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FEDERAL SPECIFICATION

SEALING COMPOUND; RUBBER BASE, TWO COMPONENT (FOR CALKING, SEALING, AND GLAZING IN BUILDING CONSTRUCTION)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the properties of a two-component cold-applied synthetic rubber base joint sealing compound, including curing agents, for sealing, calking, or glazing application in buildings and other types of construction.

1.2 Classification.

1.2.1 *Types.* The sealing compound shall be furnished in the following types, as specified (see 6.2).

Type I.—Flow, self-leveling.
Type II.—Non-sag.

2. APPLICABLE SPECIFICATIONS, STANDARDS, AND OTHER PUBLICATIONS

2.1 Specifications and standards. The following specifications and standards, of the issues in effect on date of invitation for bids, form a part of this specification to the extent specified herein.

Federal Specifications:

SS–R–406—Road and Paving Materials; Methods of Sampling and Testing.

Federal Standards:

Fed. Std. No. 102—Preservation, Packaging, and Packing Levels.

Fed. Test Method Std. No. 141—Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.

Fed. Test Method Std. No. 601—Rubber: Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standards:

MIL–STD–129—Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues in effect on date of invitation for bids shall apply:

American Society for Testing and Materials (ASTM) Publications:

E42–64—Recommended Practice for Operating Light and Water-Exposure Apparatus (Carbon-Arc Type) for Artificial Weathering Test.

C150–63—Standard Specification for Portland Cement.

C207–49—Standard Specifications for Hy-

drated Lime for Masonry Purposes.
D1191–64—Methods of Testing Concrete Joint Sealers.

(Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa.)

3. REQUIREMENTS

3.1 Material. The sealing compound shall be furnished in two components, a base component with suitable reinforcing agents and a liquid or paste curing agent consisting of accelerators and suitable extenders for on-the-job mixing. The resulting mixture shall be homogeneous and of a consistency suitable for handgun operation or for pressure extrusion. The type I compound shall be of such consistency that when properly mixed, it has sufficient flow to give a smooth level surface, when applied in a horizontal joint at a temperature between 40° and 122° F. The type II compound shall be of such consistency that when properly mixed it permits application in vertical joints with no appreciable sagging of slumping at temperatures between 40° and 122° F.

3.2 Stability. The base compound and accelerator in the orginal unopened containers shall be stable for at least 12 months from the time of delivery, when stored at a temperature not exceeding 80° F.

3.3 Toxicity. Under normal application conditions and adequate ventilation, the compound shall not be considered toxic.

3.4 Detail requirements.

3.4.1 *Color.* The color of the sealant, after curing 14 days in air at standard conditions of temperature and relative humidity (see 4.3.1), shall be any specific color agreed upon by the purchaser and supplier (see 6.2).

3.4.2 *Rheological properties.*

3.4.2.1 *Type I (flow, self leveling) compound.* The flow of a properly prepared type I compound shall be such that when tested as prescribed in 4.3.2.1 it shall exhibit a smooth level surface.

3.4.2.2 *Type II (non-sag) compound.* The flow of a properly prepared type II compound shall be such that when tested as prescribed in 4.3.2.2 it shall not sag or flow more than $\frac{3}{16}$ inch in vertical displacement.

3.4.3 *Application life.* A properly mixed compound shall have an application life of not less than 3 hours when tested as prescribed in 4.3.3.1 or 4.3.3.2.

3.4.4 *Hardness properties.*

3.4.4.1 *Hardness at standard conditions.* A properly mixed compound after 14 days cure shall show a hardness reading of not less than 15 nor more than 50 when tested for Shore "A" hardness (Shore Durometer—instantaneous method) as prescribed in 4.3.4.2.

3.4.4.2 *Hardness after heat aging.* A properly mixed compound after 14 days cure (7 days at standard conditions, 7 days at 212° F.) shall show a hardness reading of not more than 60 when tested for Shore "A" hardness as prescribed in 4.3.4.2.

3.4.5 *Weight loss after heat aging.* A properly mixed compound shall not lose more than 10 percent of its original weight after heat treatment at 212° F., when tested as prescribed in 4.3.5.

3.4.6 *Tack-free time.* A properly mixed compound shall cure to a tack-free condition in not more than 72 hours from the time of mixing, when tested as prescribed in 4.3.6.

3.4.7 *Stain and color change.*[1] A properly mixed compound shall not cause any visible stain on the top surface of a white cement mortar base, when tested as prescribed in 4.3.7. The compound itself shall not show a degree of color change that is unacceptable to the purchaser, when tested as prescribed in 4.3.7.

3.4.8 *Durability (bond-cohesion).*[2] When tested as prescribed in 4.3.8 with mortar, glass and aluminum, or any other specified accessory base material, the total loss in bond area (or cohesion) shall be less than 2 square inches after the completion of 3 test cycles. The losses in area shall be estimated to the nearest 0.1 square inch (see 4.3.8.5 regarding the presence of air bubbles in the sealant).

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[1] Compounds that are to be used exclusively for metal or glass or both, without any contact whatsoever to porous masonry such as concrete, brick, stone, etc., need not be tested for stain or color change unless such a test is specified by the purchaser.

[2] Other accessory base materials such as architectural stone, brick, stainless steel, etc., shall be used in the test in place of or in addition to the standard base materials, when requested by the purchaser.

3.4.9 *Adhesion in peel.*[2] When tested as prescribed in 4.3.9.1 with mortar, glass and aluminum, or any other specified base material, the average peel strength obtained for the sample shall not be less than 10 pounds.

3.5 *Instructions.* The proper mixing proportions, procedures, and suggested equipment for mixing the two components shall be included in the manufacturers instructions.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Sampling and inspection should be in accordance with methods 1011, 1021, and/or 1031 of Fed. Test Method Std. No. 141, as applicable.

4.3 Laboratory tests.

4.3.1 *Standard conditions for laboratory tests.* The standard conditions of temperature and relative humidity referred to in the following sections are defined as 73.4°±2° F. and 50±10 percent, respectively.

4.3.2 *Rheological properties.*

4.3.2.1 *Type I (flow, self-leveling) compound.* Apparatus and accessory materials required are: (1) Controlled temperature box, 40°±2° F.; (2) Stainless steel channel (type 304, No. 2–B finish, approximately No. 16 gage), with inside dimensions ¾ inch wide, ½ inch deep, 6 inches long and closed at both ends (fig. 1–a).

The channel shall be cleaned with methyl ethyl ketone or similar solvent followed by a thorough cleaning with a detergent solution and a final rinse with clear water. Before preparing the test assembly, 100 g. of base compound and the appropriate amount of accelerator shall be conditioned at 40°±2° F. for 16 to 24 hours. The metal channel shall also be conditioned at 40°±2° F. for 1 to 2 hours. At the end of the required conditioning period, the base compound and accelerator shall be removed from the conditioning chamber and hand mixed for 5 minutes. The mixed compound shall then be returned to the chamber at 40°±2° F. for 30 minutes after which it shall be poured into the conditioned channel, held horizontally at 40°±2° F. and then maintained at this temperature for 1 hour. At the end of this period the compound shall be examined for flow properties.

4.3.2.2 *Type II (nonsag) compound.* Apparatus and accessory materials required for this test are: (1) Oven, convection type, controlled at 122°±2° F.; (2) Cold box, controlled at 40°±2° F.; (3) Two stainless steel channels (type 304, 2–B finish, approximately No. 16 gage) with inside dimensions ¾ inch wide, ½ inch deep, and 6 inches long with the top end open and the back surface extended 2 inches (fig. 1(b)). Before preparing the test assemblies, 200 g. of base compound and the appropriate amount of accelerator, shall be exposed at standard conditions for 16 to 24 hours and the two channels shall be exposed for 1 hour, one at 40°±2° F. and the other at 122°±2° F. At the end of this conditioning period the components shall be hand mixed for 5 minutes. The conditioned channels shall be removed from their respective conditioning chambers and both filled, by spatula or gun, with the mixed compound within 12 minutes. The filled channels shall then be returned to their respective conditioning chambers and set in a vertical position with the 2-inch extension in the base position. At the end of 4 hours, the channels shall be removed from the chambers and the sag of the compound at the lower ends, measured to the nearest 1/16 inch.

4.3.3 *Application life.*

4.3.3.1 *Type I (flow, self-leveling) compound.* Accessory materials required are: (1) 6-ounce capacity air powered calking gun

[2] Other accessory base materials such as architectural stone, brick, stainless steel, etc., shall be used in the test in place of or in addition to the standard base materials, when requested by the purchaser.

("Semco", "Pyles" or similar type), (2) 6-ounce polyethylene cartridge with plunger, (3) 50 p.s.i. air supply, (4) Pint container, (5) Stopwatch. The test shall be performed on the two components that have been conditioned at least 16 hours at standard temperature and relative humidity. At the end of the conditioning period about 400 g. of base compound and appropriate amount of accelerator shall be mixed for 5 minutes and a sufficient amount placed into the 6-ounce cartridge, to completely fill the cartridge with plunger in place. The filled cartridge and gun shall be set aside at standard temperature and relative humidity for 3 hours. At the end of 3 hours, with no nozzle added to the cartridge, the compound shall be gunned at 50 p.s.i. pressure into the empty pint container. A stopwatch shall be used to time the extrusion.

The compound meets the requirement for 3 hours application life if the time required to empty the cartridge does not exceed 30 seconds (fig. 2).

4.3.3.2 *Type II (nonsag) compound.* The test procedure is the same as that described in 4.3.3.1. The compound meets the requirement for 3 hours application life if the time required to empty the cartridge does not exceed 1 minute.

4.3.4 *Hardness.*

4.3.4.1 *Hardness at standard conditions.* Accessory material required are: (1) Shore Durometer (Model A), or equivalent, (2) brass frame with inside dimensions 5 by 1½ by ¼ inch thick; (3) 2 aluminum plates 3 by 6 inch (16 to 24 gage); (4) thin knife blade; (5) metal straightedge.

The instrument used to measure hardness shall be the Shore Durometer, Model A or equivalent, described in Fed. Test Method Std. No. 601, method 3021. All readings shall be taken by the instantaneous method, using a hand pressure of about 1 kilogram. The procedure shall be carried out at standard temperature and relative humidity.

After conditioning at least 250 g. of base compound and appropriate amount of accelerator for 16 to 24 hours at standard conditions, the components shall be mixed thoroughly for 5 minutes. The frame, after being centered on the aluminum plate shall be filled with a portion of the sample and struck off flat with a spatula. The frame is then lifted up from the sealant after running a thin knife blade along the inside edge of the frame. Two such specimens shall be prepared and allowed to cure for 14 days at standard conditions. At the end of 14 days, hardness measurements shall be made with the Durometer, at standard conditions. Three readings shall be taken on each specimen and the average of six readings regarded as the accepted value (fig. 3B).

4.3.4.2 *Hardness after heat aging.* Apparatus and materials required: (1) Forced draft oven controlled at 212°±3° F.; (2) Shore Durometer, Model A; (3) brass frame with inside dimensions, 3 by 5 by ⅜ inch thick; (4) 2 aluminum plates 3 by 6 inch (16 to 24 gage); (5) thin knife blade; (6) metal straightedge.

Two specimens shall be prepared as described in 4.3.4.1 except that the thickness of the sealant layer shall be ⅜ inch instead of ¼ inch. The specimens shall be allowed to cure for 7 days at standard temperature and relative humidity followed by 7 days curing in an oven at 212°±3° F. for an additional 7 days. At the end of the oven curing period the specimens shall be allowed to cool at standard temperature and relative humidity for 3 hours. Immediately after the cooling period, a ⅛-inch layer of sealant shall be cut from half the top surface of the specimen (fig. 3C). Three hardness readings shall be taken on the newly exposed surface of each specimen, and the average of the six readings shall be regarded as the accepted value.

4.3.5 *Weight loss after heat aging.* Apparatus and materials required are (1) forced draft oven controlled at 212°±3° F.; (2) balance sensitive to 0.01 g. (3) materials listed in 4.3.4.1.

After weighing the two aluminum plates to the nearest 0.01 g., two specimens shall be prepared as described in 4.3.4.1, and weighed to the nearest 0.01 g. The specimens shall then be cured for 7 days at standard conditions followed by an additional 7 days curing in an oven controlled at 212°±3° F. At the end of the heat treatment, the specimens shall be allowed to cool for 1 hour at standard conditions and weighed to the nearest 0.01 g. The percentage weight loss of the sealant shall be calculated for each specimen. The average weight loss

obtained from the two specimens shall be the accepted value.

4.3.6 *Tack-free-time.* Accessory materials required are: (1) brass weight, 30 g., approximately 1⅝ by 1 by ⅛ inch; (2) 2 polyethylene strips (clear), approximately 4 by 0.004± 0.002 inch; (3) materials listed in 4.3.4.1.

Two specimens shall be prepared as described in 4.3.4.1. After the specimens have been exposted in air for 72 hours at standard conditions of temperature and relative humidity the polyethylene film shall be pressed on the top surface of the compound with the brass weight (30 g.) for 30 seconds. The film shall then be progressively withdrawn at right angles to the compound (fig. 4). The sample meets the requirement if the film pulls off from both specimens without any sealant adhering to it.

4.3.7 *Stain and color change.* Apparatus and accessory material required are: (1) Accelerated weathering machine, single carbon arc, with 102–18 cycle (102 minutes light followed by 18 minutes light and deionized water spray) conforming to type A of Standard Recommended Practice ASTM E42–64; (2) Portland cement, white, nonstaining, conforming to type I of ASTM Specification C150–63; (3) Hydrated lime, conforming to type S of ASTM Specification C207–49; (4) Three aluminum plates, 6 by 2¾ inch, approximately No. 16 gage; (5) Frame, brass rectangular (designated "A" frame), ¼ inch thick with inside dimensions approximately 1/32 inch less than the aluminum plates; (6) Frame "B" rectangular, brass, ¼ inch thick, with inside dimensions 5 by 1½ inch; (7) Steel straight edge; (8) Thin knife blade. Test shall be made in the laboratory at standard conditions or as specified.

The test specimen shall consist of a slab or mortar mix upon which is placed the properly mixed compound. The mortar shall be prepared by combining, by weight, 1 part white portland cement, 0.25 part hydrated lime and 4 parts graded Ottawa sand, with sufficient water to make a smooth workable paste (water-cement ratio=0.8). The mortar mix shall be spread, with the aid of Frame A over the entire surface of each of the aluminum plates to a depth of approximately ¼ inch and struck off flat with a straight edge. Three such mortar specimens shall be prepared and be allowed to cure in air for 4 hours at standard conditions. At the end of the 4-hour curing period a ¼-inch-thick layer of properly mixed sealant shall be spread with the aid of Frame B, over the surface of two of the three specimens leaving a margin of approximately ½ inch of mortar free of sealant.[3] The third specimen shall be left without sealant. The three specimens shall be exposed in air for 16 to 24 hours at standard conditions (fig. 5).

At the end of the initial air exposure, two specimens, one with and one without sealant, shall be placed on the inside of the drum of the accelerated weathering machine for 100 hours. Specimen temperature shall be 140°±5° F. and water temperature 75°±4° F. The third specimen (with sealant) shall be exposed in air at standard conditions of temperature and relative humidity for 14 consecutive days. During this exposure period, the specimen shall be immersed in distilled water for 1 minute, once a day (working days only).

At the end of the exposure periods, examine all specimens containing the sealant for stains in the mortar and color change in the sealant. The mortar specimen without sealant is used as a control.

A stain shall be recorded if there is any discoloration in the mortar color of either of the two sealant test specimens when compared with the mortar color of the control specimen.

A color change shall be reported if there is any variation in color of the sealant that has been placed in the weathering machine, as compared with the sealant exposed under laboratory conditions.

All pink, red, and brown stains in the mortar shall be cause for failure. Very light tan, gray, or buff stains as well as any color changes in the sealant shall be reported but with final acceptance to be decided by the purchaser.

4.3.8 *Durability (bond-cohesion).*

4.3.8.1 *Extension machine.* The machine used in this test shall be so designed that the

[3] The unopened sample (base and activator) shall be conditioned at standard temperature and humidity for 16 to 24 hours before use. About 250 g. of sealant shall be mixed.

test specimen while at a temperature of 0°±2° F. can be extended from an original joint width of 3/8 inch to a final width of 9/16 inch at a uniform rate of 1/8 inch per hour. The machine shall be similar in design to the one described in SS–R–406, method 223.11 or in ASTM D1191–52, Testing Concrete Joint Sealers. Figures 6a and 6b illustrate two such types of machines with 1/8-inch stainless steel grips to accommodate hight tensile strength rubber base compounds.

4.3.8.2 *Accessory materials.* The accessory base materials used in the durability test shall be (1) portland cement mortar; (2) plate glass (3) anodized aluminum.

Note: Other accessory materials such as brick, cast stone, wood, stainless steel, etc. may be specified either in place of the standard materials, or in addition to them, in the durability test at the request of the purchaser.

4.3.8.2.1 *Mortar blocks.* Cement mortar blocks, 3 by 2 by 1 inch shall be prepared as prescribed in SS–R–406, method 223.11, paragraph 7.2, or in ASTM D1191–52T, except that each block shall be surfaced by wet grinding on an iron lap with No. 60 silicon carbide or aluminum oxide abrasive grain.

4.3.8.2.2 *Plate glass.* Glass accessory plates shall be 3- by 2- by 1/4-inch plate glass. Prior to use, the plates shall first be cleaned with methyl ethyl ketone or similar solvent followed by a thorough cleaning with a detergent solution and a final rinse with clear water.

4.3.8.2.3 *Aluminum.* The aluminum plates shall be 3 by 2 by approximately 3/16-inch aluminum alloy 6061–T6, anodized a minimum of 20 minutes over a scale free finish. The plates shall be cleaned as described in 4.3.8.2.2.

4.3.8.3 *Preparation of test specimens.* Three test specimens shall be prepared for each accessory base material that is used with the sample under test. After conditioning the sample for 16 to 24 hours at standard temperature and relative humidity, 250 g. with proper amount of accelerator shall be mixed for 5 minutes and then applied in a bead 3/8 by 1 by 2 inches between parallel 3- by 2-inch faces of two similar accessory blocks or plates as shown in figure 7 a, b, and c. Metal spacer bars 3/8 by 1/2 by 2 inches shall be used to give the proper size of bead. (fig. 7d). Paraffin, mold release agent, or polyethylene sealed to the inside surfaces of the spacers shall be used to prevent adhesion. Heavy rubber bands or clamps shall be used to hold the test assembly together before and after filling with the compound. In the case of a flow type compound, masking tape or melted paraffin may be used to retain the compound in place during the curing period.

Note: Accessory base materials shall be primed with the manufacturer's recommended primer only when the use of such primer is specified by the seller and agreed upon by the purchaser.

The test assemblies shall be cured in air for 10 days at standard temperature and relative humidity followed by 4 days curing while immersed in distilled water at standard temperature.

4.3.8.4 *Cycling procedure.* Following the curing period of 14 days the spacers shall be separated from the compound and the specimens put through the following cycle three times.

a. Specimens (with spacers between blocks or plates but not in contact with compound) shall be heated for 24 hours in an oven at 158°±2° F.
b. Specimens shall be allowed to cool to room temperature and then immersed in distilled water (without spacers) at standard temperature for 7 hours.
c. Specimens shall be surface dried and placed in cold box held at 0°±2° F. for not less than 8 hours.
d. Specimens shall be placed (frozen) in the grips of the extension machine and extended from the original 3/8 inch width to 9/16 inch at 0°±2° F., at the rate of 1/8 inch per hour.
e. After the extension is completed, spacers, 9/16 inch diameter shall be placed between the blocks or plates, and the stretched specimens removed from the machine and allowed to warm up for 3 hours in air at standard conditions (fig. 7e). At the end of the 3 hours, the specimens shall be examined for bond and cohesion breaks.

f. To start the second cycle the specimens shall be placed with the original ⅜-inch spacers, in the oven at 158° ±2° F., so that the 2- by 3-inch face of each specimen rests on the oven shelf. Note: The joint usually recovers to the original ⅜-inch width. If necessary, a small weight, approximately 2 pounds may be placed on the upper block or plate to hasten the recovery of the joint.

At the end of the third cycle, the total loss in bond and cohesion shall be estimated to the nearest 0.1 inch.

4.3.8.5 *Formation of bubbles.* On the completion of the measurements of bond and cohesion loss, each test specimen shall be cut in half through the middle of the sealant and the specimens examined for air bubbles. The presence of air bubbles which cover more than half the area of the sealant in two or more specimens shall be cause for failure.

4.3.9 *Adhesion in peel.* This test is made on plate glass, anodized aluminum and portland cement mortar after the test specimens have been cured for 14 days as specified herein. It is performed in a testing machine in which the sealant (sealed to cloth) is peeled back at an angle of 180° at a separation rate of 2 inches per minute.

Note: Other accessory base materials such as brick, cast stone, wood, stainless steel, etc. may be specified either in place of the standard materials or in addition to them, at the request of the purchaser.

4.3.9.1 Apparatus and accessory materials required are: (1) Testing machine with tension grips capable of pulling at a rate of separation of 2 inches per minute with a dial or chart indicator calibrated in 1-pound units; (2) Two 5- by 3-inch pieces of anodized aluminum (same type as described in section 4.3.8.2.3); (3) Two 5- by 3-inch pieces of ¼-inch plate glass; (4) Two 5- by 3- by ⅜-inch mortar slabs prepared as described in 4.3.8.2.1 except for size; (5) Desized grade A airplane fabric, 4.28 ounces per yard, 80/84 count, or any suitable cloth that will adhere to the sealant (six 6- by 3-inch pieces); (6) Paper masking tape, 1 inch wide.

Before constructing the test assemblies, the test surfaces shall be cleaned with methyl ethyl ketone or a similar solvent followed by a thorough washing with a detergent solution and a final rinse with clear water.

A strip of 1-inch paper masking tape shall be placed across the width of the plate so that the lower edge of the tape is parallel to the lower edge of the plate and 2 inches above it (fig. 8a). After exposing not less than 250 g. of compound and accelerator for 16 to 24 hours at standard conditions, a properly mixed portion shall be spread on the surface of the plate to a thickness of ⅛ inch over an area from the top edge of the tape to the bottom of the plate and the entire width of the plate (fig. 8b). The cloth, approximately 6 by 3 inch is smeared with the compound at one end over an area of 3 by 3 inch and forced into the cloth using a spatula. The impregnated cloth is laid over the ⅛-inch layer of compound without entrapping air. Then the assembly is placed between $\frac{1}{16}$-inch spacer bars and the surfaces of the cloth rolled with a glass rod so that the thickness of the compound between the cloth and the surface is $\frac{1}{16}$ inch (fig. 8c).

Two aluminum, glass and mortar specimens shall be prepared as described above for each sample of sealant. Primer shall be applied to the dry surfaces only when specified and supplied by the manufacturer and agreed upon by the purchaser.

After preparation, the test specimen shall be allowed to cure in air for 7 days at standard conditions of temperature and relative humidity followed by an additional 7 days curing while completely immersed in distilled water at standard temperature. After the specimen has cured the first 2 days, the cloth shall be coated with a thin layer ($\frac{1}{32}$ inch or less) of the mixed sample to protect the cloth from moisture and to minimize cloth adhesion failure after water immersion (fig. 8d).

After 7 days curing in air and immediately before immersing the specimen in water for 7 days, the surface of the fabric shall be cut through to the base surface with a sharp razor blade leaving two strips of sealant and fabric 1 inch wide, separated by a space approximately ⅜ inch wide (fig. 8e).

Immediately following the 14 day cure, the specimen shall be prepared for testing by wiping it dry, and releasing 1 inch of the cloth and

masking tape from the base. Then the specimen shall be placed in the testing machine and the cloth peeled back at an angle of 180°. The rate of separation of the jaws of the machine shall be 2 inches per minute. The sealant shall be pulled for 1 minute, and the average value in pounds indicated by a dial or recording chart on the machine be noted. If the cloth peels from the sealant, during testing, such values obtained shall be disregarded. In such instance the compound shall be cut across with a sharp razor blade in order to get separation at the interface to the test surface.

Four strips shall be tested for each base material (aluminum, glass etc.) and the average peel values recorded in pounds.

Any sample of sealant showing an average peel strength of less than 10 pounds shall be regarded as failed, for the specific base material.

4.4 The packaging, packing, and marking of the sealing compound shall be inspected to determine conformance to the requirements of section 5 of this specification.

5. PREPARATION FOR DELIVERY

For civil agency procurement, the definitions and applications of the levels of packaging, and packing shall be in accordance with Fed. Std. No. 102.

5.1 Packaging.

5.1.1 *Levels A and B.* Not applicable.

5.1.2 *Level C.* The sealing compound is supplied in two containers, the larger container holding the base compound, and the smaller container holding the curing agent or activator. Mixing instructions are provided on the label or on the manufacturer's instruction sheet. The base compound container may be a full gallon, quart, or pint, etc., or a partially full gallon kit, or quart kit, etc. The kits contain premeasured quantities of base compound and curing agent which can be mixed together in the base container without weighing the contents. Containers shall be the kind commonly used for this type of material on the commercial market.

5.2 Packing.

5.2.1 *Levels A and B.* Not applicable.

5.2.2 *Level C.* The sealing compound shall be packed in a manner which will insure arrival at destination in satisfactory condition and which will be acceptable to the carrier at lowest rates. Shipping containers shall comply with the carrier rules and regulations applicable to the mode of transportation.

5.3 Marking.

5.3.1 *Labeling.* Each container of the compound shall be suitably labeled to show the following information:

a. Manufacturer's name and address.
b. Name and type of material.
c. Capacity.
d. Color.
e. Manufacturer's batch No.
f. Manufacturer's code No.
g. Date of manufacture.
h. Mixing proportions (by weight).

5.3.1.1 In addition to any special marking required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL–STD–129.

6. NOTES

6.1 Intended use.

6.1.1 The joint sealing compound covered by this specification is intended to seal joints in all types of structures where some movement is expected and where tightness against dust, dirt, wind and water is required. Some of the users of the compound as a sealer include channel glazing, bedding and sealing around panels and lights of curtain wall structures, sealing window and door perimeters, sealing the joints between precast concrete panels, sealing flashings and expansion joints, and pointing brick and stone masonry. Producers of rubber base joint sealers list many other and varied uses for this type of sealer.

6.1.2 Small quantities may also be mixed together on a board or plate in lieu of using the base container. On large jobs the compounds may be mixed together in specially designed power mixers.

6.1.3 The mixed compound should be installed with either a calking gun, putty knife or trowel in strict accordance with the producers instructions. It is of prime importance that the joint be dry and free of dust, dirt, oil, grease or old loose calking, before the compound is placed in the joint.

6.1.4 The compound should not be applied to

surfaces coated with lacquer or paint. Such coatings shall be removed before applying the compound. Before applying the compound to masonry joints previously treated with water repellent solutions, a laboratory test for bond shall be made as described in 4.3.8, using the specified type masonry and water repellent solution as accessory materials.

6.1.5 The compound should not be applied in contact with joint fillers such as asphaltic materials, oil base calkings or any other sealants in which the bonding properties and adverse effects resulting from the combination are not known.

6.1.6 Areas adjacent to a joint to be filled can be protected from smearing by the compound with paper masking tape. The tape should be removed 5 to 10 minutes after the joint section is filled. Fresh compound that has accidentally been smeared on masonry should be scraped off immediately and rubbed clean with methyl ethyl ketone, toluene or similar solvent. Cured compound can be removed from tools, containers, etc., with a chlorinated solvent such as ethylene dichloride or other chemical stripping agents.

6.1.7 Some producers recommend the use of a specified primer for porous surfaces (concrete, stone, brick, wood, etc.) before application of the compound. The primer is designed to assure adhesion of the compound to the porous masonry. In all cases where primers are recommended with a compound it is necessary to have the durability and peel strength tests made with the primer in question.

6.1.8 The two component sealing compounds generally have a limited application life of a few hours (75° F.) after the base compound and curing agent are mixed. In case of need the mixed compound can be refrigerated at deep freeze temperature, and the conversion to rubber postponed for several days or weeks as may be required. When ready to apply, the mixed compound may be thawed for a half hour at about 75° F. The feasibility of such procedure should be confirmed by the manufacturer of the compound.

6.1.9 The compound should not be applied to a joint at temperatures under 40° F. At such temperatures a film of moisture is likely to form on the surfaces of the joint as a result of condensation. This moisture film which can be entirely invisible under certain atmospheric conditions may prevent the formation of a strong bond between the compound and the structural material.

6.1.10 Although the compounds are available in several colors, a freshly cured compound may be painted any desired color provided the producer approves such procedure.

6.1.11 Modification of a compound by the addition of liquids or powders to alter its flow properties should not be permitted.

6.1.12 A compound shall not be used on any job if the date of manufacture indicates that the compound is more than 12 months old.

6.2 Ordering data. Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

(*a*) Title, number, and date of this specification.
(*b*) Type required (see 1.2).
(*c*) Color required (see 3.4.1).
(*d*) Size of containers or kits required (see 5.1.2).

6.3 Transportation description. Transportation descriptions and minimum weights applicable to this commodity are:

Rail:

Calking or glazing compound, not otherwise indexed by name.
Carload minimum weight 36,000 pounds.

Motor:

Calking or glazing compound, not otherwise indexed.
Truckload minimum weight 36,000 pounds, subject to Rule 115, National Motor Freight Classification.

CUSTODIAN
Navy—BuDocks
Air Force—69
Army—MR
Review Interest
Army—MR, MU, WC
Air Force—69
Navy—YD

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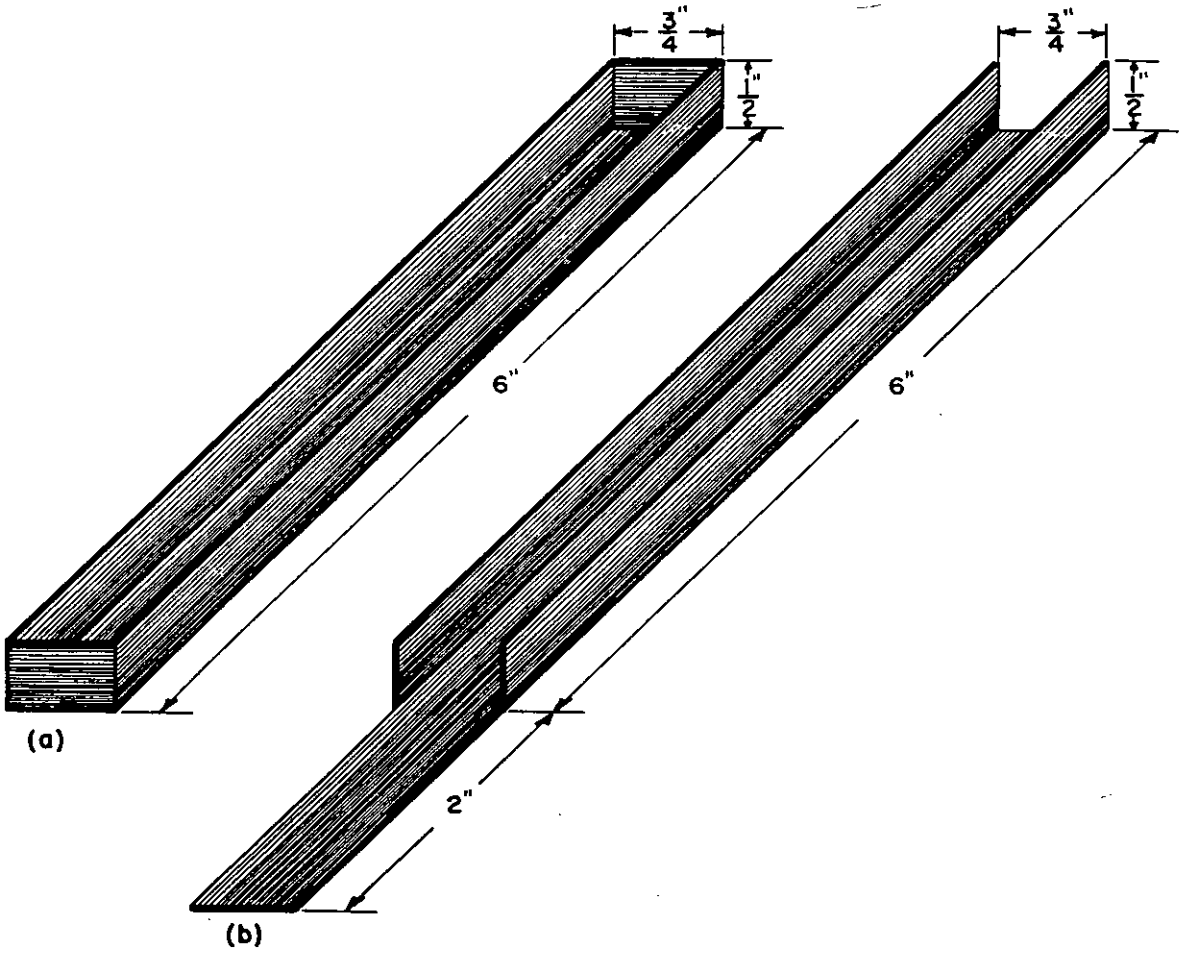

FIGURE 1.—*Channels used for determining rheological properties, (a) for self leveling flow type compound (class A), (b) for non-sag type compound (class B)*

FIGURE 2.—*Application life test using a 6 oz power gun containing a 6 oz cartridge without added nozzle, and operated at 50 psi.*

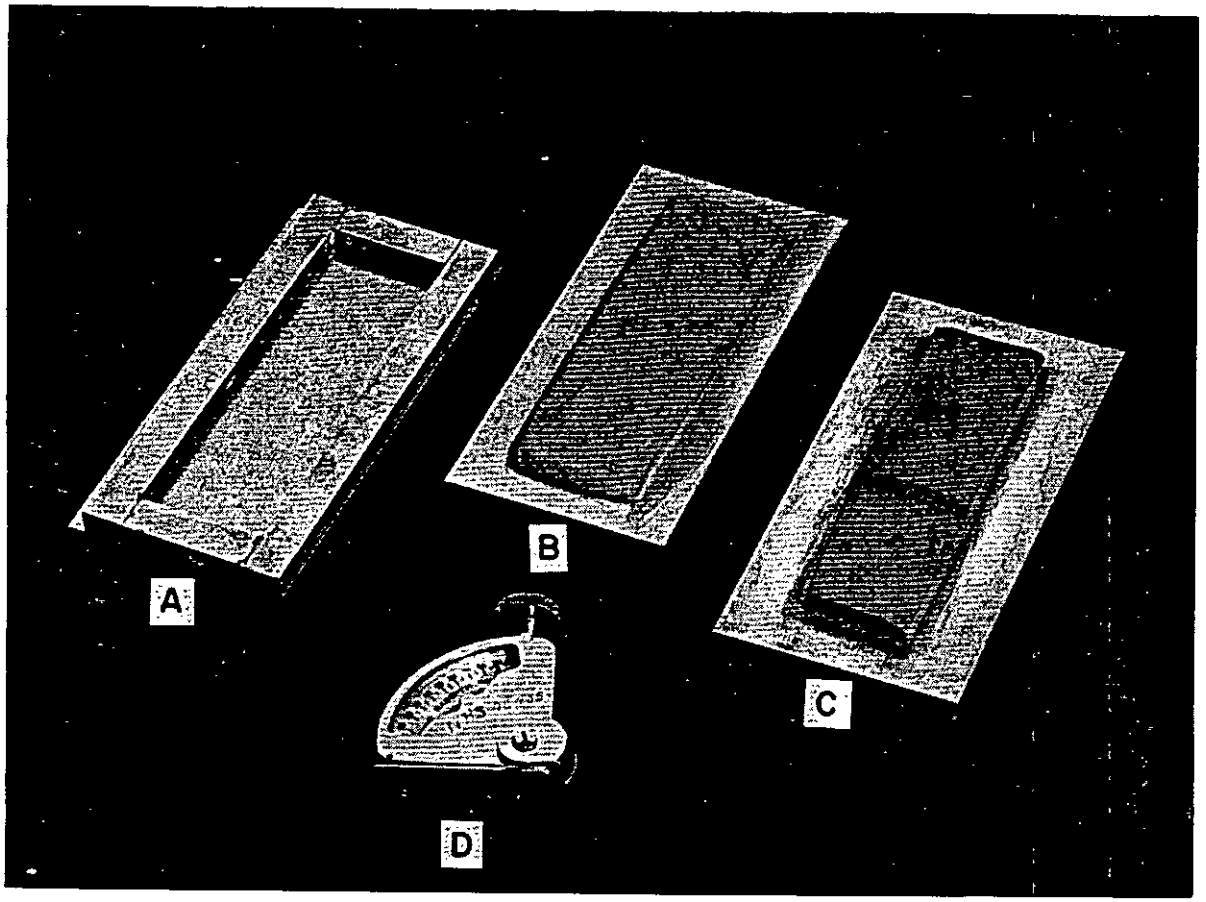

FIGURE 3.—*Stages in the preparation of hardness test specimens. (A) frame. (B) specimen for hardness at standard condition. (C) specimen for hardness after heat aging. (D) Shore Durometer.*

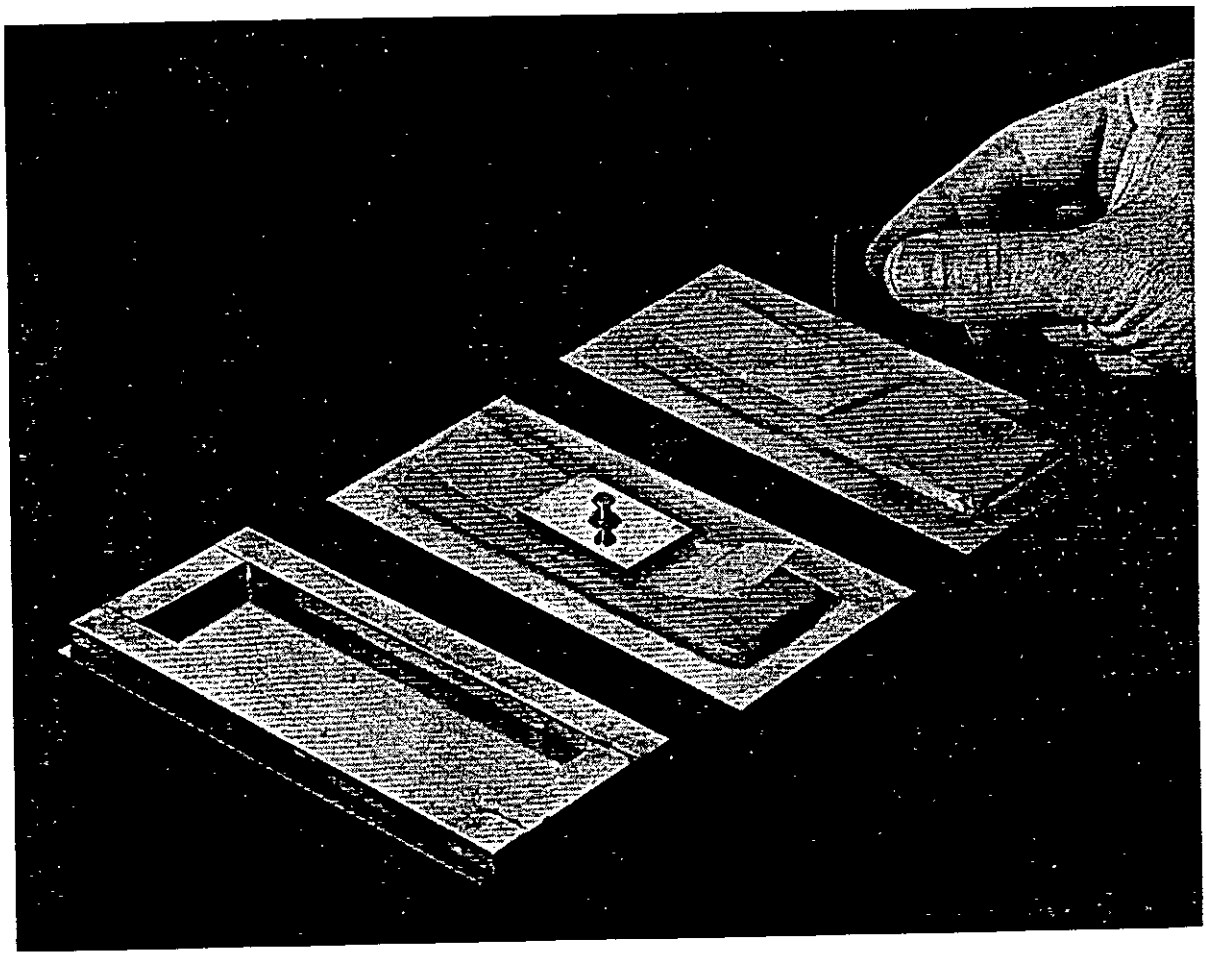

FIGURE 4.—*Stages in the tack-free time test procedure.*

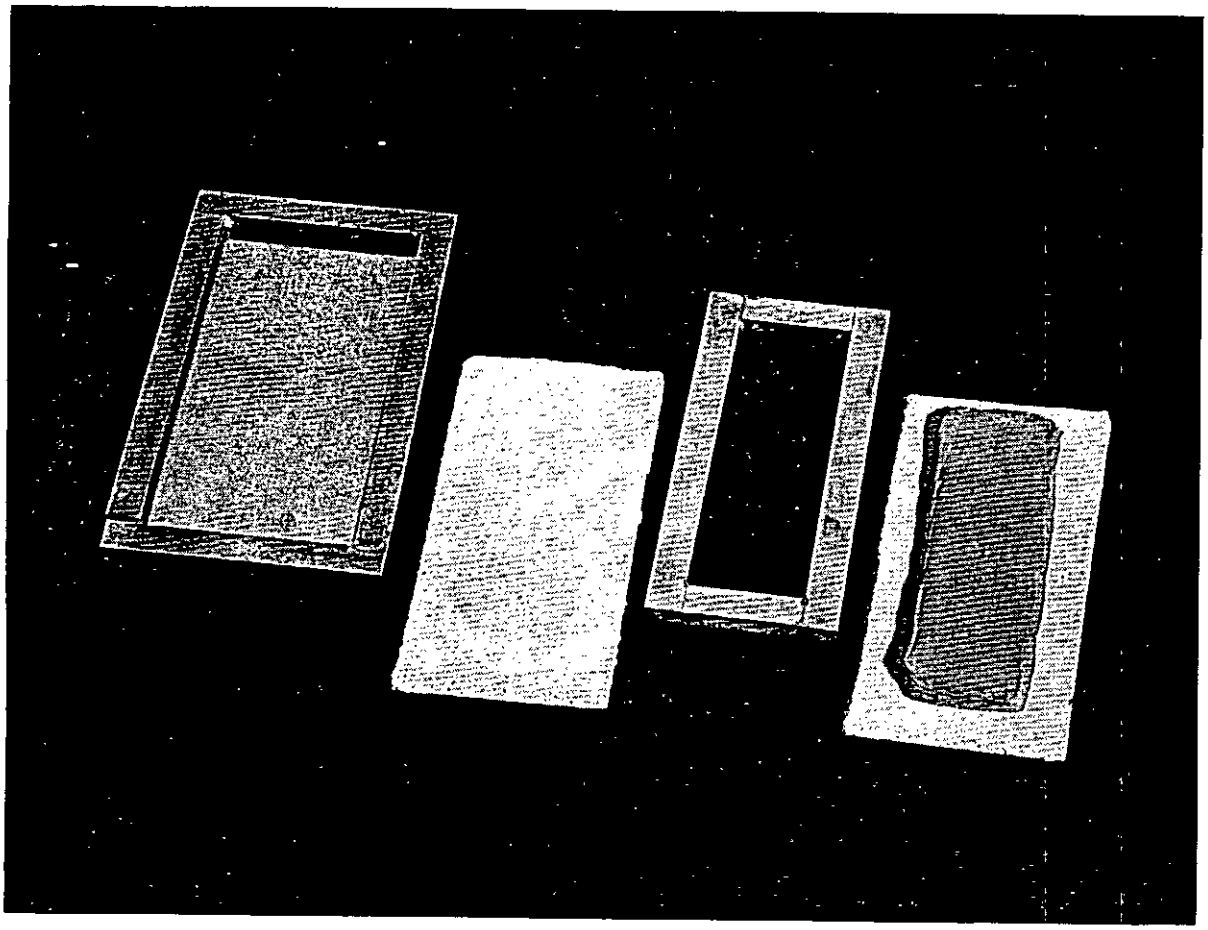

FIGURE 5.—*Stages in the preparation of the stain test specimen.*

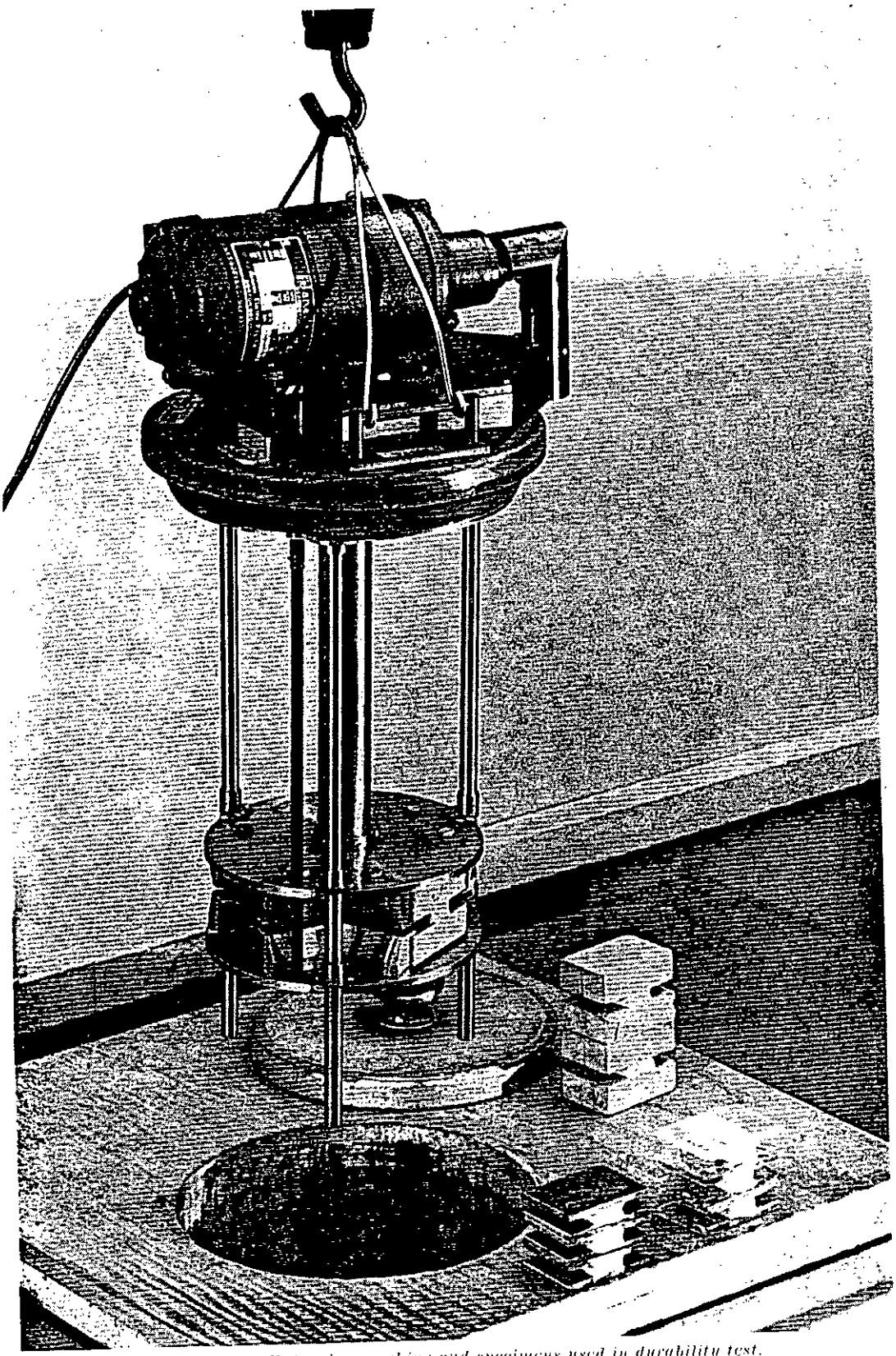

FIGURE 6a.—*Extension machine and specimens used in durability test.*

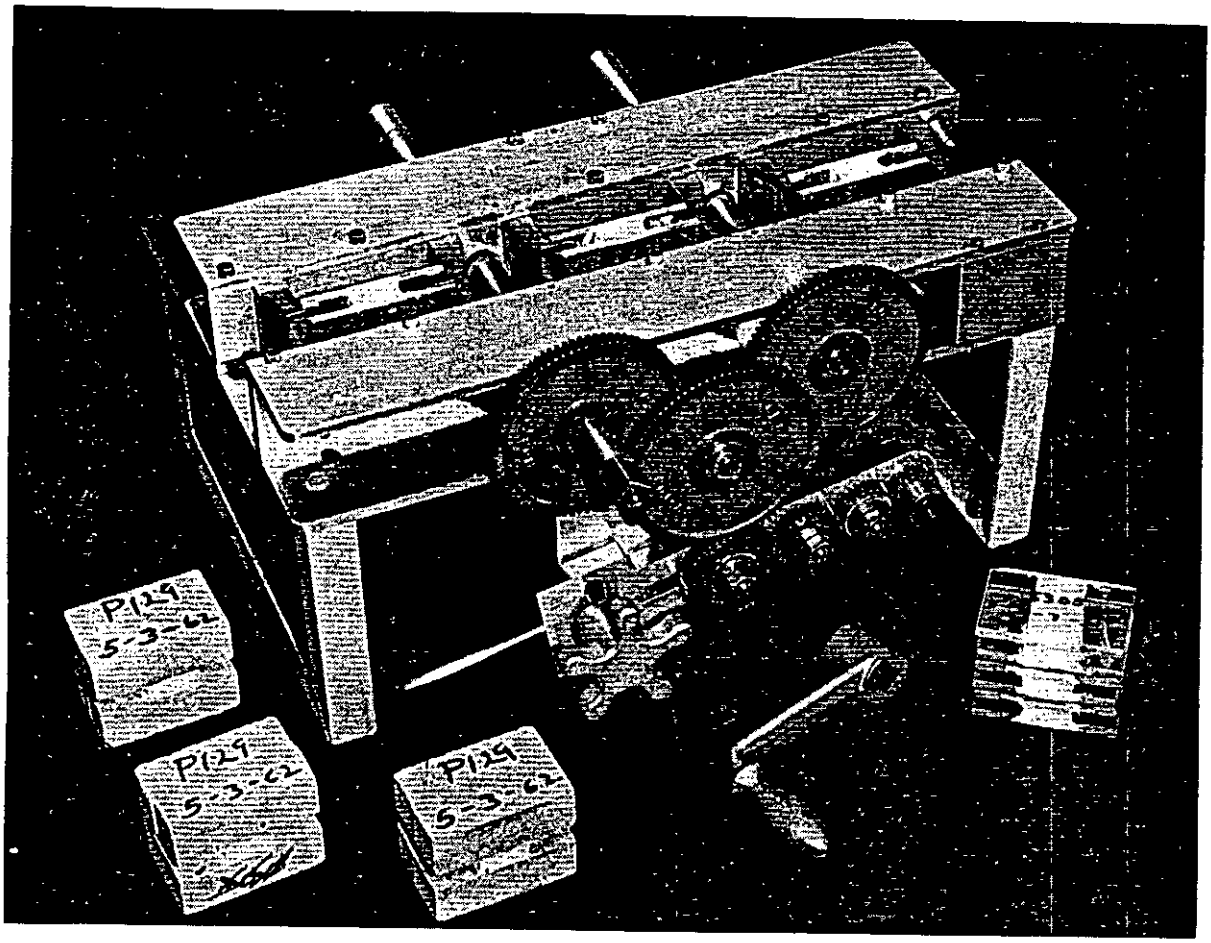

FIGURE 6b.—*Extension machine and specimens used in the durability test.*

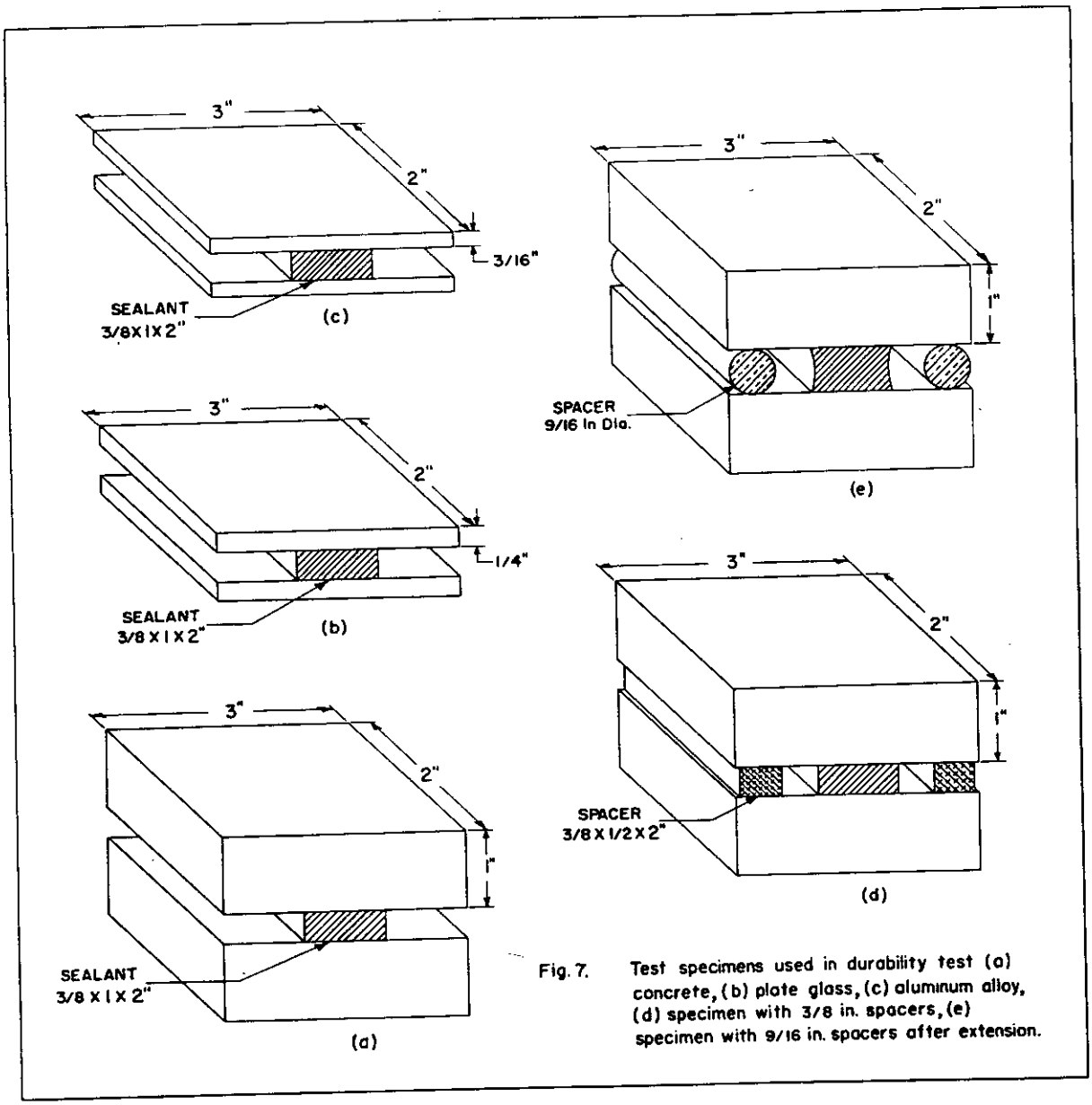

Fig. 7. Test specimens used in durability test (a) concrete, (b) plate glass, (c) aluminum alloy, (d) specimen with 3/8 in. spacers, (e) specimen with 9/16 in. spacers after extension.

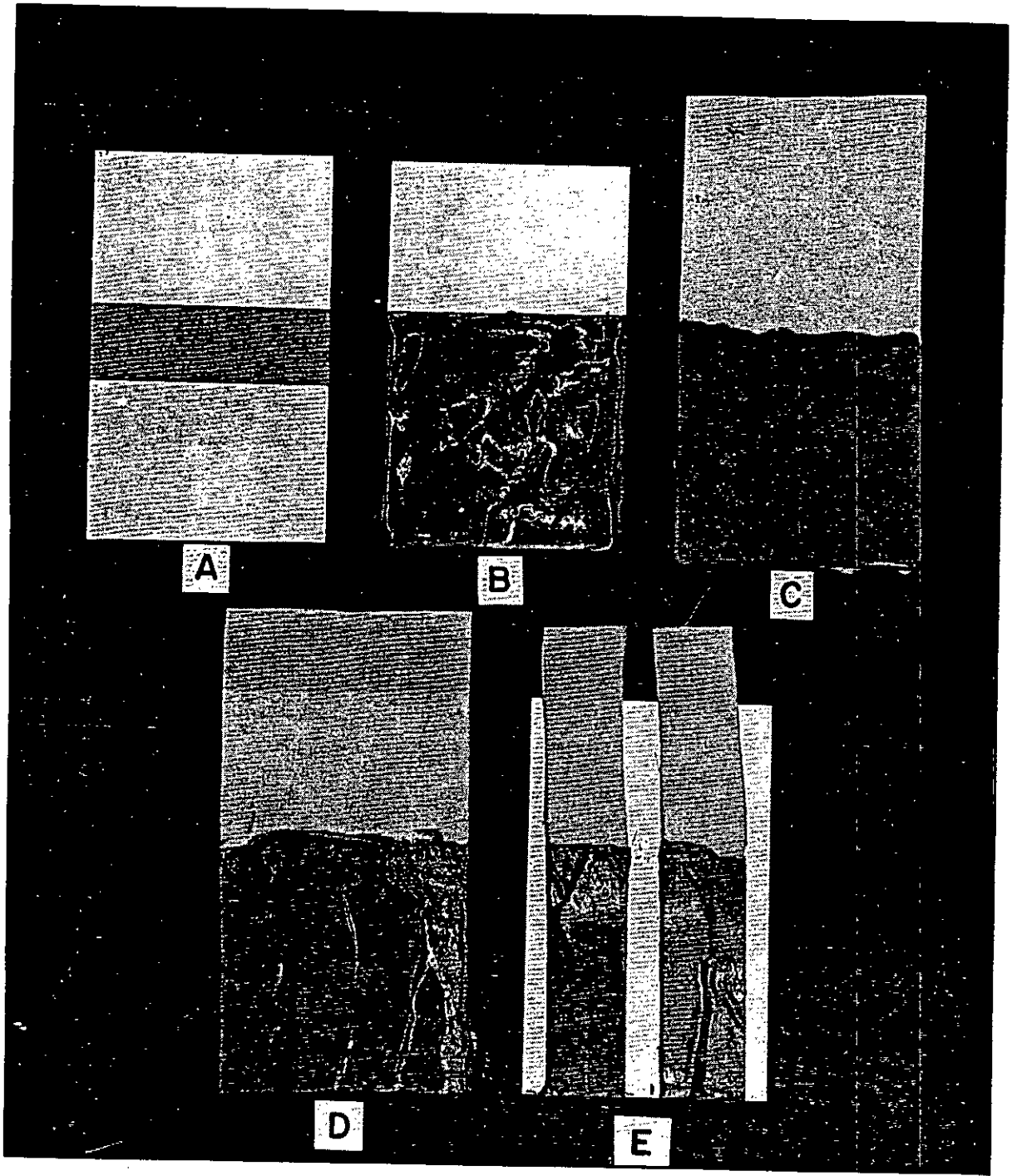

FIGURE 8.—*Stages in the preparation of the adhesion in peel specimen.*

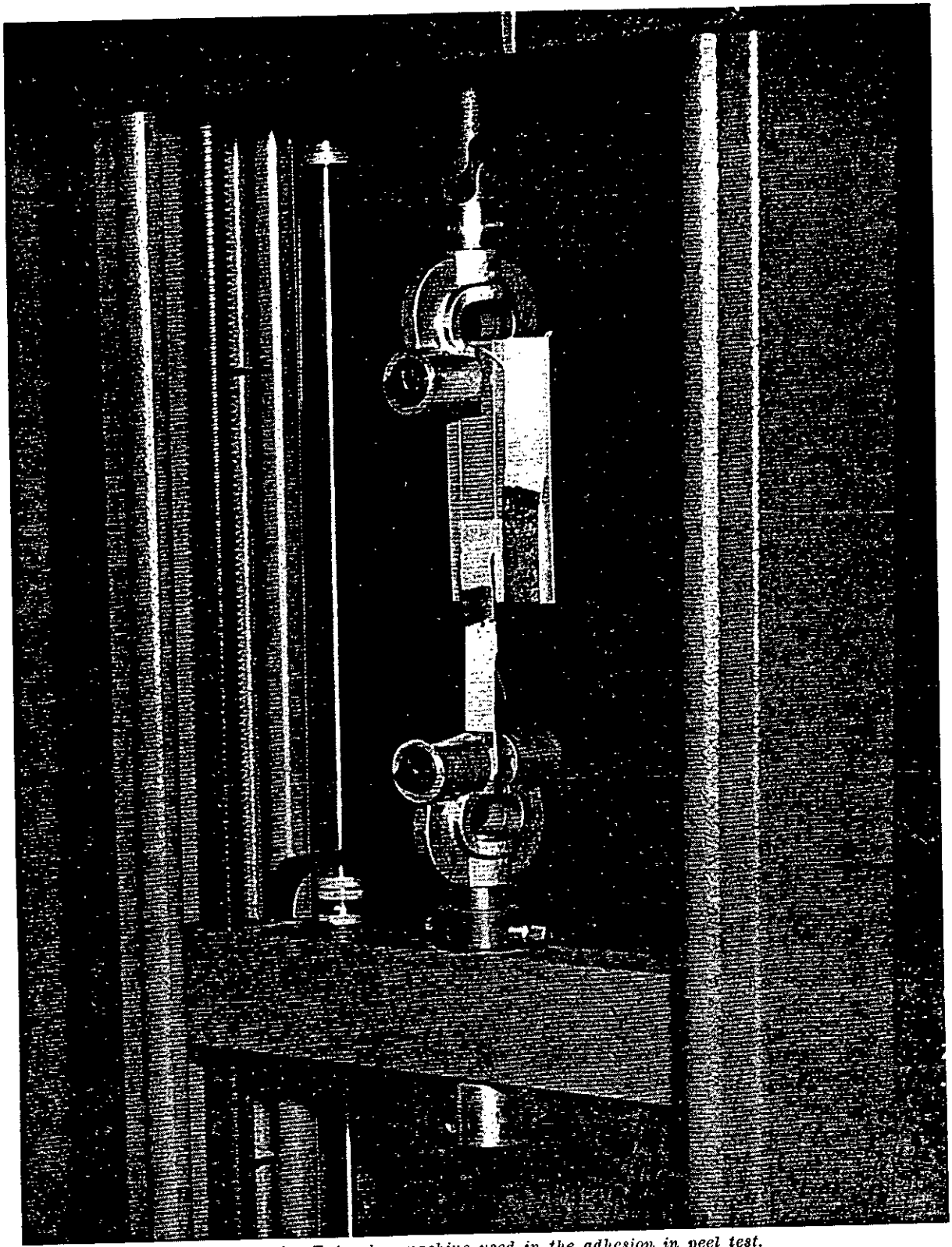

FIGURE 9.—*Extension machine used in the adhesion in peel test.*

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