section on this rotary fixture (neg. 31503).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--JUPITER

Workmen on assembly stands then apply their skill to completing details on this section by routing out four large holes. (neg. 31505).

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Assembly Operations--JUPITER

Here a metal circle or skirt has been welded on the base of the upper piece. This large special machine automatically drills and rivets support rings inside diameter of the cone (neg. 31513).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--JUPITER

With metal work completed on the aft section, instrumentation, installation, and finish buildup are handled assembly-line fashion, on a row of stands (neg. 31506).

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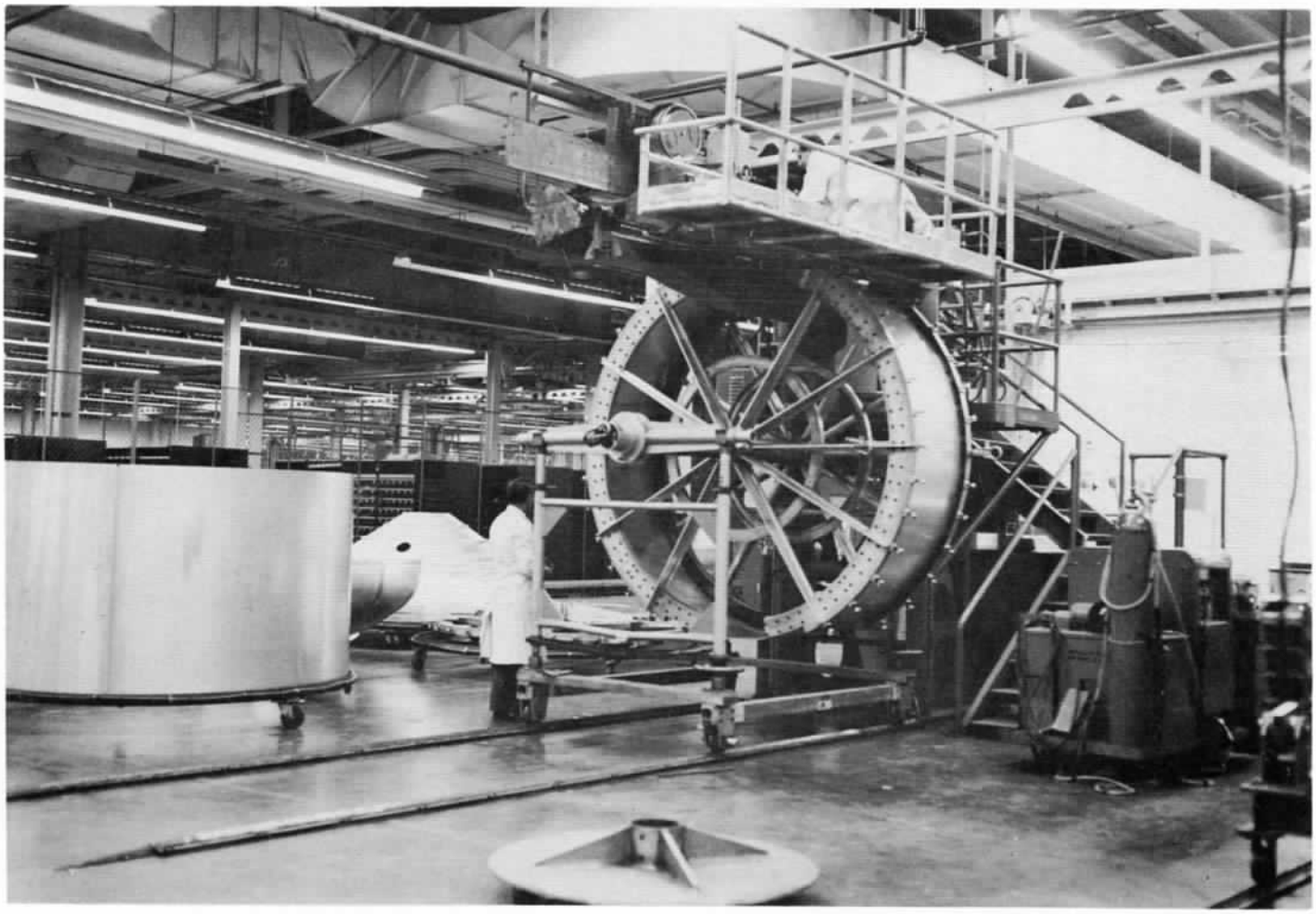
Assembly Operations--JUPITER



The center section of the JUPITER is also made up of skin sections. In this picture, two semicircles are heliarc-welded to form one of the sections on a huge specially-made jig (neg. 31507).

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Assembly Operations--JUPITER

Support rings, or Z-segments for the skin sections, are trimmed to length with a power saw (neg. 31510).

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Assembly Operations--JUPITER

Two workmen rivet in a Z-ring on the shortest of the seven skin sections (neg. 31515).

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Assembly Operations--JUPITER

On the larger skins, assembly crews install vertical support brackets as well as Z-rings (neg. 31504).

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Assembly Operations--JUPITER

A big radial drill is brought into use to provide holes for joining Skin 1 to the aft section (neg. 31557).

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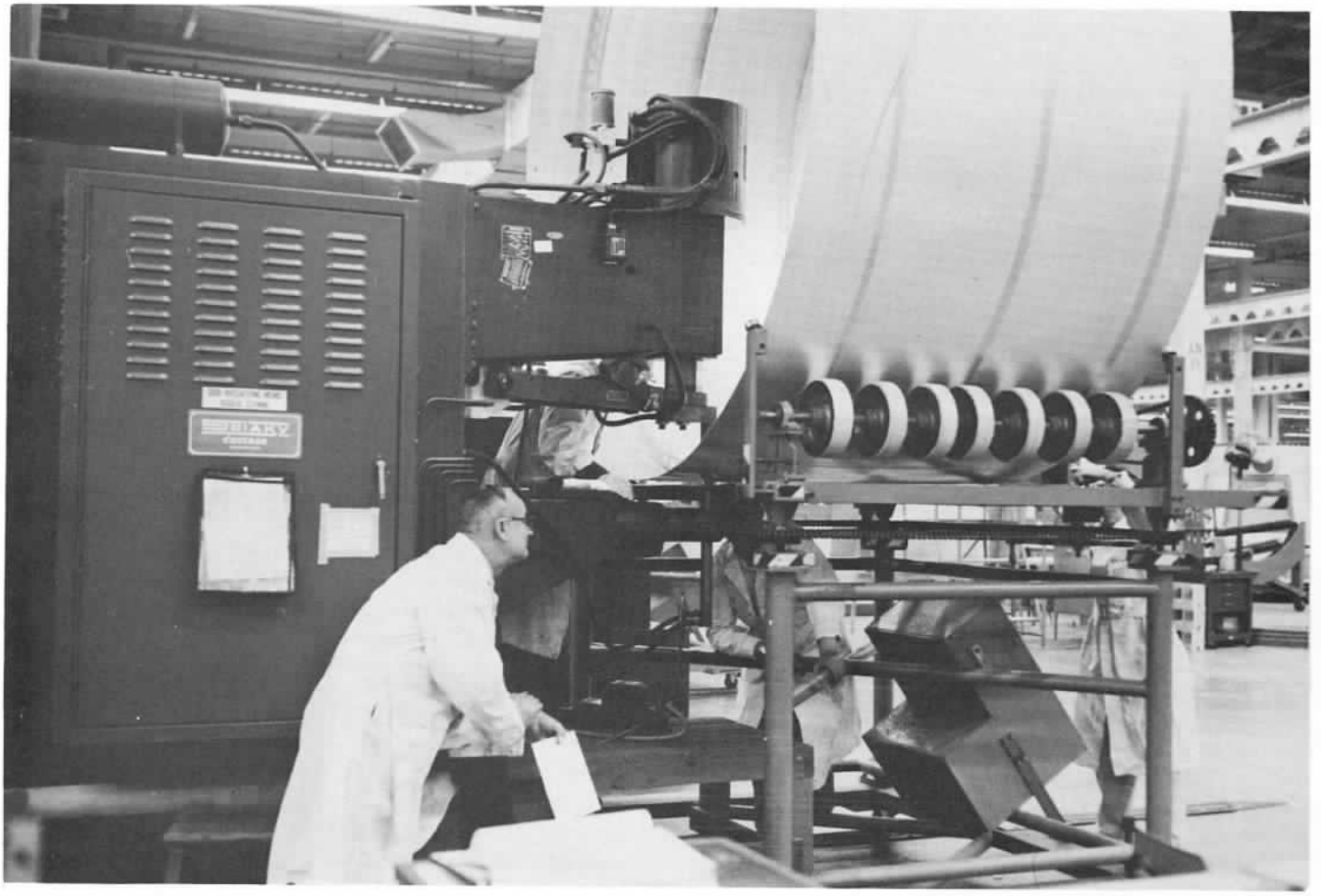
Assembly Operations--JUPITER



For extra strength, this roller fixture has been set up to spot weld the Z-rings to the skin (neg. 31502).

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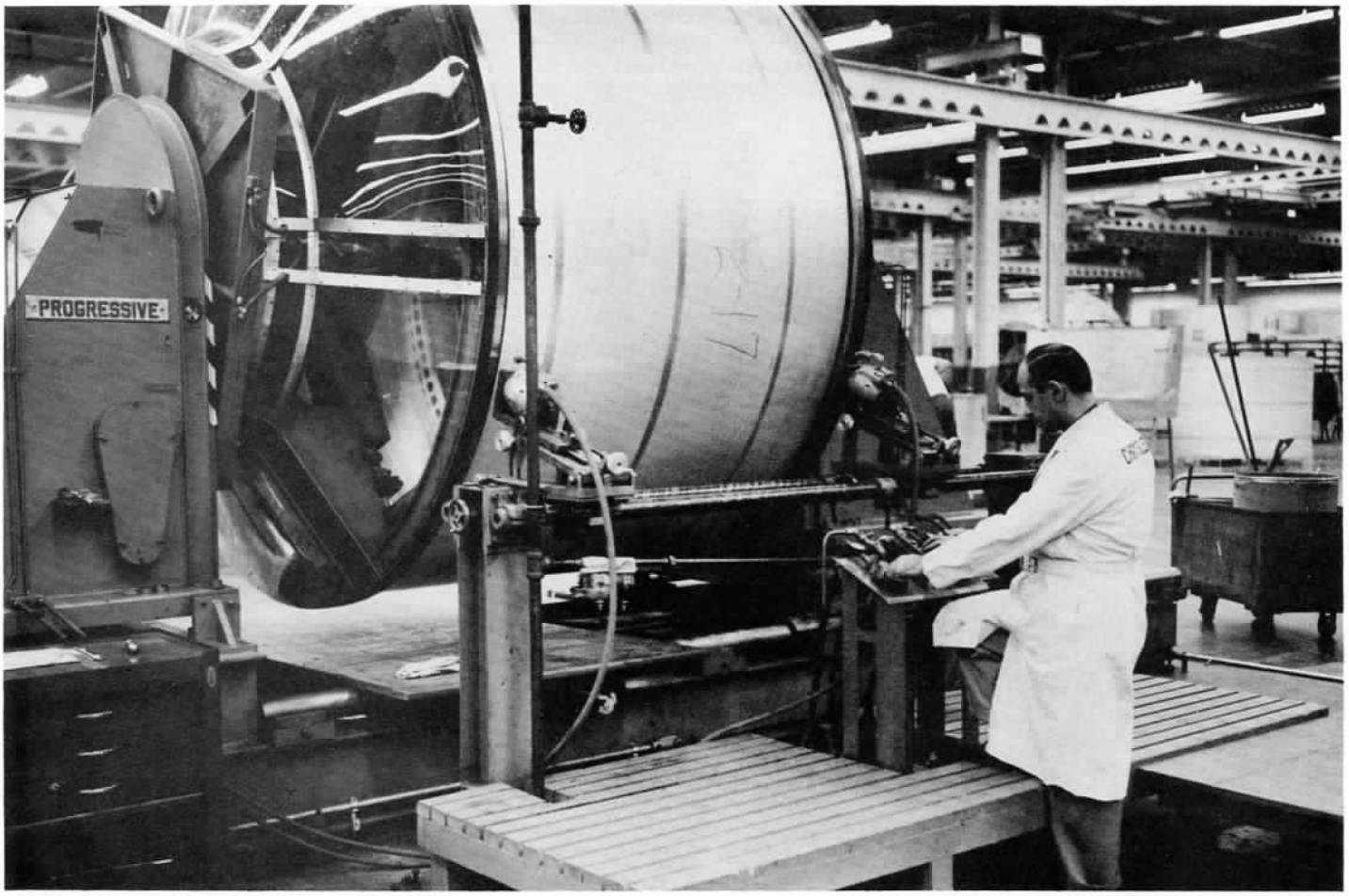

Then the completed skins are trimmed to correct length with this special rotating setup

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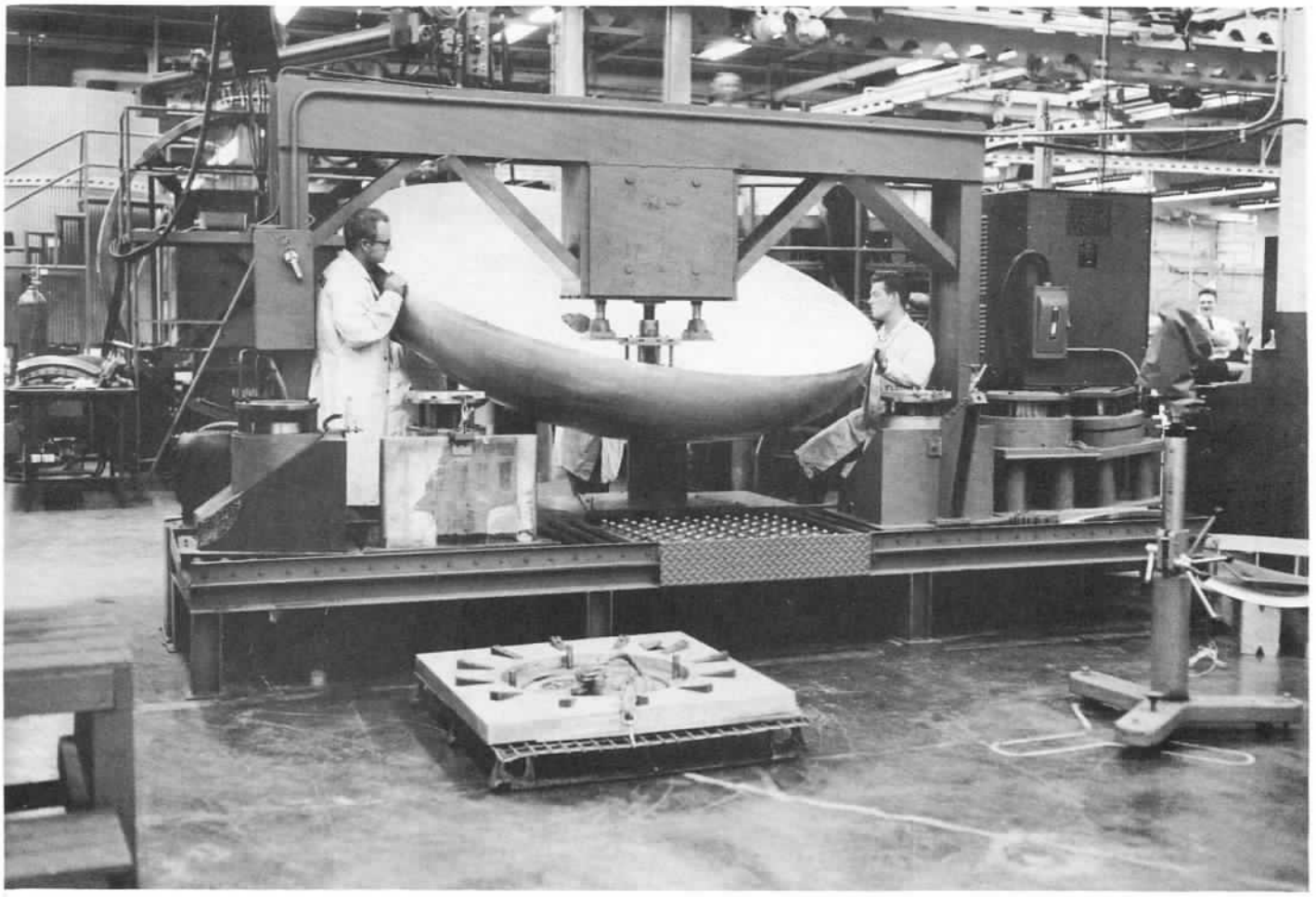
Assembly Operations--JUPITER



To serve as internal separating walls, spherical-shaped bulkheads like these are formed and welded inside two of the skin sections (neg. 31512).

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Assembly Operations--JUPITER

A supporting structure and other components are welded into the bulkhead (neg. 31556).

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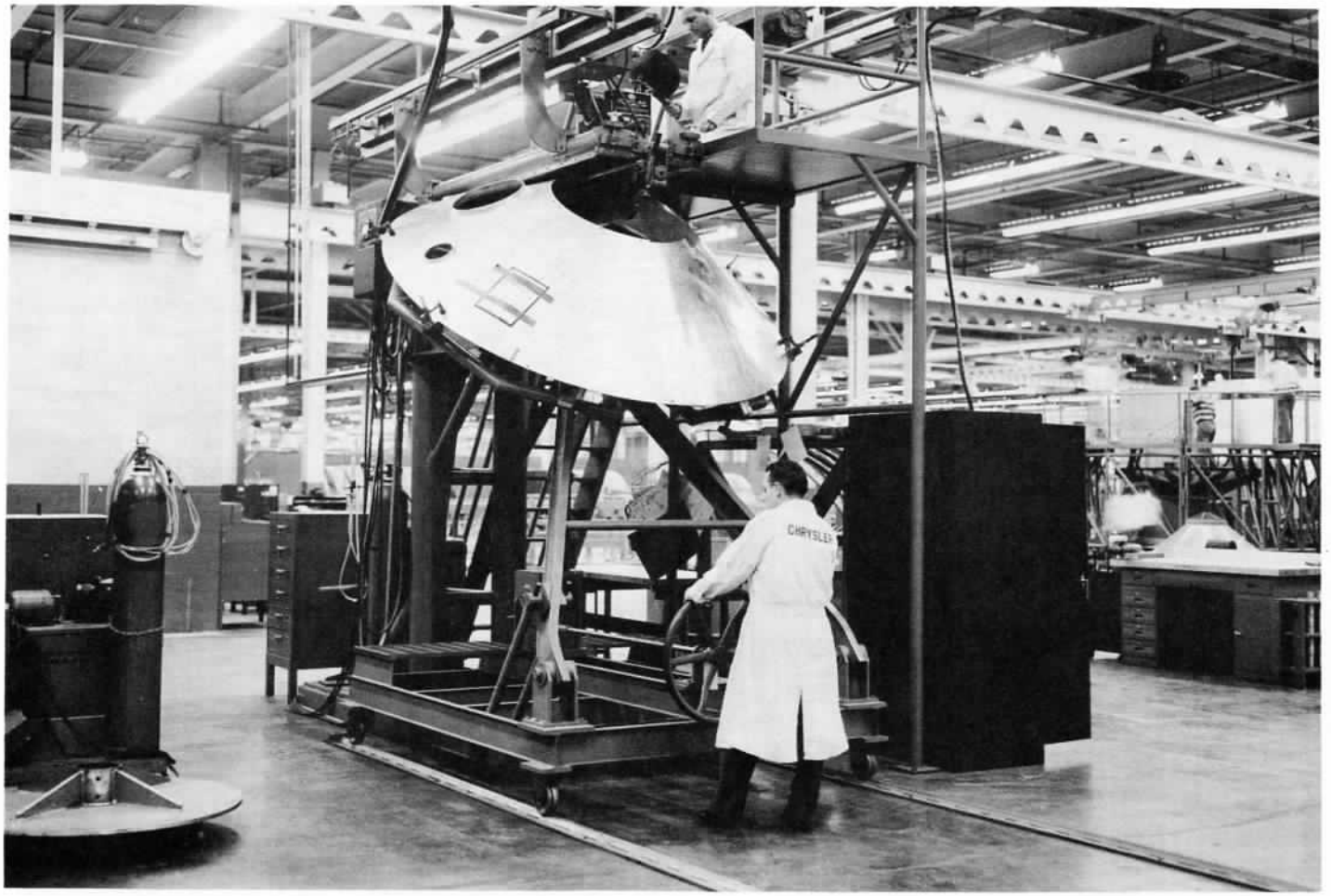
Assembly Operations--JUPITER



On his high platform a welder seals two halves together to make up the third bulkhead, this one a conical shape. For the longitudinal weld, the piece is moved forward on a dolly by the man below. (neg. 31555).

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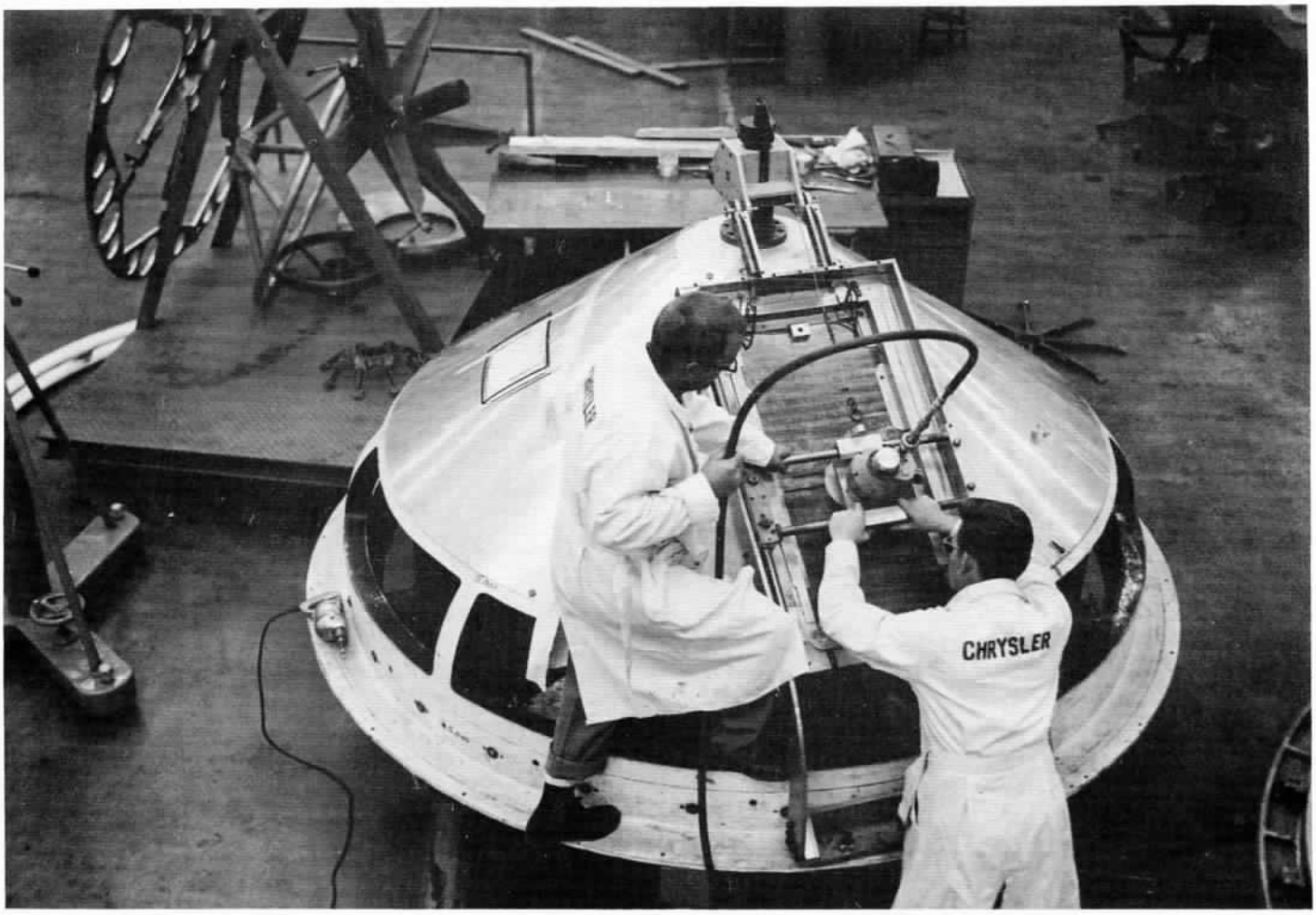
Assembly Operations--JUPITER



Another special fixture provides the means for routing out a flanged hole in the bulkhead (neg. 31516).

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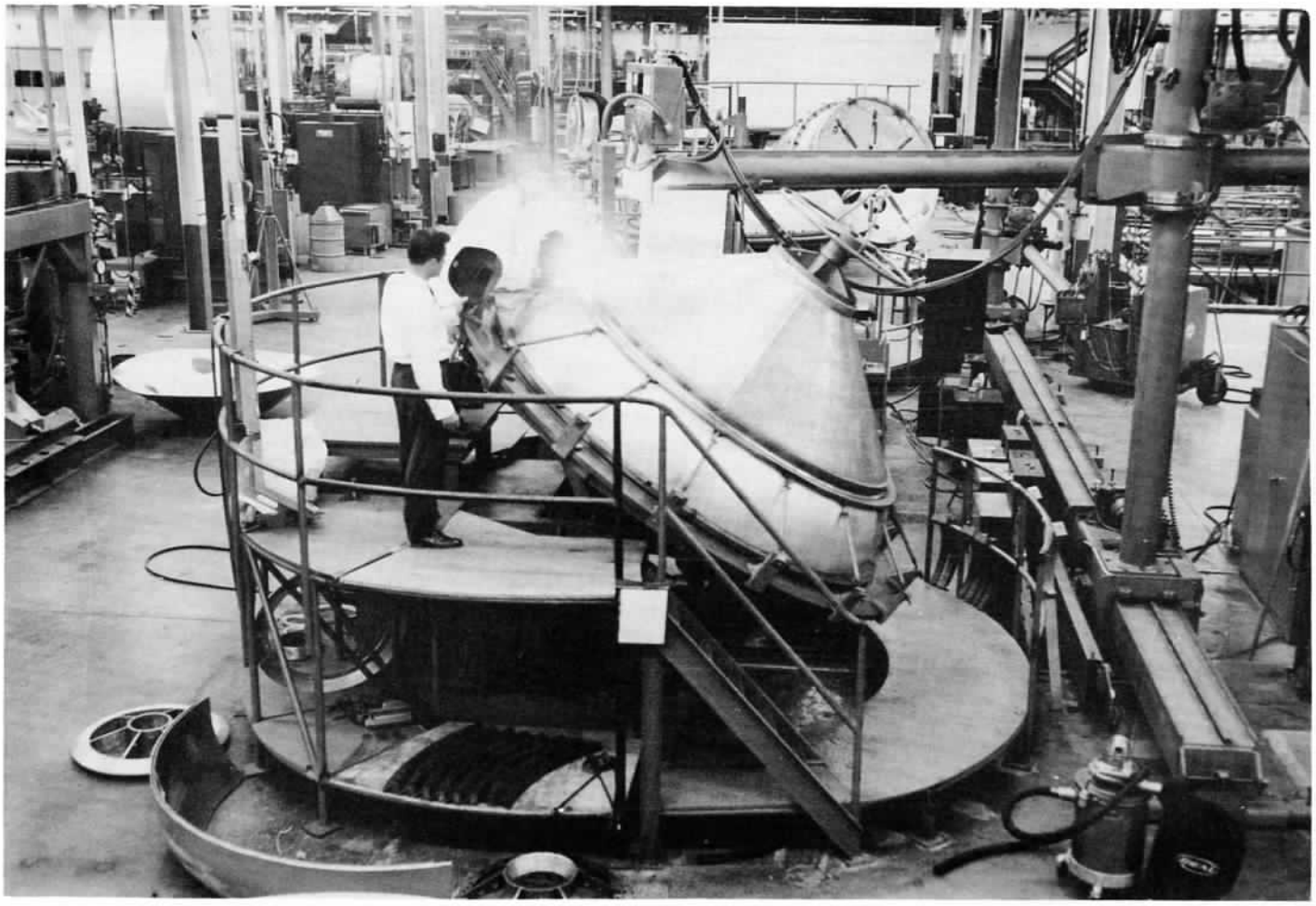
Assembly Operations--JUPITER



With welding torches lighted, assembly men complete the building up of the conical bulkhead. They use a swing-out welding arm (neg. 31499).

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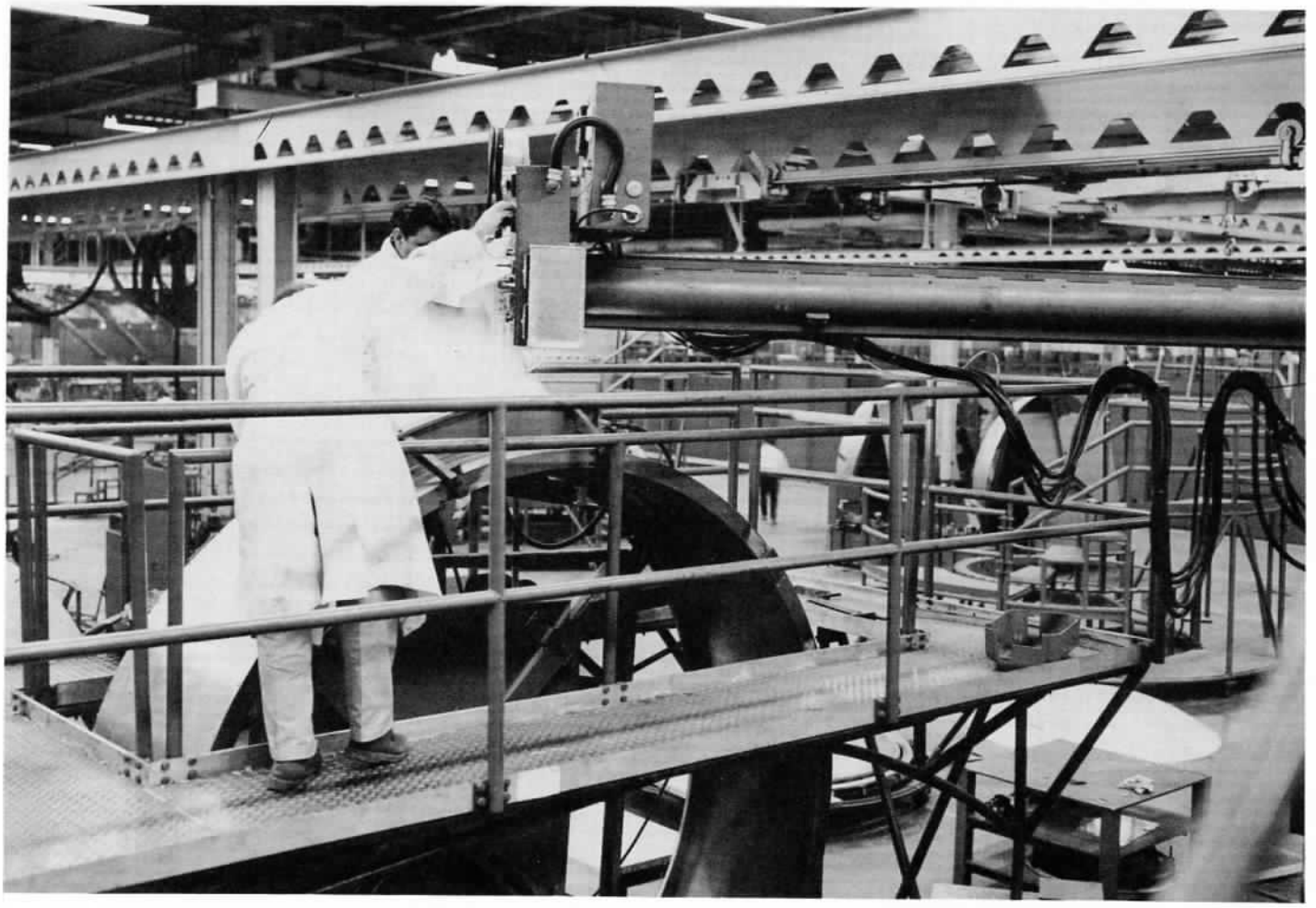
Assembly Operations--JUPITER



Using the swingout arm, men in a specially-constructed stand weld test sample skin section (neg. 31501).

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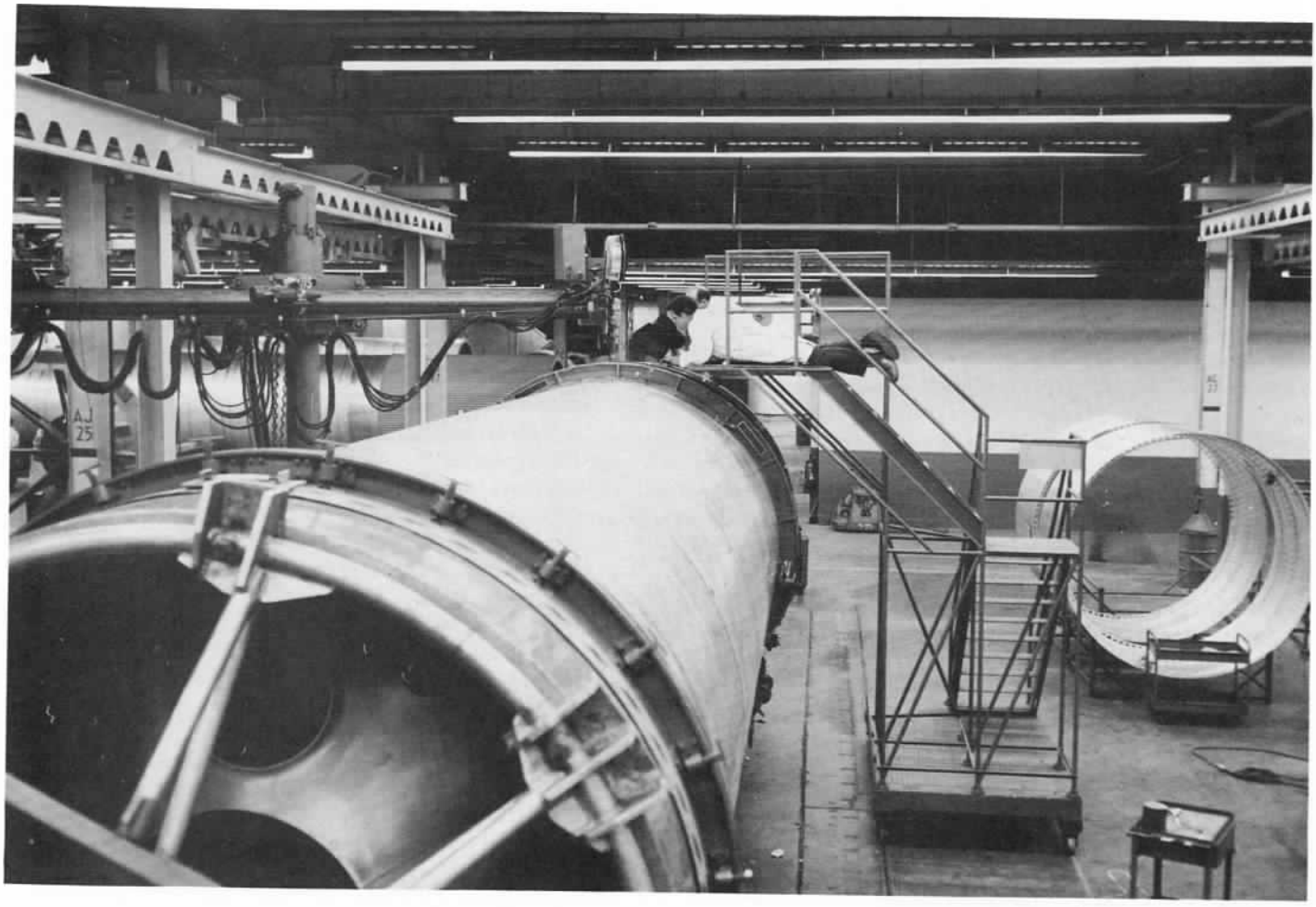
Assembly Operations--JUPITER



After the test samples prove satisfactory, the welding arm swings over to seal the skin sections, 1 through 7, into a long, cylindrical section (neg. 31522).

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Assembly Operations--JUPITER

For the tail section a corrugated skin is used. It is cut to length and width in the manner shown here (neg. 31511).

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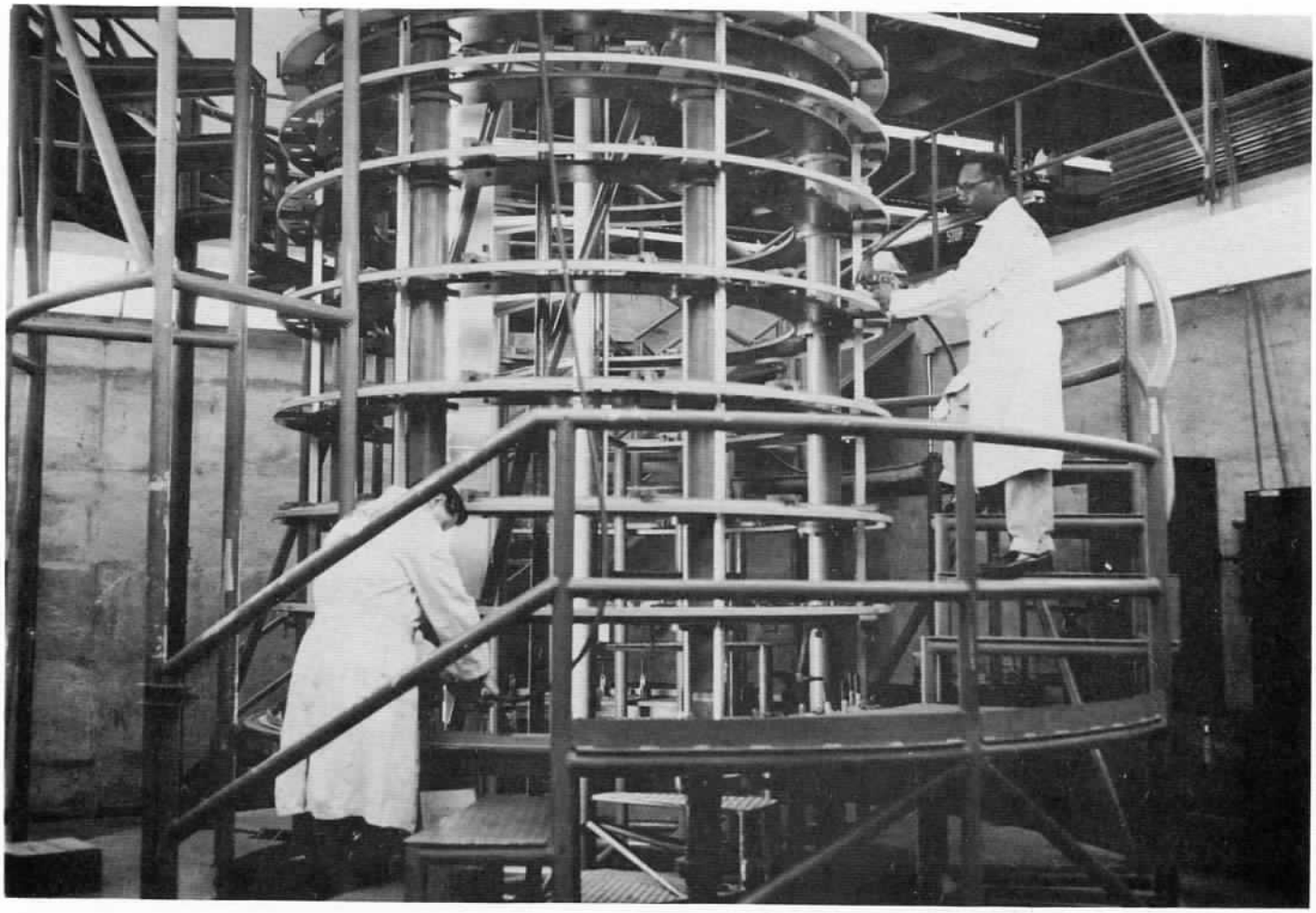
Assembly Operations--JUPITER



On this intricate framework, assemblers rivet together the many support rings and frame for the tail section (neg. 31508).

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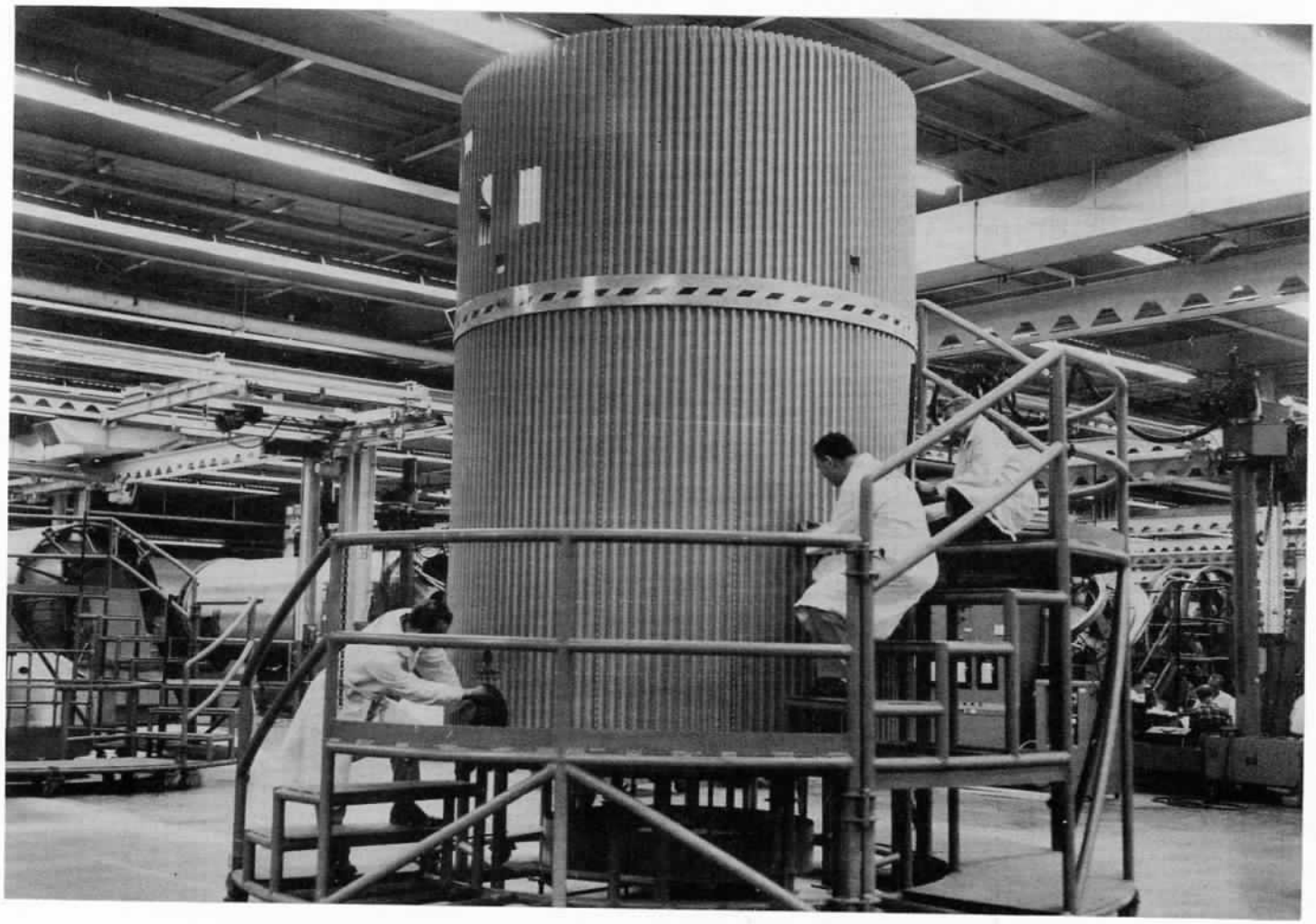
Assembly Operations--JUPITER



Next, the corrugated skin is applied over the ring frame and the required openings in the skin are cut out (neg. 31509).

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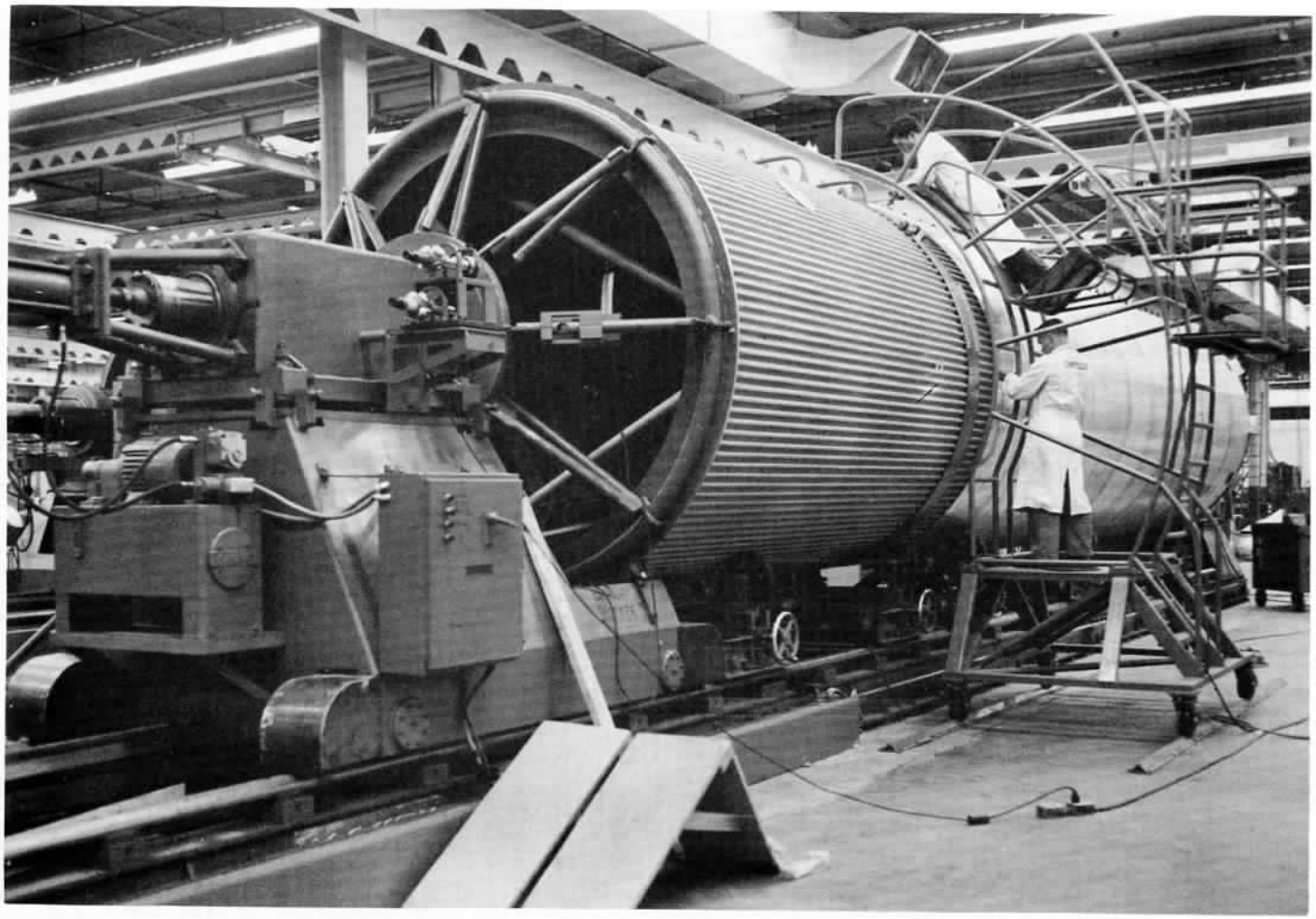
Assembly Operations--JUPITER



With basic shells completely assembled, crew men concentrate on joining the center and tail sections. They first use optical scopes to aline the two, then rivet them together as shown (neg. 31554).

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Assembly Operations--JUPITER

Fuel suction lines and vent pipe are assembled by this team (neg. 31514).

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Assembly Operations--JUPITER

These men hoist a fixture into the JUPITER shell to assure mounting of the suction lines in the exact longitudin center of the missile (neg. 31498).

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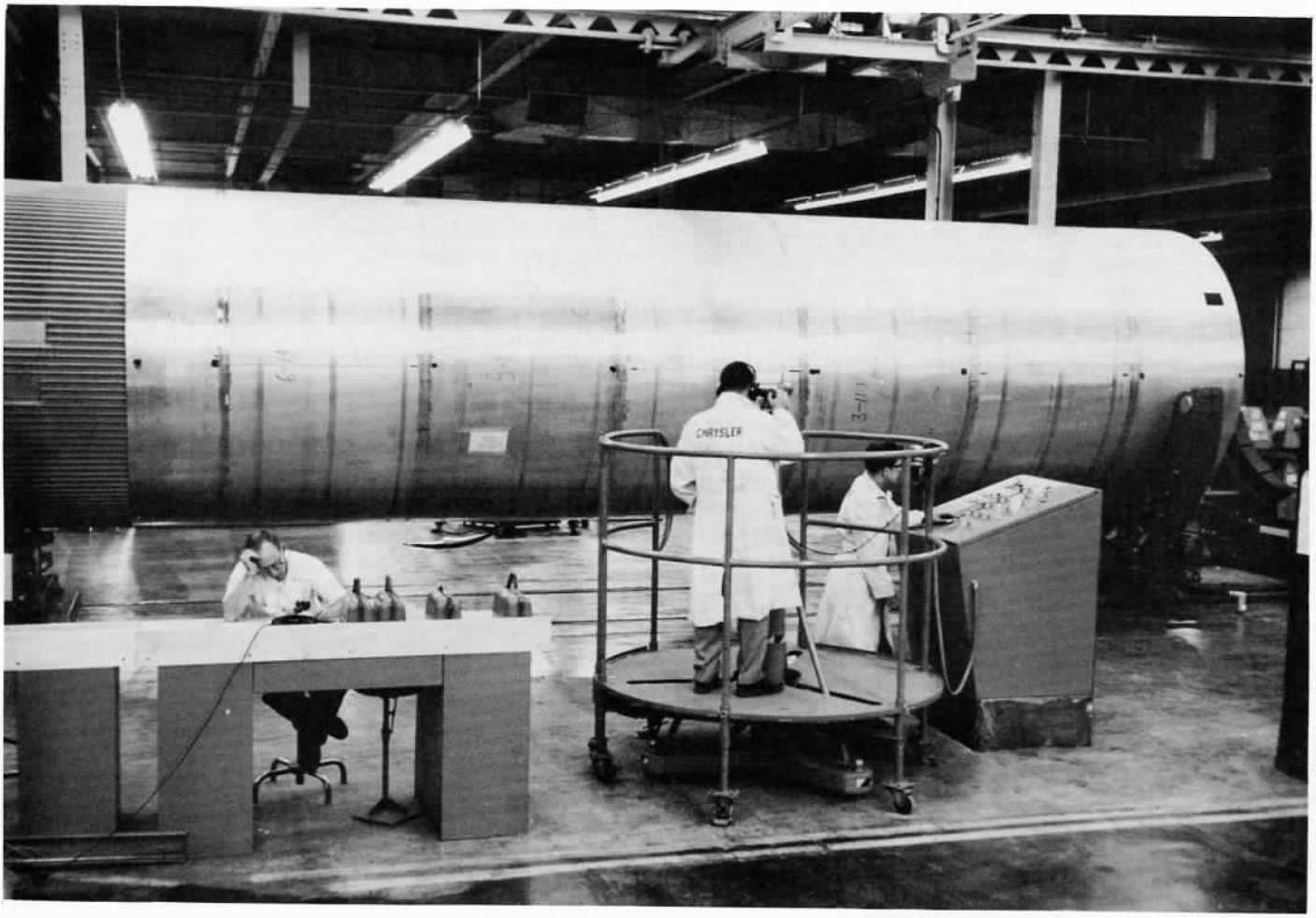
Assembly Operations--JUPITER



In the final assembly area, optical sighting equipment is again employed to ascertain perfect alinement. Adjustment is done electronically by the man at the control panel; relay setup on the dolly's base (right center) answers his signals (neg. 31560).

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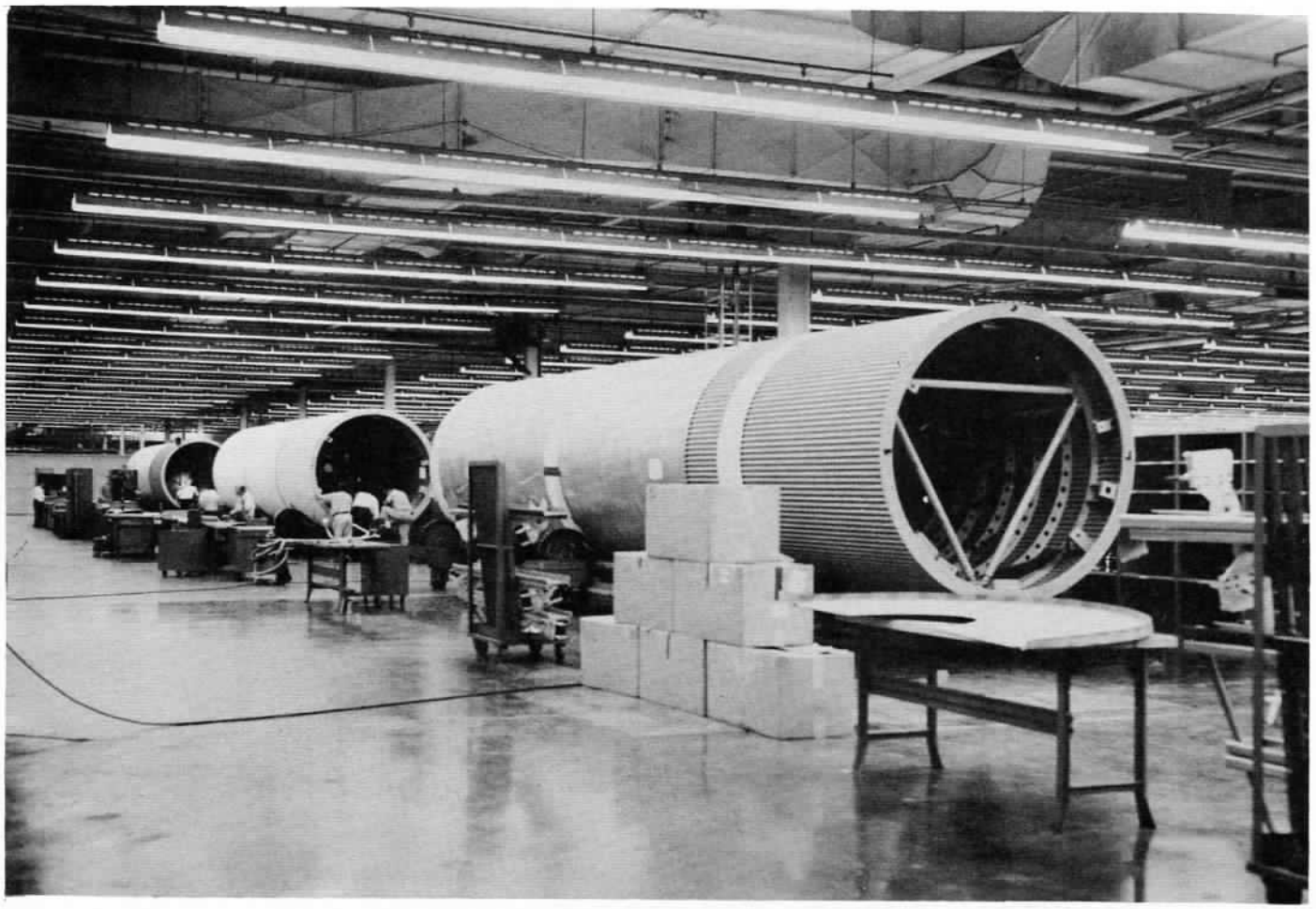
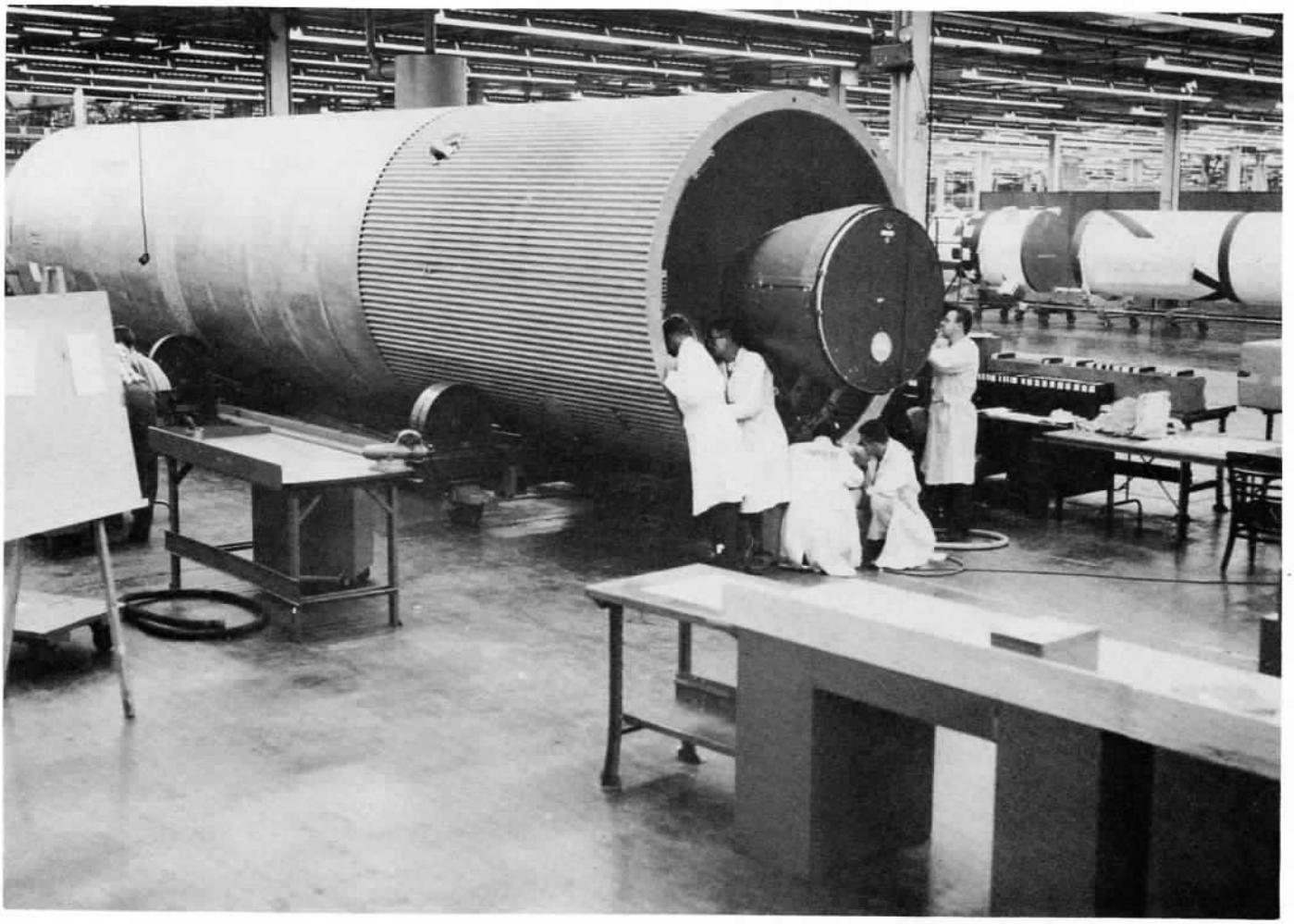
Assembly Operations--JUPITER



This view shows the final assembly line of the JUPITER, where the inside components are assembled and the aft nose section is joined to the missile (neg. 31568).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--JUPITER



Engine in place, this JUPITER receives installation of all electrical and mechanical components.

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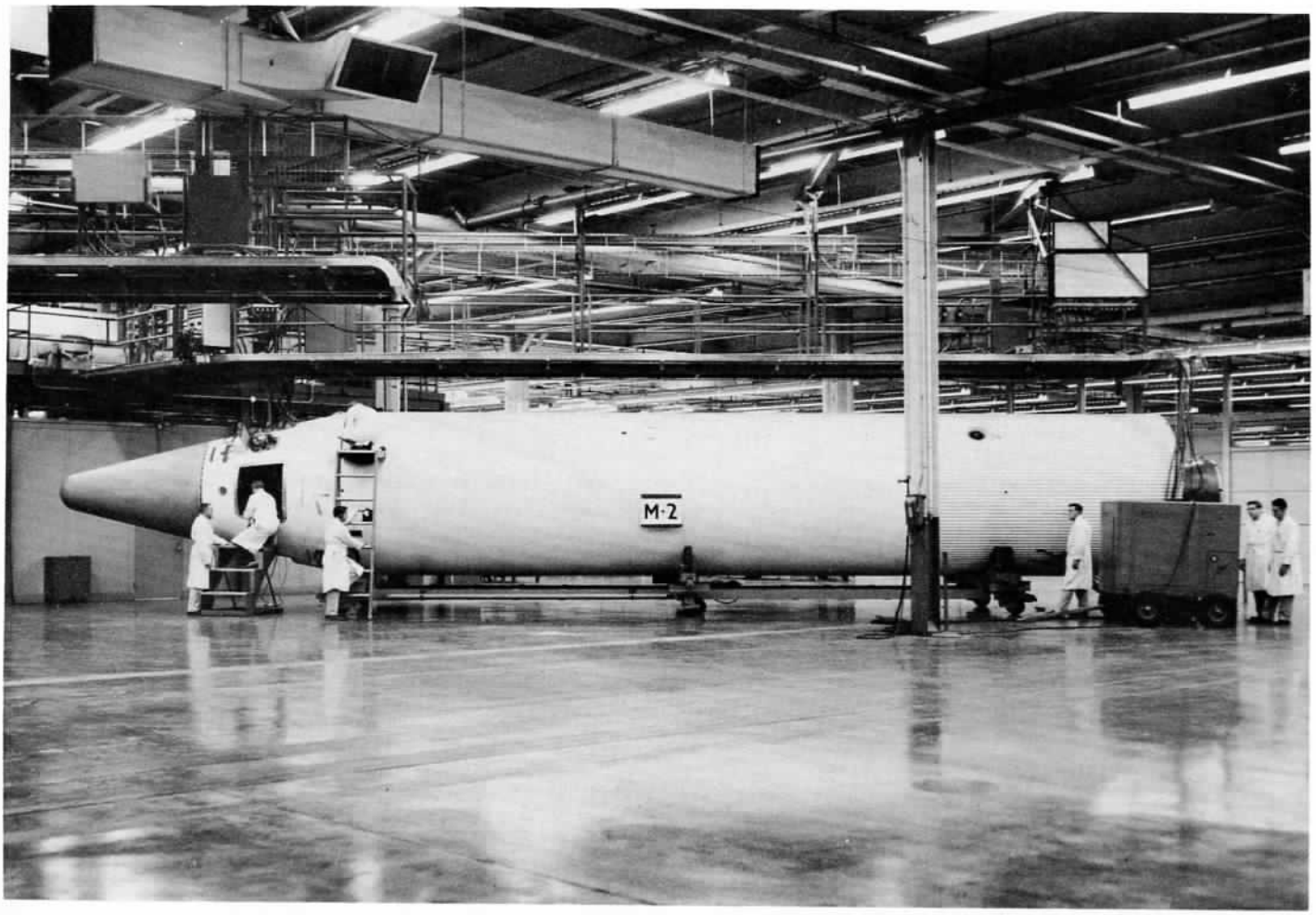
Assembly Operations--JUPITER



The completed missile undergoes its final checkout. Every operating part is thoroughly tested in this severe check (neg. 31564).

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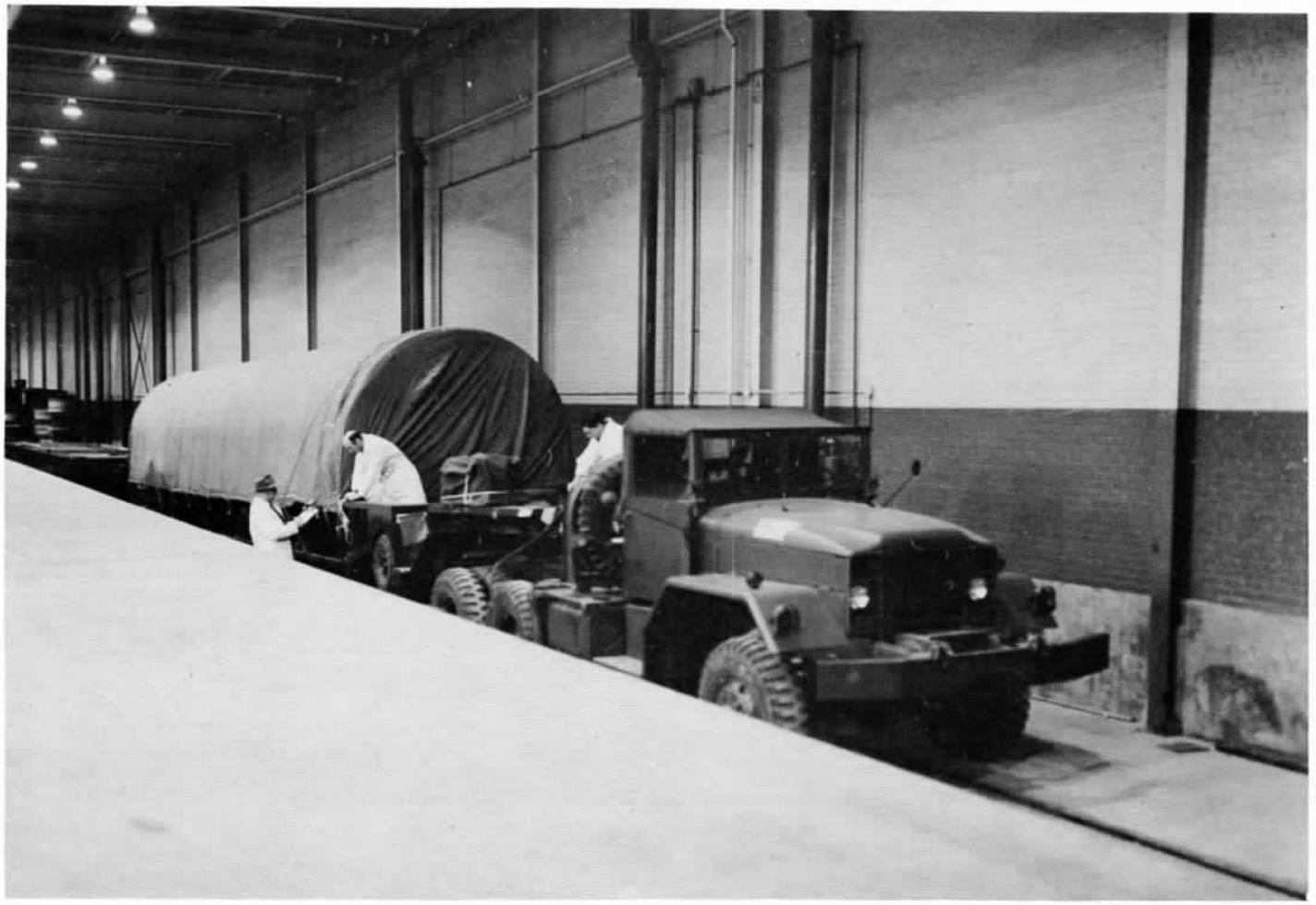
Assembly Operations--JUPITER



Following satisfactory completion of testing, JUPITER is loaded onto a custom-made trailer for shipping (neg. 31530).

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And here it goes, on its way to -- Cape Canaveral?

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

In another assembly area, the REDSTONE missile is also put together as three separate sections. Here, on the left, technicians make up the skin frame for the aft section, while at the right men are fashioning the nose cone (neg. 31532).

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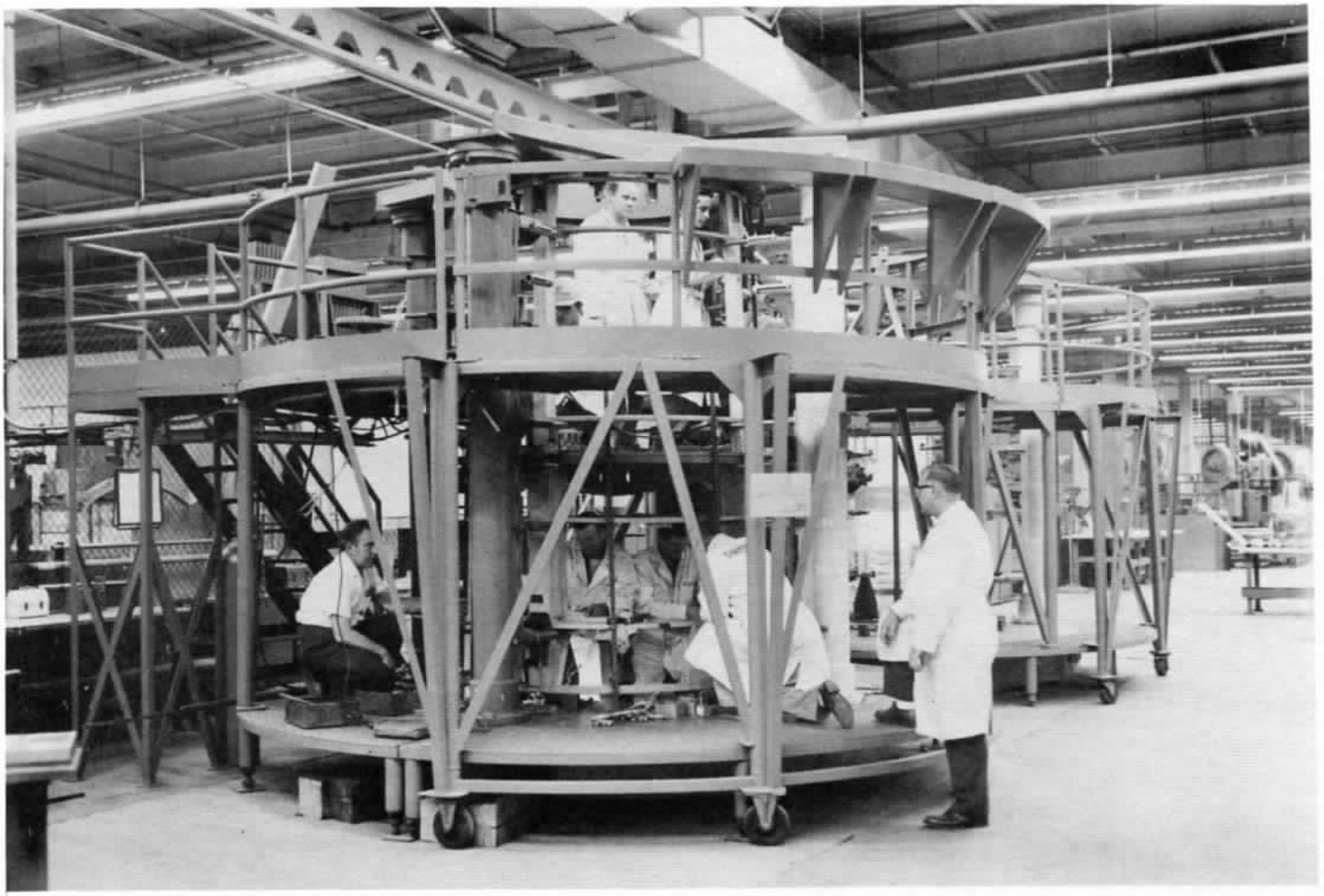
Assembly Operations--REDSTONE



Framework for the tactical body is built up on this elaborate fixture by a skilled team (neg. 31569).

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Assembly Operations--REDSTONE

Nose cone and aft section for the REDSTONE consist of 8 longitudinal strips welded together around their frames. Men here finish up assembly of the skin section for the complete tactical body, or aft section of the missile (neg. 31533).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

Another crew meanwhile has fabricated component parts for the top (neg. 31534).

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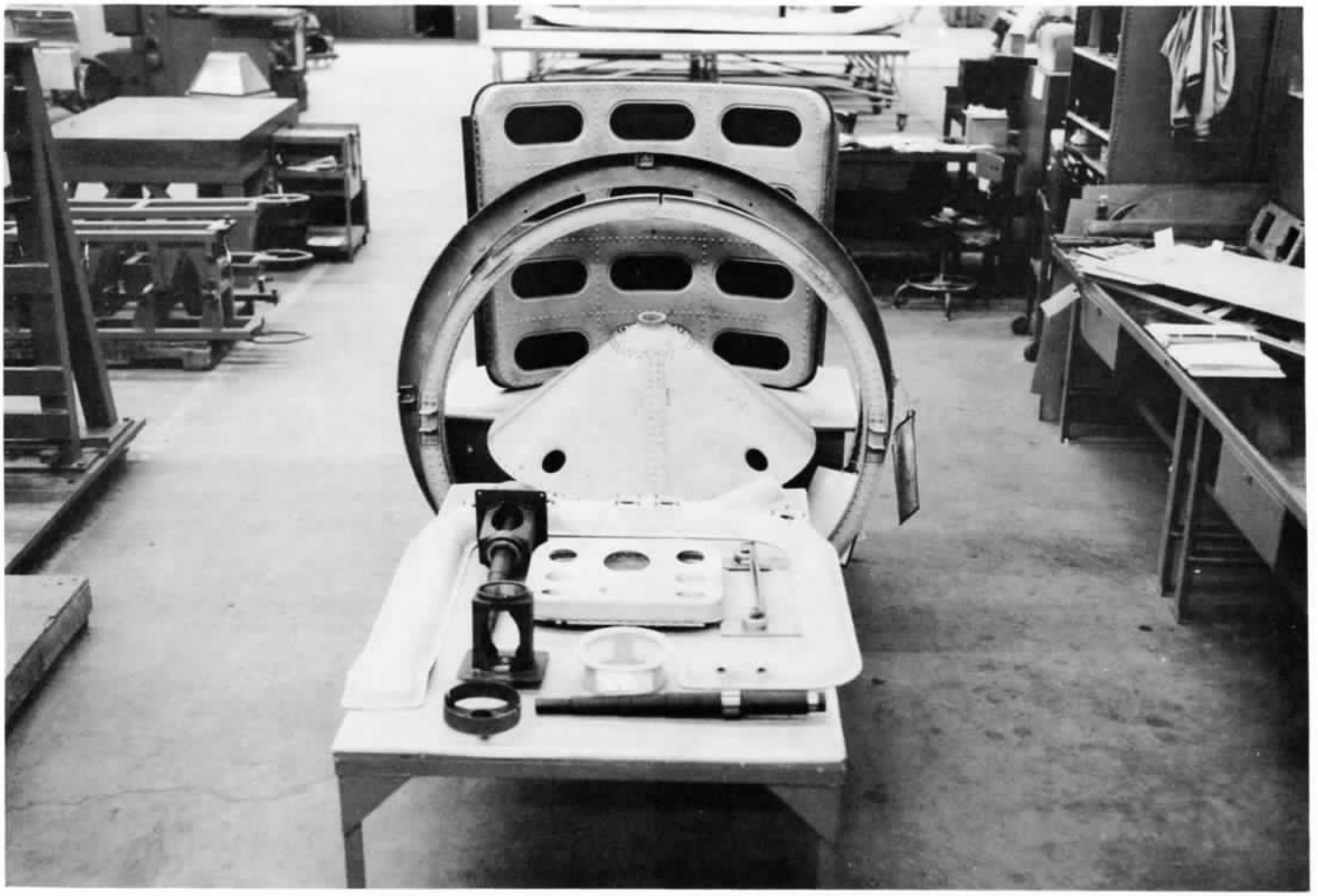
Assembly Operations--REDSTONE



Some ready-to-assemble component parts are grouped here. They include the instrument panel door, payload support rings, door, and cone support. Dark parts are the vane drive assembly (neg. 31571).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

Another team builds up a pressure bulkhead, which is to be installed in the center of the aft section (neg. 31583).

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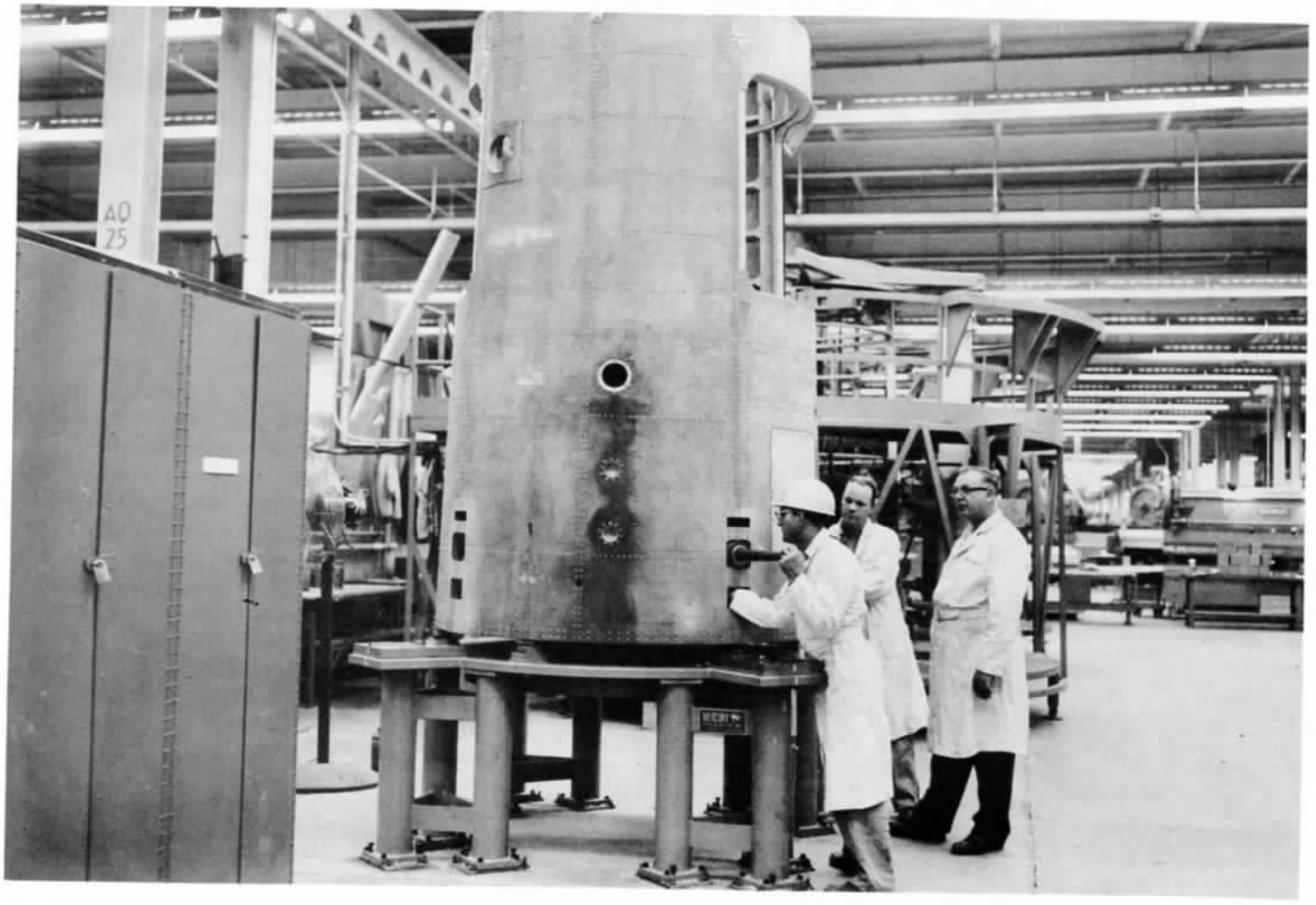

Vane drive assemblies are next installed as the aft section rests on a stout assembly stand (neg. 31572).

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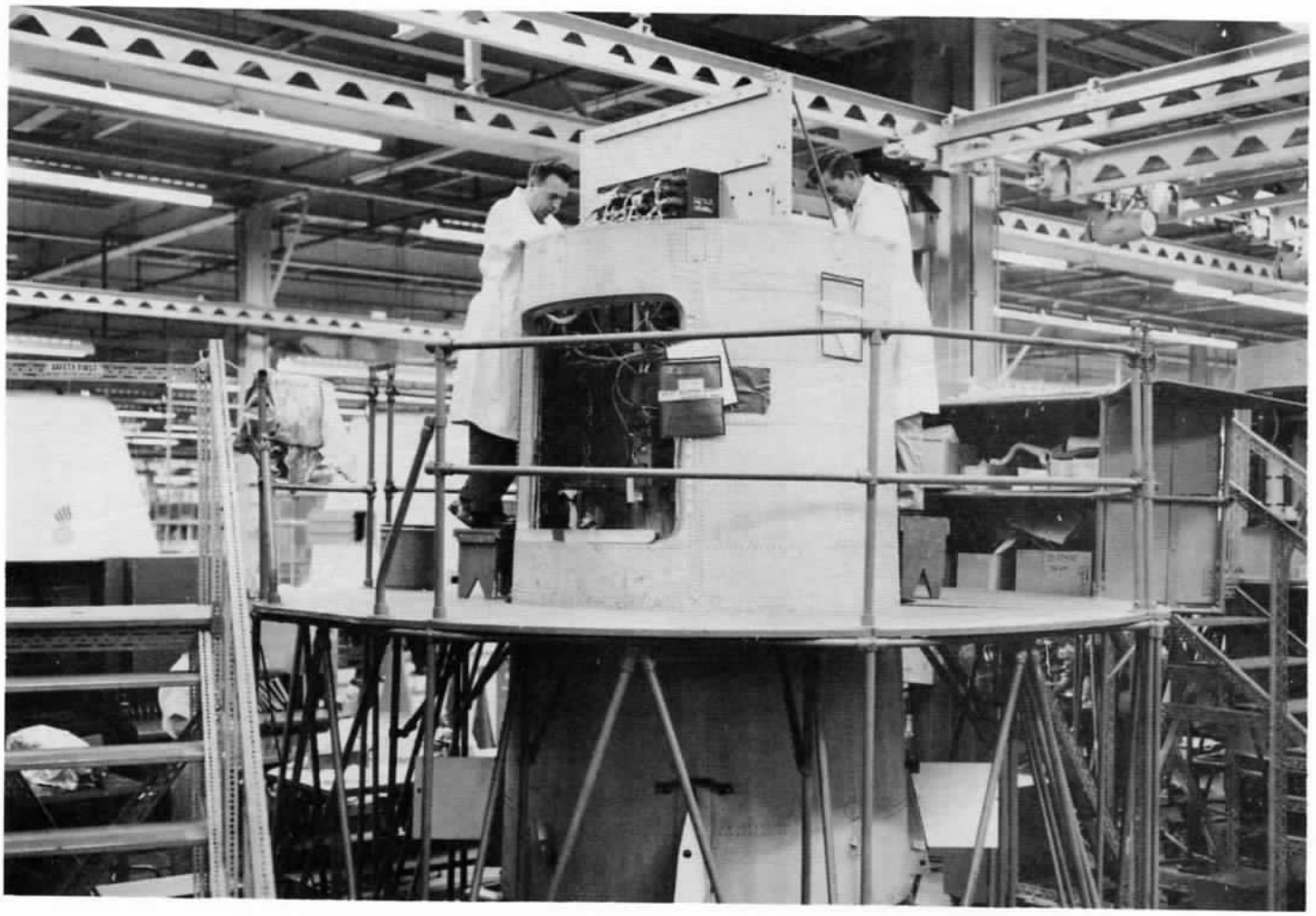
Assembly Operations--REDSTONE



On another made-to-order assembly stand, technicians install instrumentation in the aft section (neg. 31574).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

The tactical body, now completed, is rolled from the paint booth after receiving its new coat (neg. 31546).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

This picture shows the sturdy angle plate fixture for drilling engine mount and spherical bolt holes to insure interchangeability and alinement between engine and top section (neg. 31540).

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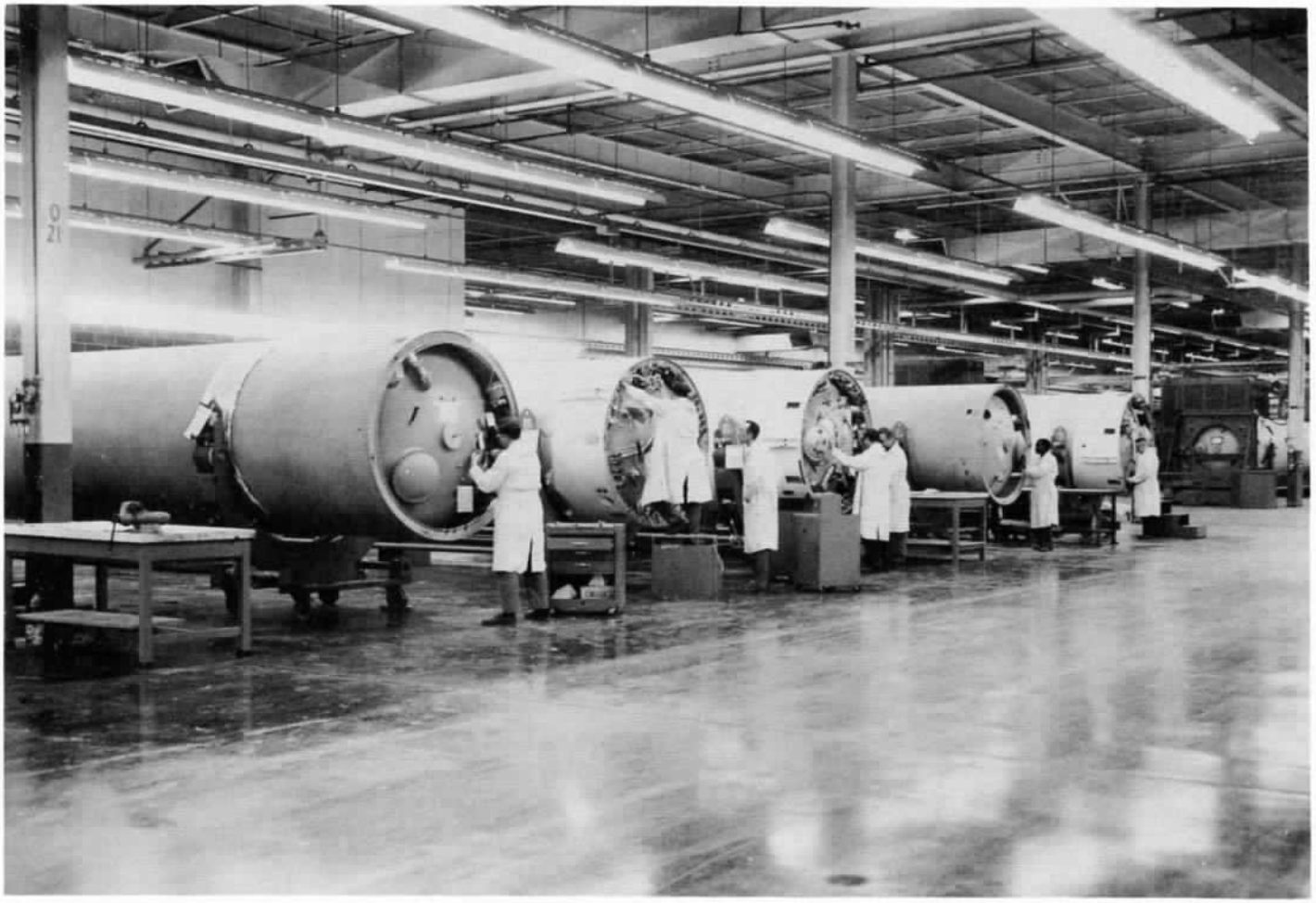

After the center section has been built up much the same as the aft part, electrical specialists install the harness assemblies (neg. 31541).

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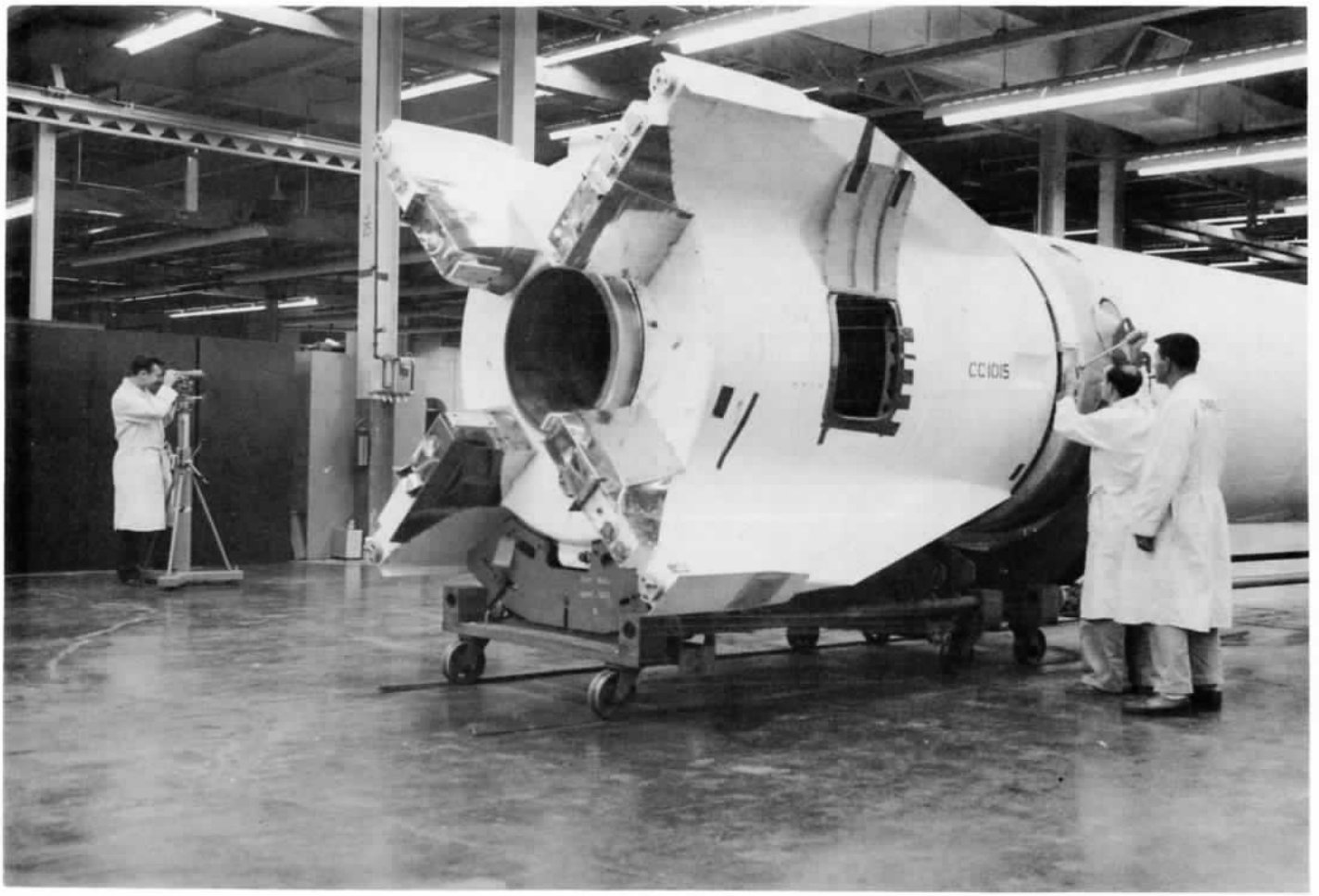
Assembly Operations--REDSTONE



When the engine has been installed, the already-constructed tail section is assembled. Alinement is carefully checked with optical scope for this critical operation (neg. 31585).

CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

REDSTONE undergoes its final checkout before taking its place as a powerful addition to America's arsenal of defense weapons (neg. 31565).

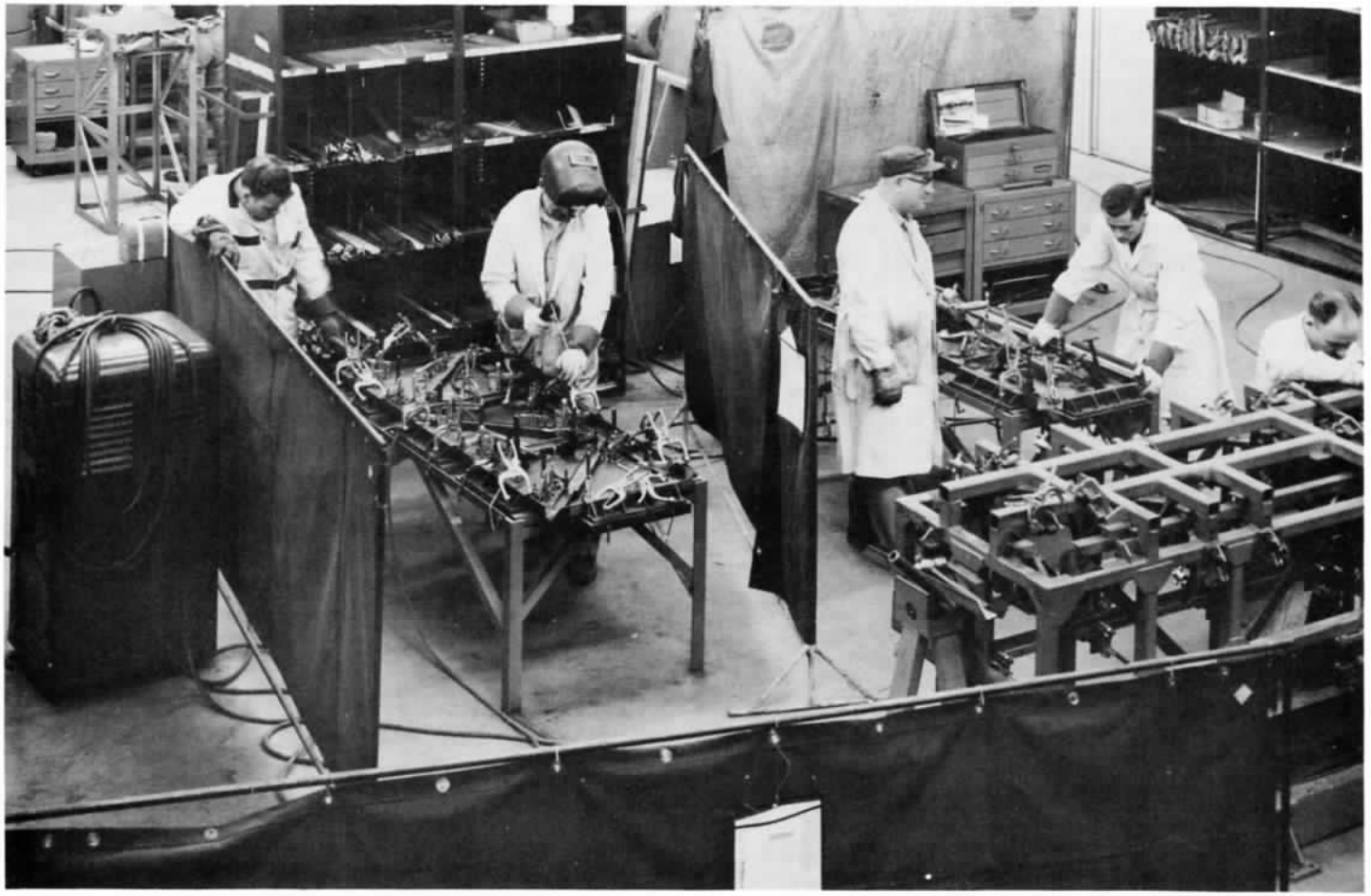
CHRYSLER CORPORATION MISSILE DIVISION

Assembly Operations--REDSTONE

Here is the REDSTONE, completely assembled and painted (neg. 31544).

CHRYSLER CORPORATION MISSILE DIVISION

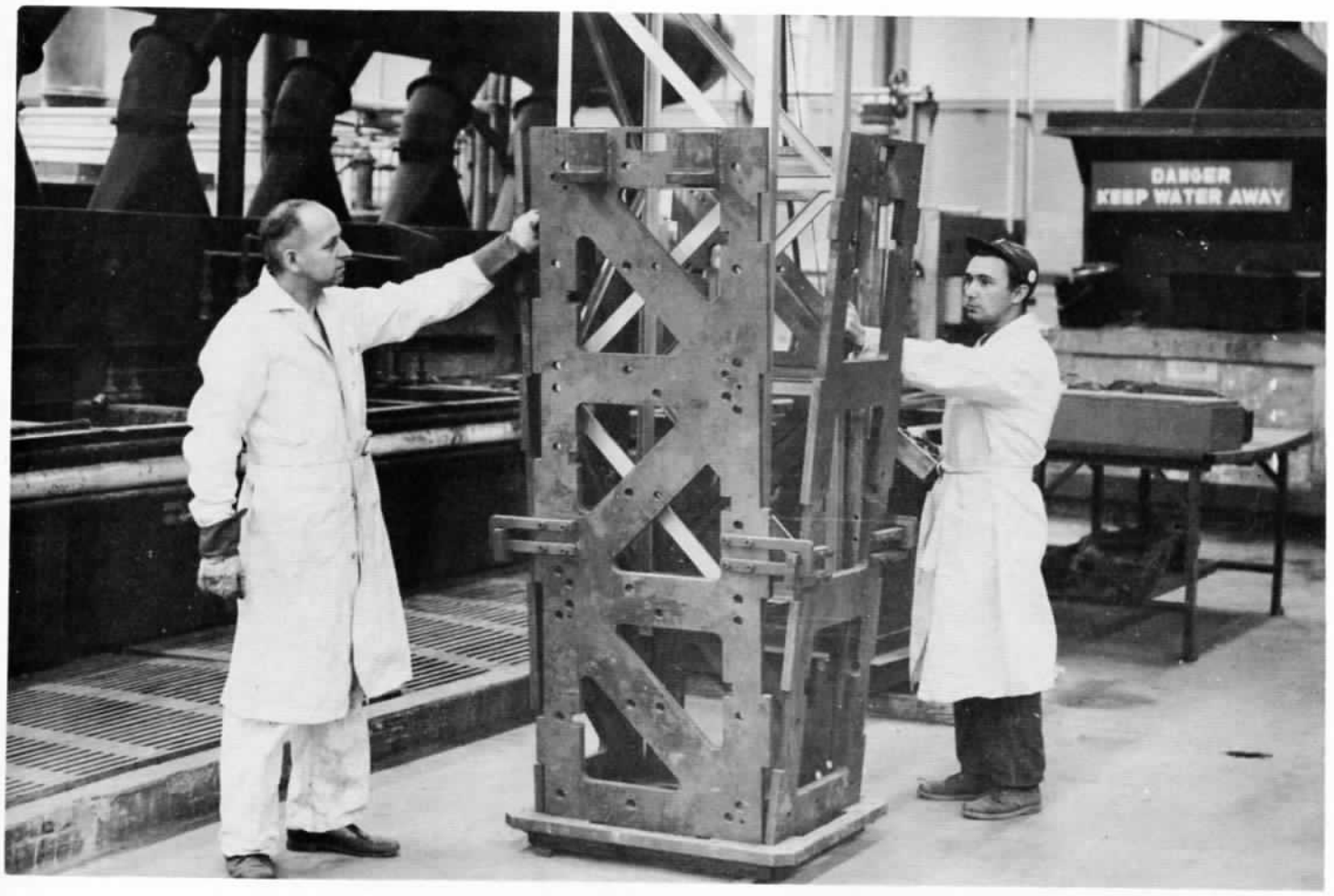
Ground Support Equipment--JUPITER



Racks used to hold electrical console units for ground support equipment are formed in the Welding Department.

CHRYSLER CORPORATION MISSILE DIVISION

Ground Support Equipment--JUPITER



Normalizing, or relieving metal stress caused by mill running and welding, is accomplished by baking the racks at 1000° F for 1 hour. The racks are first placed in these forms which are then lowered into cylindrical ovens.

CHRYSLER CORPORATION MISSILE DIVISION

Ground Support Equipment--JUPITER

This is the final assembly area for JUPITER mobile and RIM area launching console racks. Electrical components are installed in the racks after they have been fitted into equipment trailers.

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Ground Support Equipment--JUPITER

Fault isolation trailers, seen here in final assembly, are used for countdown checkout and centralizing of fault or error within the ground support unit.

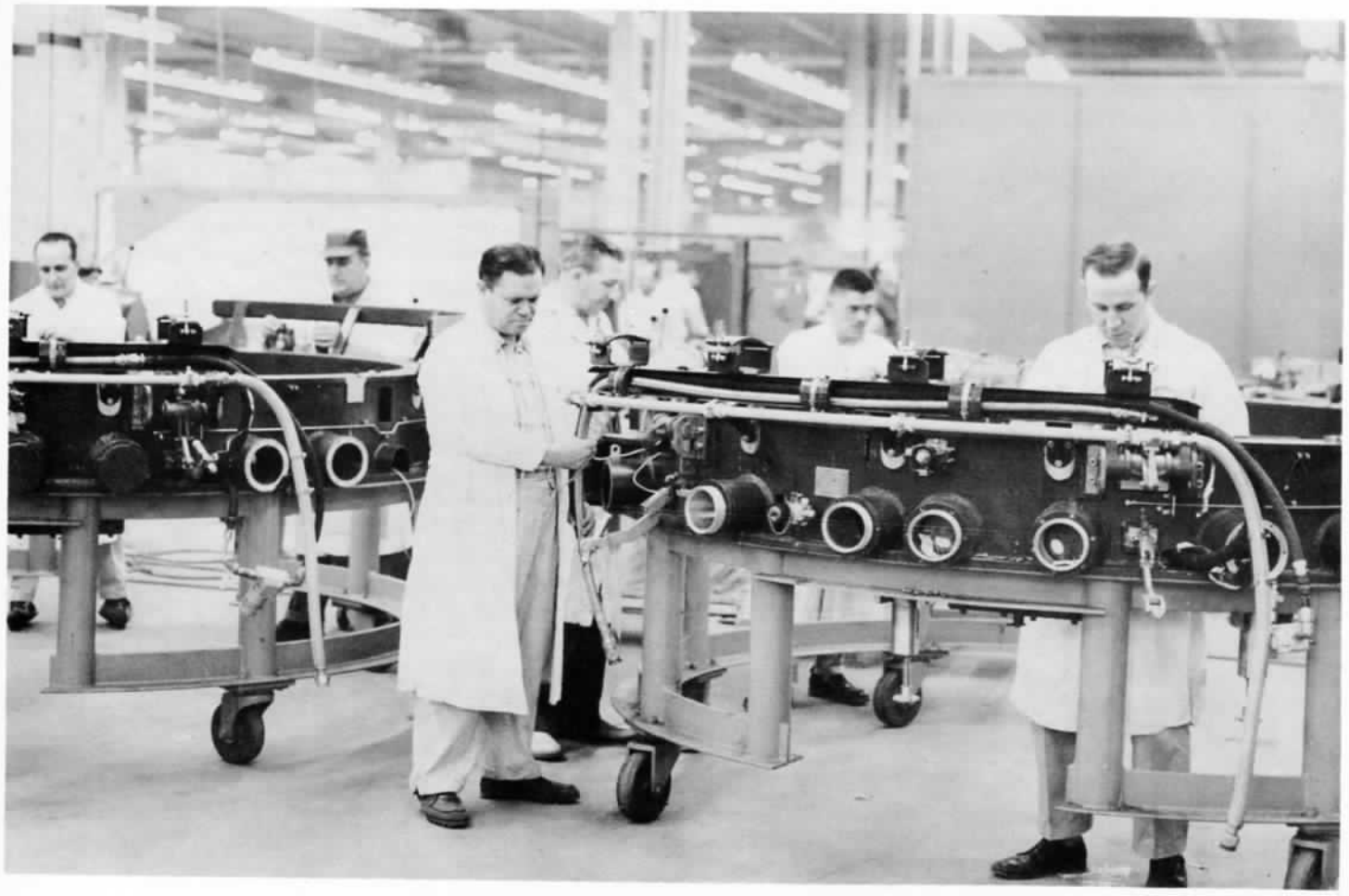
CHRYSLER CORPORATION MISSILE DIVISION

Ground Support Equipment--JUPITER

Electrical components are installed in an electrical equipment trailer in the final assembly area.

CHRYSLER CORPORATION MISSILE DIVISION

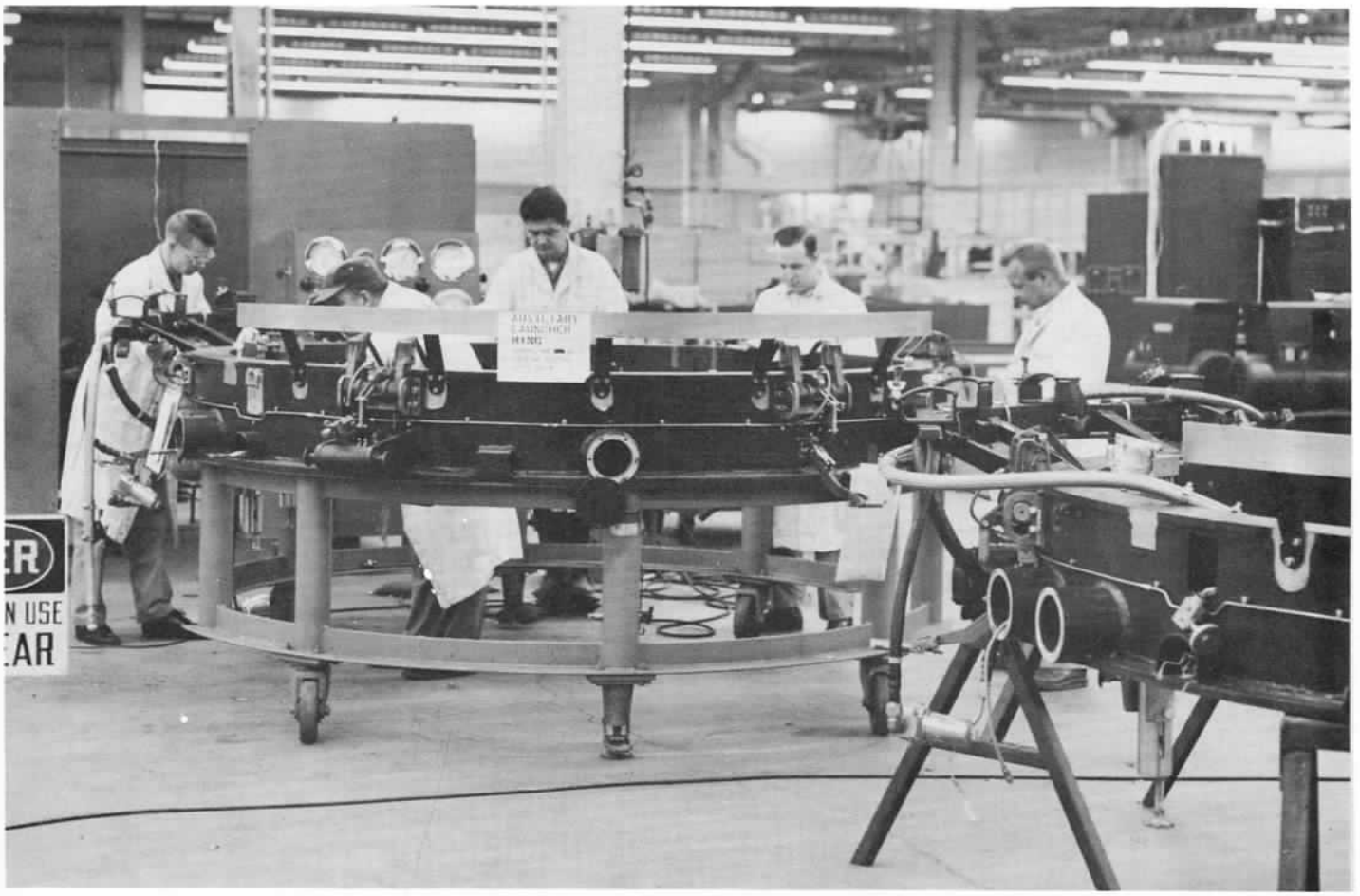
Ground Support Equipment--JUPITER



This is the final assembly area for auxiliary launching rings.

CHRYSLER CORPORATION MISSILE DIVISION

Ground Support Equipment--JUPITER



Once assembly is completed, the auxiliary launching ring is given a pneumatic test at 3,000 psi.

CHRYSLER CORPORATION MISSILE DIVISION

Ground Support Equipment--JUPITER

This 30-watt generator, which is assembled at Chrysler Missile Division, supplies all the power for lighting, at the launching site.

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