Tentative Method

For

DETERMINATION OF THE CONSISTENCY OF MAGNESIUM OXYCHLORIDE CEMENTS BY MEANS OF A FLOW TABLE

(OCA 300-12-50) Revised June 29, 1960

SCOPE

1. This method of test describes equipment and defines procedures for determination of the consistency of magnesium oxychloride cements by means of a flow table. (See Note 1)

APPARATUS

2. (a) Flow Table. - (1) General. - The flow table apparatus (See Fig. 1) shall consist of a rigid metal frame and a movable circular top mounted on a heavy pedestal. A mold for forming test specimens of the plastic oxychloride cement mortar shall be provided. All parts of the total assembly shall conform to the detailed specifications as defined in succeeding sections.

(2) Table Top and Shaft. - The top of the flow table shall be made of cast bronze, brass, or of other non-corrodible material having a minimum hardness of B-25 on the Rockwell scale. The top shall be circular in shape with a diameter of 10 ± 0.1 in. and shall have a minimum thickness at its rim of 0.3 ± 0.05 in. The under edge of the rim shall be finished to a smooth surface for a minimum distance of 0.5 in. from its periphery. The top shall be reinforced underneath by a minimum of 6 ribs symmetrically distributed and cast integrally with the top. The top of the table shall be ground and finished to a plane, smooth surface, free from blow-holes and surface defects, and shall have 8 symmetrically spaced lines lightly scribed into its surface radiating from a similarly scored circle to the periphery of the table as illustrated in Fig. 1. The scribed circle shall have a radius from the center of the table top approximately 0.03 in. greater than the radius of the mold (Section 2 (c)). The scoring shall be performed with a 60° scribe to a depth of 0.01 in. The top shall be mounted on a vertical shaft and the shaft, in turn, shall be so mounted in the frame that the table top can be raised and dropped through a distance of 0.5 ± 0.005 in. by means of a rotating cam. (See Note 1). The shaft shall be of medium carbon machinery steel with a diameter of 0.6230 in. within tolerances of +0.0000 in. and -0.0005 in. and shall be attached to the table top by means of a screw thread. The top end of the shaft shall have a collar integrally attached. The lower surface of this collar and the top surface of the frame through which the shaft extends (see following Section (3)) shall be chilled and hardened to a minimum depth of 0.25 in. and both of these surfaces shall be so ground that, at the end of the drop, they will make contact at all points. The shaft shall be perpendicular to the face of the table. The lower end of the shaft which contacts the cam shall be chilled and hardened to the same degree as the top of the cam. The combined weight of table top and shaft assembly shall be 9 ± 0.1 lb. and the weight shall be distributed symmetrically relative to the center-

(3) Frame. - The supporting frame of the flow table and its base shall be integrally cast of fine grained cast iron. The frame casting shall have three integral stiffening ribs extending the full height of the frame and located 120° apart. The base of the frame shall have a thickness of not less than 0.5 in. The top of the frame shall be chilled to a depth of approximately $\frac{1}{4}$ in. and ground as specified in Section 2 (a) (2). The guide-bore in the frame which accepts the shaft of the table top shall be bored and reamed to a diameter of 0.625 in. within tolerances of +0.0000 in. and -0.0005 in. The base of the frame shall be provided with three symmetrically placed holes for anchoring to pedestal top.

(4) Cam. - The rotating and removable cam provided to raise and lower the table top shall be of medium carbon machinery steel the edge or face of which shall be hardened to the same degree as the collar of the table-shaft which contacts it. Means shall be provided for rotating the cam by either a crank or by power furnished by a motor through a suitable gear. The lower end of the shaft shall not strike the cam at the end of the drop, but shall contact the cam at a point not less than 120° from the point of drop. The face of the cam shall be a smooth spiraled curve of uniformly increasing radius from 0.5 in. to 1.25 in. in 360° and there shall be no perceptible jar as the shaft strikes the cam. The contact faces of the cam and shaft shall be such that the table does not rotate more than one revolution during the 25 drops.

(b) Pedestal. - The pedestal on which the flow-table frame is mounted shall weigh not less than 300 lb. and shall be grouted to a concrete floor with 0.5 in. of grout, or shall rest on a gasket-cork pad not less than 0.25 in. thick for dampening. The pedestal shall be at least 10 in. square at the tope and 15 in. square at the bottom and at least 25 in. in height. The top of the pedestal shall be level and plane and shall be provided with a minimum of 4 symmetrically distributed pins for anchoring a plate on which the flow-table frame is to be mounted. These pins shall be not less than 0.5 in. in diameter and 8 in. long. The top plate shall be of cast iron or steel not less than 1.0 in. in thickness and its top surface shall be machined to a smooth and plane finish. The plate shall have 3 symmetrically distributed threaded holes the tops of which shall be tapped to provide slight bevels to make it possible to firmly anchor the flow-table frame, and the table top, after the frame has been mounted on the pedestal, shall be level along two diameters at right angles to each other in both the raised and lowered position.

(c) Mold. - The mold for casting the specimens of oxychloride cement shall be in the form of a frustrum of a right cone and shall be of cast bronze or brass or other noncorrodible material and weighing not less than 2 lb. The hardness of the material shall be not less than B-25 on the Rockwell scale. The base and top shall be open and the top and botton surfaces shall be parallel and at right angles to the vertical axis of the cone. The wall of the mold shall have a thickness of not less than 0.2 in. The inside diameter of the mold shall be 2.75 in. at the top and 4.0 in. at the bottom (all dimensions within tolerances of 0.01 in.). The outside of the top edge of the mold shall be provided with a collar for convenient lifting of the mold. All surfaces shall be machined to a smooth finish.

(d) Caliper. - A caliper, conforming to the design and dimensions shown in Fig. 1, shall be provided for measuring the diameter of the specimen after it has been spread by operation of the table. The scale shall be machine divided and the construction and accuracy of the instrument shall be such that the distance between the jaws shall be 4 $\pm$ 0.01 in. when the indicator is set at zero. The graduations shall be such that the readings of four measurements may be added to give the flow value without the necessity of calculating the average of four individual measurements.

(e) Timing Device. - A stop watch or stop clock having a sweep second hand and an integrating minute hand and minute scale shall be provided for timing.

TEMPERATURE AND HUMIDITY

3. All operations shall be performed in an atmosphere maintained at a temperature of 70 ± 1 F and at a relative humidity of 50 ± 5 per cent (corresponding to a wet bulb temperature range of 56.5 F to 60.5 F). All test equipment and materials shall be equilibrated to these standard conditions at time of use.

PROCEDURE

4. The flow of the plastic cement shall be determined as follows: The top surface of the table and the contacting surfaces of the shaft collar and top of the frame shall be dry and free of grease and soil. The flow mold with its smaller end uppermost shall be placed on the table top with its center over the center of the table. The plastic mix to be tested shall be prepared as specified in Method of Mixing Oxychloride Cement Compositions with Gauging Solution (Designation OCA 300-20) of the Oxychloride Cement Association. Immediately after completing the mixing operation, partially fill the mold and rod gently. Complete the filling and again rod through the first portion to insure complete filling. Strike off the excess cement with a straight edge, using a sawing motion. Repeat with a stroke in the opposite direction. Carefully lift the mold from the cement and rotate the cam so as to cause the table to drop 25 times at a uniform rate during the succeeding period of 15 ± 1 sec., starting the dropping cycles at 75 ± 5 sec. after cessation of the mixing procedure. (See Note 2).

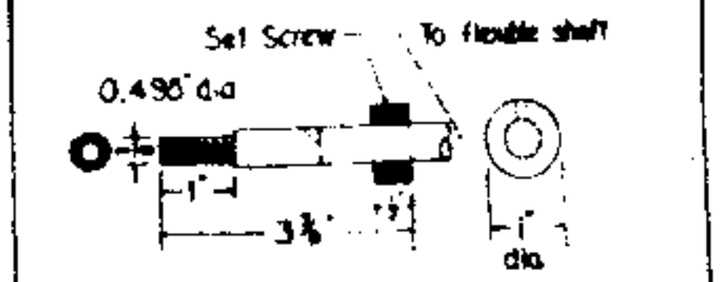
5. The percentage flow shall be determined by measuring the diameter of the spread specimen with the caliper at four symetrically distributed points and adding the four values thus recorded. The recorded values shall be rounded off to the nearest 0.1 per cent as recommended in A.S.T.M. E 29.

REPORT

6. The report shall include: (a) Designation of flow table used (see Note 1) and (b) Per cent flow.

Note 1. Sections 2 and 3 shall apply to tables installed subsequent to the date of these specifications. The distance of drop for tables already in use shall be 0.5 ± 0.02 in.

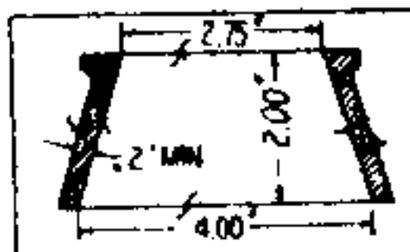
Note 2. An alternate procedure for filling the mold is as follows: Place the flow mold on a section of plate glass (approximately 5 x 5 in.) with the larger end uppermost. Fill the mold and strike off the excess cement in the manner described above. Place the top of the flow table on the filled mold, carefully grasp and invert the table and mold. Insert the shaft in the base, center the mold and slide the glass plate off. Proceed from this point in the operation as directed in Section 4.

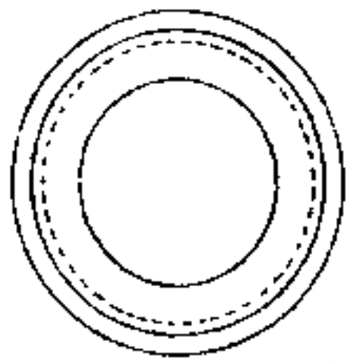


1 - CAM SHAFT
Medium carbon machinery steel

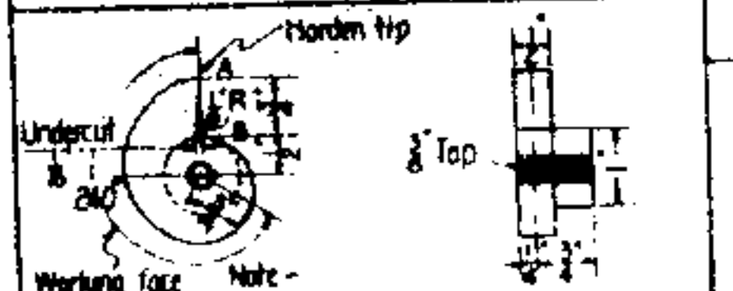
NOTE 1 - Weight of table top and shaft assembly shall be 9 ± 0.1 lb

NOTE 2 - Flow table may be driven by motor, connected to cam shaft through an enclosed worm gear speed reducer and flexible coupling. Speed of cam shaft to be approximately 100 rpm.
(A 1/20 hp motor has been found to be enough)

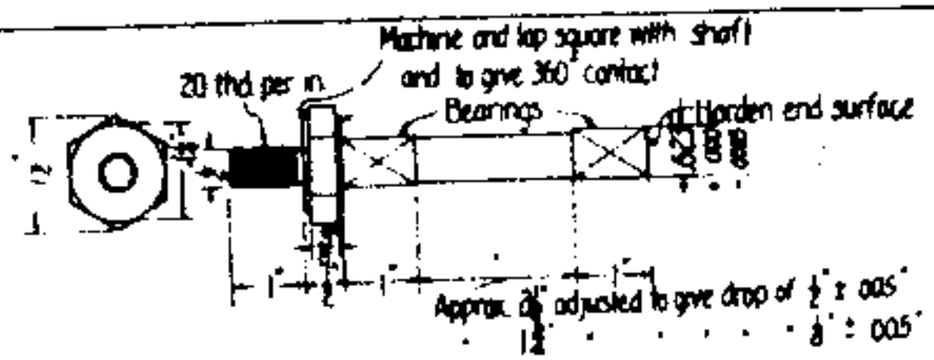




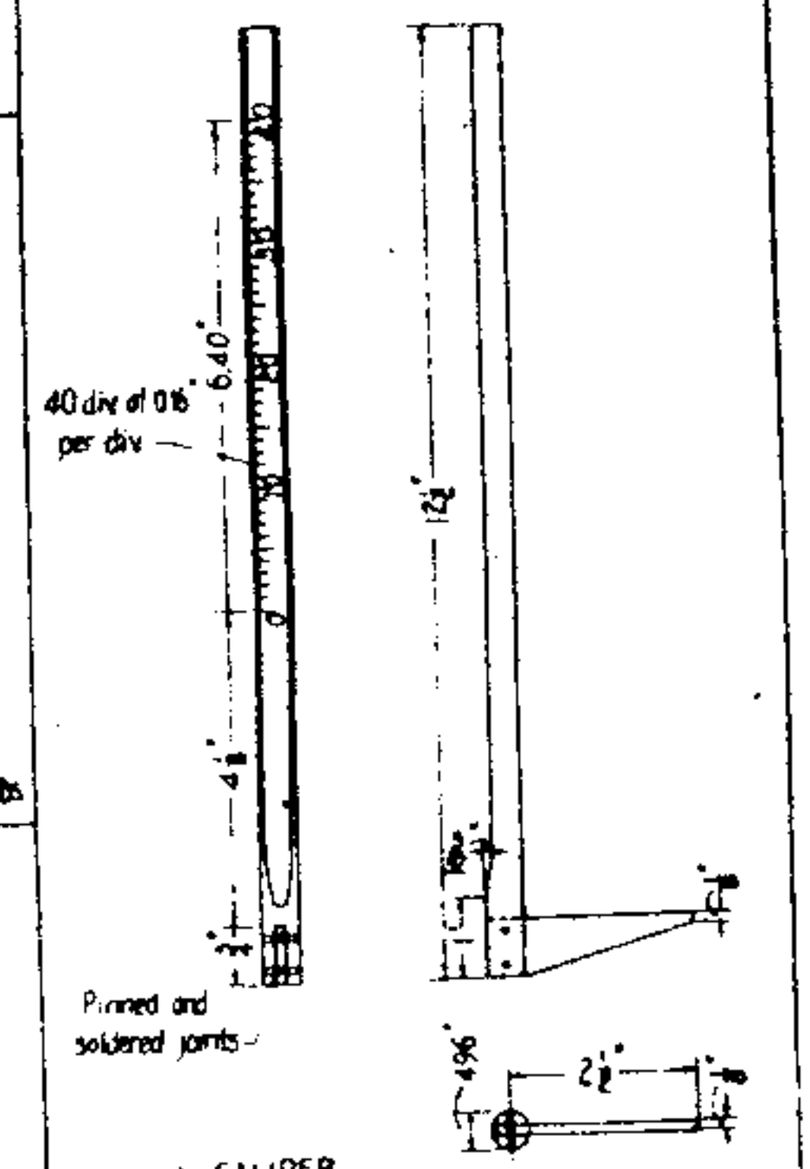
1 - MOLD
Bronze (Rockwell B-25) min wt 2 lbs



1 - CAM - Medium carbon machinery steel



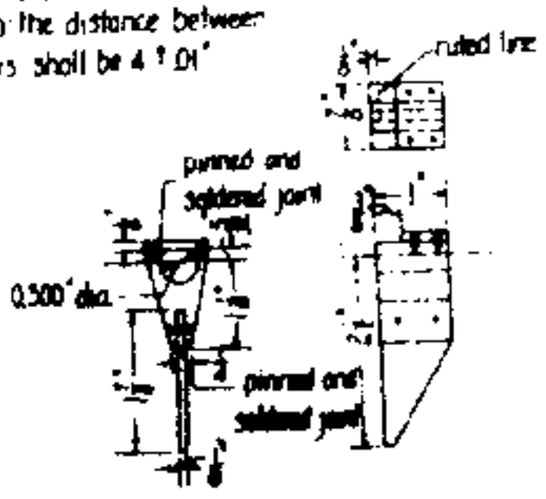
2 SHAFTS - Medium carbon machinery steel

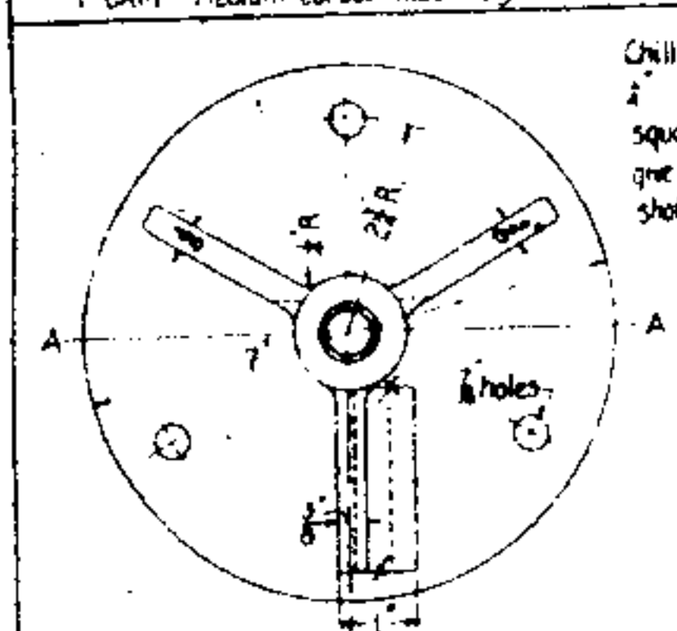


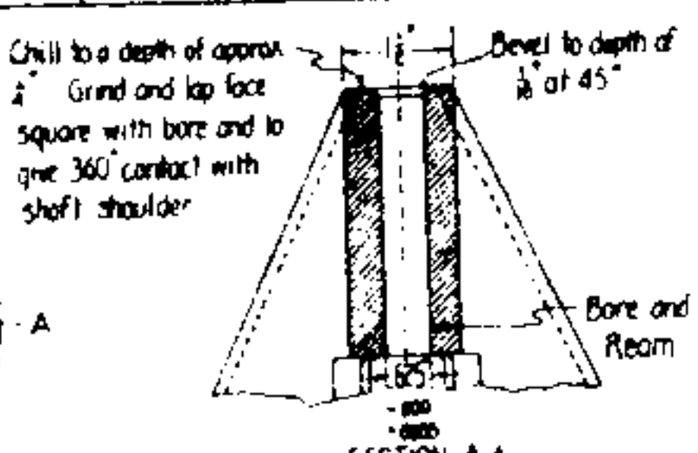
1 - CALIPER
Bronze (Rockwell B-55)

Note - High temperature or brazing solder to be used in soldered joints

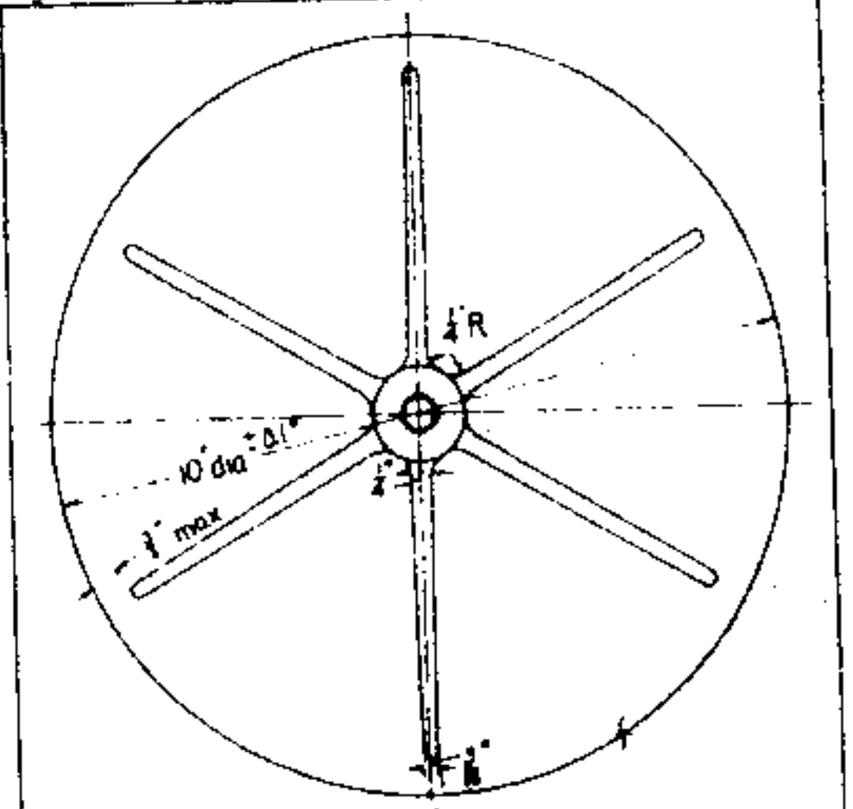
With indicator set at zero the distance between jaws shall be 4 ± .01"



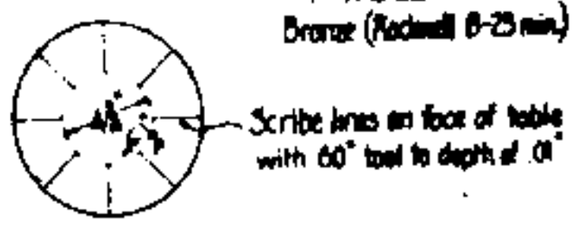




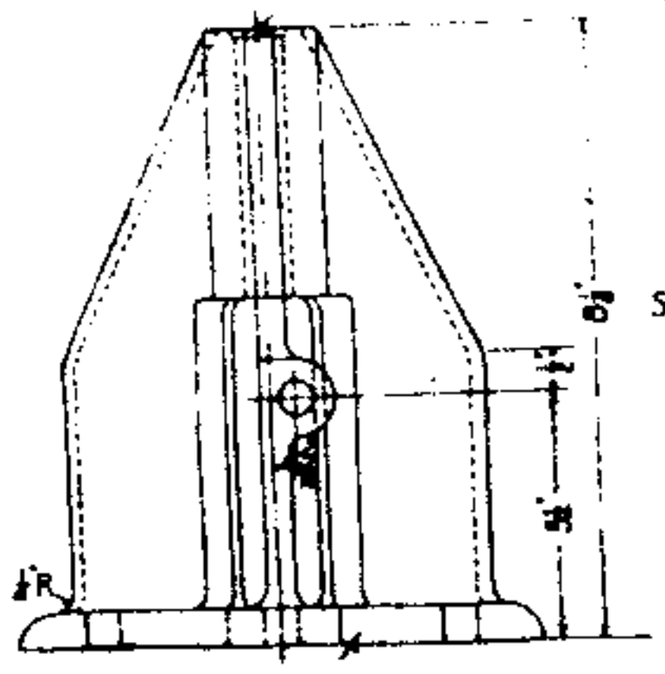
SECTION A-A
Fine grained high-grade cast iron



1 - TABLE
Bronze (Rockwell B-25 min)



1 - STAND
Cast Iron



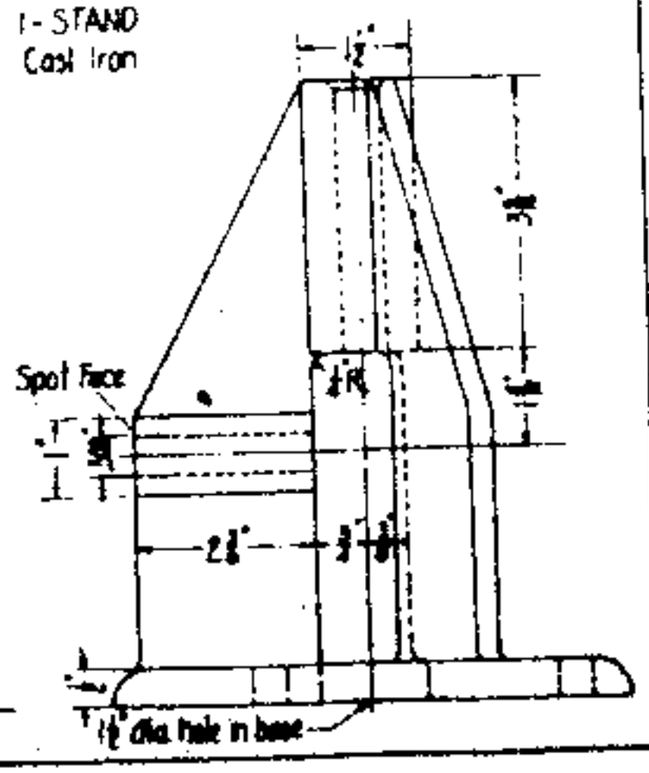


Fig. 1

Tentative Method of Test For

TRANSVERSE STRENGTH OF MAGNESIUM OXYCHLORIDE CEMENT COMPOSITIONS USING SIMPLE BAR WITH KNIFE EDGE OR TWO POINT LOADING

Revised June 29, 1950

(OCA 300-13-50)

SCOPE

1. This method of test covers the procedure for determining the transverse strength of magnesium oxychloride compositions by the use of a simple flat bar with two point or single poing loading.

APPARATUS

2. (a) Two Point Loading Method.-A two point loading method shall be used in making flexure tests of oxychloride cement, employing bearing blocks which will insure that the forces applied to the beam will be vertical only and applied without eccentricity, provided the points of load application are spaced equidistant between the supports and provided that the ratio of the distance between point of load application and nearest reaction to the depth of the beam is not less than one. A diagram of an apparatus which accomplishes this purpose is shown in Fig. 1.

(b) Single Point Loading.-The single point loading method shall be an alternative procedure. For this method an apparatus shall be used which consists of knife edges 10 ± 1/16 in. apart and the load shall be applied by means of a knife edge at a point within ± 1/32 in. of the center of the 10 in. span. A diagram of an apparatus which accomplishes this purpose is shown in Fig. 2.

(c) The accuracy of the above testing devices shall be ± 1 per cent of the applied load over the entire range and shall be verified, at least quarterly, by means of an accurate (± 0.25%) dynamometer.

TEST SPECIMEN

3. (a) The test specimens are molded in the form of flat bars, 23 ± 1 in. long, 2 in. wide, 1/2 in. thick. Molds shall be oiled with a saturated solution of stearic acid in trichlorethylene. A diagram of the mold for this purpose is shown in Fig. 3.

(b) Making the Test Piece.-The plastic magnesium oxychloride cement shall be prepared by mixing the dry composition with magnesium chloride gauging solution as specified in the Tentative Method for Mixing Oxychloride Compositions with Gauging Solution (OCA Designation 300-20) of the Oxychloride Cement Association. It shall then be spread along the length of the mold and worked into the corners with the trowel. Somewhat more than needed to fill the molds should be used, and the excess struck off by not more than three strokes of the trowel forward and three backward over the full length of the mold. Further troweling should not be done, as excessive troweling materially changes the surface of the test piece.

(c) All test specimens shall be retained in the molds on the plane plates for a minimum of twelve hr. after final set when they shall be freed from the forms and stored under standard conditions.

(d) The complete preparation of test specimens, including storage of materials and solutions and the curing, shall be carried out in an atmosphere maintained at 70 ± 1° F. and at a relative humidity of 50 ± 5% (corresponding wet bulb temperature range 56.5° F. to 60.5° F.). After removal from the molds the test specimens shall be stored, for the designated duration of the test, on a rack or grating which will permit access to the standard atmosphere at a velocity of not less than twenty nor more than five hundred feet per minute to all sides of the test specimen.

TESTING PROCEDURE

4. The test specimen shall be turned face down with respect to its position as molded and shall be centered on the bearing blocks. The load-applying blocks shall be brought in contact with the upper surface at the third point between the supports. Load shall be applied at the rate of 20 ± 0.5 lb. per min. The breaking strength shall be the average transverse strength of nine breaks. Each 23 ± 1 in. bar shall be broken three times on 10 in. spans first by breaking in the center and subsequently breaking each of the halves resulting from the first break.

MEASUREMENT OF SPECIMENS AFTER TEST

5. Measurements to the nearest 0.01 in. shall be made to determine the width and the average of three measurements to determine the thickness of the specimen at the section of failure.

CALCULATIONS

6. (a) If the fracture occurs within one in. of either side of the middle of the 10 in. span length, the modulus of rupture shall be calculated as follows:

In the case of two point loading:

$$R = \frac{3W(L-1)}{2bh^2}$$

In the case of single point loading:

$$R = \frac{3WL}{2bh^2}$$

Where:

R = modulus of rupture in pounds per square inch.
W = maximum applied load indicated by the testing machine in pounds.
L = span length in inches (10).

l = distance in inches between points of load application for two point loading.
b = width of specimen in inches.
h = average thickness of specimen in inches to the nearest 0.01 in.

(b) If the fracture occurs more than one inch either side of the middle of the span length, the results of the test shall be discarded.

(c) The modulus of rupture of the average of nine breaks shall be rounded off to the nearest 100 lb. in accordance with the procedure and practice recommended by A.S.T.M. E 29-40 T.

REPORT

7. The report shall include the following:

(a) Identification of test sample.
(b) Age of specimen at time of test.
(c) Average modulus of rupture calculated to the nearest 100 lbs.
(d) Applied load in pounds for each break.
(e) Width to the nearest 0.01 in. for each break.
(f) Average thickness to the nearest 0.01 in. for each break.

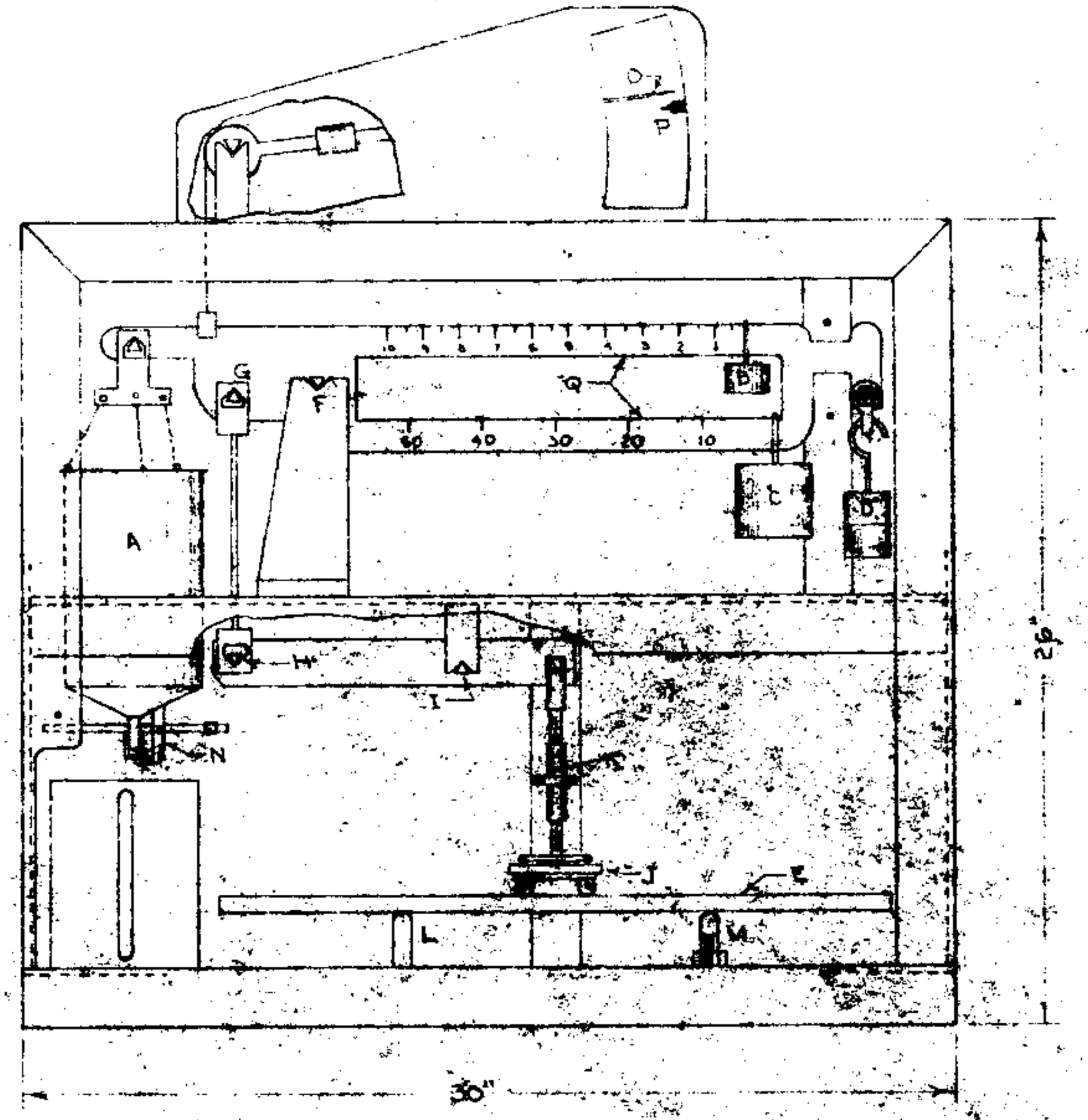


Fig. 1. Cross Bending Testing Machine, two point loading.

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WESTVACO CHLORINE PRODUCTS CORP.
NEWARK, CALIFORNIA

CROSS - BENDING TESTING MACHINE

DRAWING NO. 2058

~~FIGURE 2~~

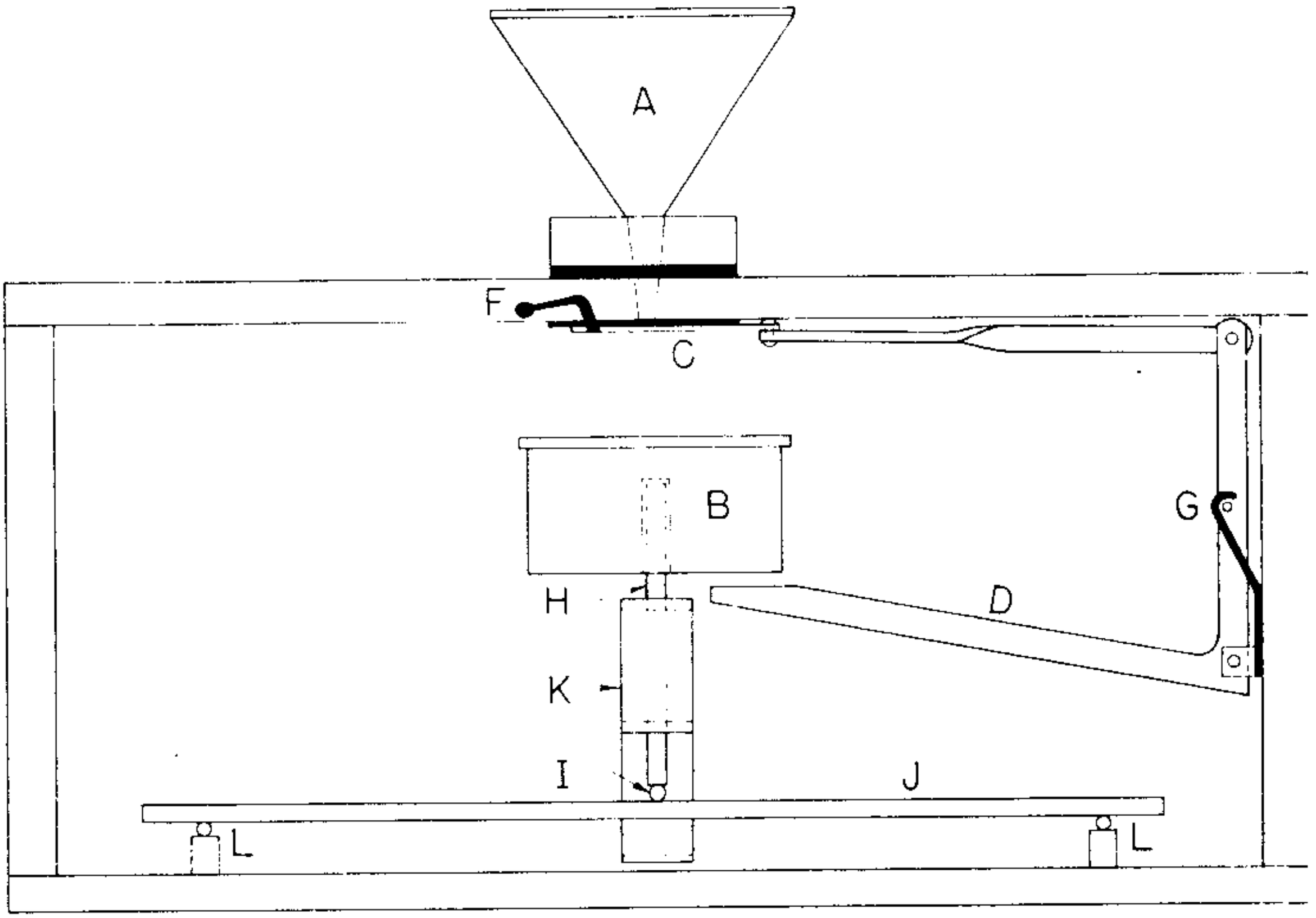


Fig. 2. CROSS BENDING TESTING MACHINE

Single Point Loading.

LEGEND

A Shot Reservoir
B Shot Cup
C Trip Rod
D Trip Lever
F Release Rod
G Trip Rod Catch
H Shot Cup Stem
I Bar Fulcrum
J Test Bar Speciman
K Cup Stem Guide
L Bar Supports

~~FIGURE 2~~

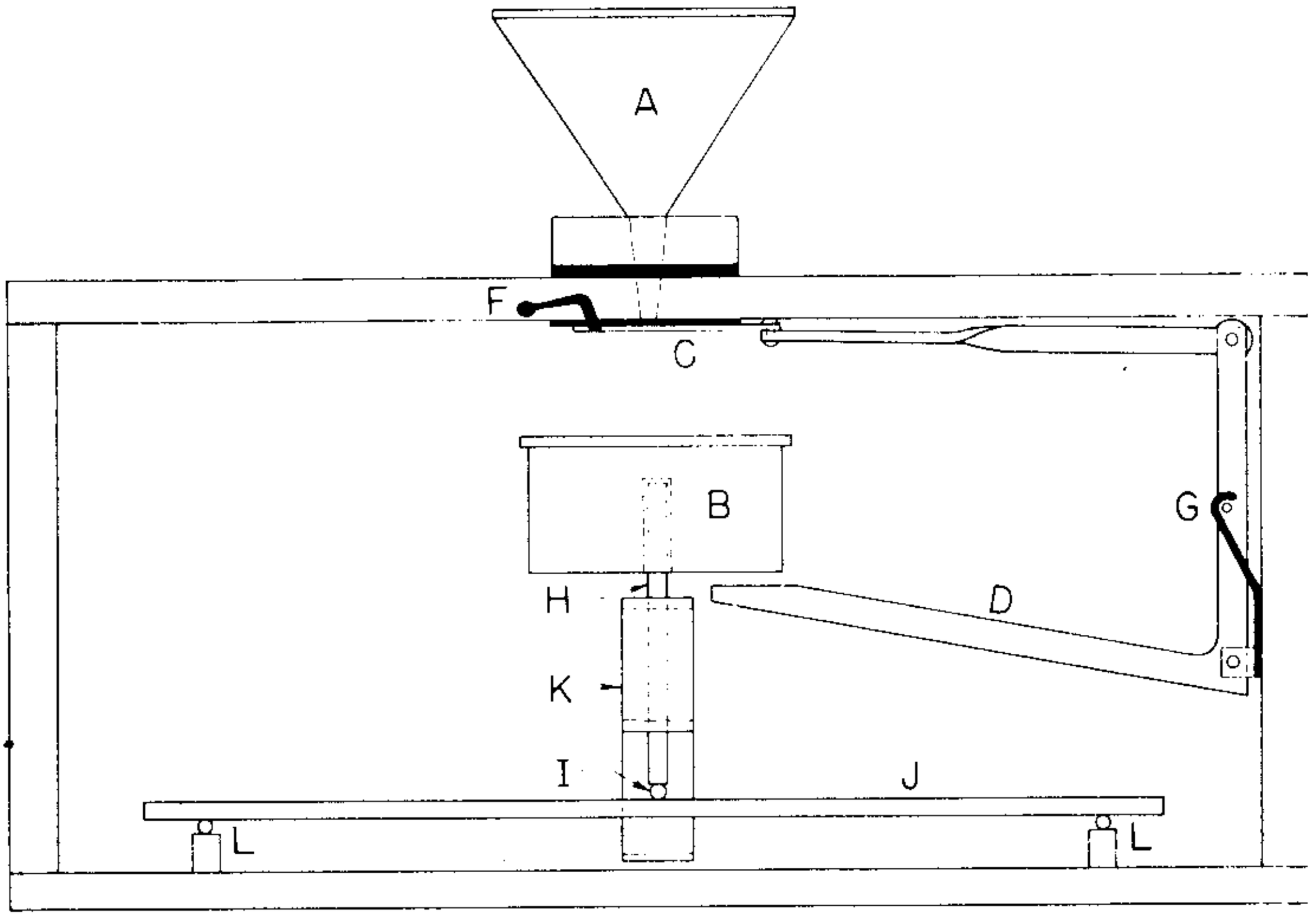


Fig. 2 CROSS BENDING TESTING MACHINE

Single Point Loading

LEGEND

A Shot Reservoir
B Shot Cup
C Trip Rod
D Trip Lever
F Release Rod
G Trip Rod Catch
H Shot Cup Stem
I Bar Fulcrum
J Test Bar Speciman
K Cup Stem Guide
L Bar Supports

Tentative Method of Test For

COMPRESSIVE STRENGTH OF MAGNESIUM OXYCHLORIDE CEMENT COMPOSITIONS

(OCA 300-14-50)

Revised June 29, 1950

SCOPE

1. This method of test covers procedures for the determination of the compressive strength of oxychloride magnesia and magnesium oxychloride compositions.

APPARATUS

2. (a) Molds.-The compression test specimens shall be 2 in. cubes. Molds for the specimens shall be tight fitting. The parts of the molds, when assembled, shall be positively held together. The molds shall be made of hard metal not attacked by the cement mortar. For new molds, the Rockwell hardness number of the metal shall be not less than B55 (the Brinell hardness number not less than 95). There shall be sufficient material in the sides of the molds to prevent spreading or warping. The interior faces of the molds shall be true plane surfaces with a permissible variation of 0.001 in. for new molds and 0.002 in. for molds in use. The distance between opposite faces of the molds shall be 2 ± 0.005 in. for new molds, or 2 ± 0.01 in. for molds in use. The height of the molds, measured separately for each cube compartment, shall be 2 in. with a permissible variation of plus 0.01 in. and minus 0.005 in. for new molds, or plus 0.01 in. and minus 0.015 in. for molds in use. The angle between adjacent interior faces and between interior faces and top and bottom planes of the mold shall be 90 ± 0.5°. Molds shall be oiled with a saturated solution of stearic acid in trichlorethylene.

(b) Testing Machine.-The testing machine for determination of the compressive strength may be of either the hydraulic or the screw type with sufficient opening between the upper bearing surface and the lower bearing surface of the machine to permit the use of verifying apparatus. The load applied to the test specimen shall be indicated with an accuracy of plus or minus 1.0 per cent. The upper bearing shall be a spherically seated, hardened metal block firmly attached at the center of the upper head of the machine. The center of the sphere shall lie at the center of the surface of the block in contact with the specimen. The block shall be closely held in its spherical seat, but shall be free to turn in any direction. The diagonal or diameter of the bearing surface shall be only slightly greater than the diagonal of the face of the 2 in. cube, in order to facilitate accurate centering of the specimens. A hardened metal bearing block shall be used beneath the specimen to minimize wear of the lower plate of the machine. The bearing block surfaces intended for contact with the specimen should have a hardness not less than Rockwell number C 60 (Brinell number 620). These surfaces shall not depart from plane surfaces by more than 0.0005 in. when the blocks are new, and shall be maintained within a permissible variation of 0.001 in.

(c) The complete preparation of test specimens, including storage of solutions and materials and subsequent curing, shall be carried out in an atmosphere maintained at 70 ± 1° F and at a relative humidity of 50 ± 5% (corresponding wet bulb temperature range 56.5° to 60.5° F). After removal from the mold the test specimen shall be stored, for the designated duration of the test, on a rack or grating which will permit access to the standard atmosphere at a velocity of not less

than twenty nor more than five hundred feet per minute to all sides of the test specimen.

PROCEDURE

3. (a) Preparation of Plastic Mix.-The plastic mix shall be prepared as provided in the Tentative Method for Mixing Magnesium Oxychloride Compositions with Gauging Solution (OCA Designation 300-20) of the Oxychloride Cement Association.

(b) Immediately after mixing the plastic oxychloride composition, the wet mix shall be placed in the cube molds which shall rest on plane non-absorbent plates. The molds shall be filled heaping full and the entrapped air removed and the corners of the molds completely filled by using a cutting and stabbing motion with a small apatula for a period of fifteen seconds. Additional wet mix shall be heaped above the molds and struck off level and smoothed with a trowel. Three strokes of the trowel shall be all the troweling permitted to level and smooth the cubes.

(c) All test specimens shall be retained in the molds on the plane plates for a minimum of twelve hours and not more than 24 hours after final set, when they shall be freed from the forms and stored under standard conditions.

(d) At the end of the designated duration of the test the cubes shall be removed from the constant temperature, constant humidity storage, and broken on the compression testing machine specified in Section 2 (b). The load shall be applied to the faces of the cubes that were in contact with the true plane surfaces of the mold. These faces shall be checked by application of an accurate straight-edge. If appreciable curvature is present, the face or faces shall be ground to a plane surface before loading, or the specimens shall be discarded.

(e) Loose sand grains or incrustations shall be removed from the contact faces, and the cubes shall then be carefully placed in the testing machine below the center of the upper bearing block. No cushioning or bedding materials shall be used. The loading up to 25 per cent of the expected maximum load may be applied at any convenient rate, after which the specimens shall be loaded continuously to failure at a rate or rates which shall at no time be less than 1000 or more than 6000 pounds per square inch per minute.

Note.-This is the rate of loading specified in A.S.T.M. Method C 109-44

(f) The strength shall be the average compressive strength of nine cubes.

CALCULATIONS

4. (a) The total maximum load indicated by the testing machine shall be recorded, and the compressive strength calculated in pounds per square inch from the cross-sectional area of the cube tested. Cubes that are manifestly faulty or that give strengths differing by more than ten per cent from the average value of all test specimens made from the same sample and tested at the same period shall not be considered in determining the compressive strength.

(b) The average compressive strength value for the average of nine cubes shall be rounded off to the nearest 100 lb. in accordance with the procedure and practice recommended by A.S.T.M. E 29.

REPORT

5. The report shall include the following:

(a) Identification of test sample.
(b) Age of specimen.
(c) Applied load in pounds for each cube.
(d) Average compressive strength calculated to nearest 100 pounds.

Tentative Method

For

DETERMINATION OF SETTING TIME OF MAGNESIUM OXYCHLORIDE CEMENTS

(OCA-300-15-50

Revised June 29, 1950

SCOPE

1. This method describes equipment and defines procedures for the determination of setting time of magnesium oxychloride cements by means of Westvaco needles on an automatic setting time machine.

APPARATUS

2. (a) Westvaco Needles. - The needles shall be of a noncorrodible metal suitably weighted and shall conform to the following requirements:

Initial Needle:	
Weight	1 lb ±8 gr. (453.6 ±0.5 g.)
Tip diameter	0.167 ±0.002 in. (4.24 ±0.05 mm.)
Tip length	0.015 ±0.001 in. (0.38 ±0.03 mm.)
Shoulder diameter	0.250 ±0.002 in. (6.35 ±0.05 mm.)
Final Needle:	
Weight	4 lb. ±16 gr. (1814.4 ±1.0 g.)
Tip diameter	0.083 ±0.002 in. (2.12 ±0.05 mm.)
Tip length	0.015 ±0.001 in. (0.38 ±0.03 mm.)
Shoulder diameter	0.167 ±0.002 in. (4.24 ±0.05 mm.)

The needle tips shall be cylindrical and of the same diameter for the entire length. There shall be no undercutting or tapering at the junction of the tip and the shoulder. The needle ends and the faces of the shoulders shall be plane, free of tool marks, and at right angles to the axis of the stem. The shoulder shall be cylindrical and of the same diameter for a distance of approximately 0.187 in. (see Fig. 1). The needles shall be maintained in a clean condition at all times and, in routine use, shall be checked to determine conformity with requirements at least once a week. Those used infrequently shall be checked prior to each determination.

(b) Automatic Setting Time Machine. - This machine, illustrated in Fig. 2, consists essentially of a base (A) on which are mounted suitable guides (B) for one or more carriages (C). These carriages are 4 in. by 15 in. in size and are moved horizontally in one direction at a uniform rate of from 1.95 to 2.25 in. per hour by a pinion (D) and a rack fastened to the underside of the carriage. This slow translating motion is obtained by a series of gear units of suitable speed reduction, driven by a motor (E) connected to a drive shaft (F). The drive shaft carries a cam (G) which rotates at a uniform speed of not less than 7.5 and not

more than 10 revolutions per hour. In any event the speed of the cam and carriage shall be so correlated that punch-marks made by the needles do not overlap. The cam actuates a rocker arm (I) which is connected to a suitable support from which the testing needles (L) are suspended directly over the carriages. A guide (M) maintains the needles in a vertical position. A pair of Westvaco needles is used for each carriage and are suspended from the lifting mechanism by a light chain of at least 3 links so that the needles receive no downward thrust. The length of the chain is such that the needle penetrates the setting time specimen to a depth of not more than 0.125 in. The cam has a throw of 1 in. and is designed to provide a cycle within the following limits:

Operation	Per cent of Cycle
Drop from maximum suspension to contact with specimen	8–16
Duration of contact with specimen	7–15
Rise from specimen to maximum suspension	4–14
Duration of maximum suspension	67–75

steel

(c) Mold. - A mold for containing the setting time specimen shall be in the shape of an elongated "O" with inside dimensions of approximately 3 by 15 in. and a wall thickness of 0.375 in. (±0.125) (Fig. 3). A saw-cut through one end of the mold facilitates removal of the specimen at the completion of the determination.

(d) Trowel. - A trowel having a five-inch straight-edged blade shall be employed.

(e) Timing Device. - A stop watch or stop clock having a sweep second hand and an integrating minute hand and minute scale shall be employed.

PARTING SOLUTION

3. A saturated solution of stearic acid in trichloroethylene shall be employed as a parting compound to coat the mold and the carriage of the setting time machine.

TEMPERATURE AND HUMIDITY

4. The complete preparation of test specimens and subsequent testing, including storage of solutions and testing equipment, shall be carried out in an atmosphere maintained at 70 ±1° F. and at a relative humidity of 50 ± 5% (corresponding wet bulb temperature range 56.5 F. to 60.5° F.). An air circulation of between 20 and 500 feet per min. shall be maintained in the vicinity of the setting time machine during the determination.

PROCEDURE FOR THE DETERMINATION OF SETTING TIME

5. (a) Coat the mold and the carriage of the setting time machine with the parting agent sufficiently in advance of molding to permit complete evaporation of the trichloroethylene. Alternately, the mold may be separated from the carriage by 4 by 16 in. strip of kitchen-type waxed paper. Center the mold on the carriage.

Fill the mold with the oxychloride cement prepared as prescribed in the Tentative Method for Mixing Magnesium Oxychloride Cement Compositions with Gauging Solution (OCA designation 300-20) of the Oxychloride Cement Association. The cement shall not have aged more than 20 min. from completion of mixing. Strike off the excess cement, using a sawing motion and producing a plane, smooth surface, flush with the top of the mold by means of the trowel. Avoid puddling or excessive working of the cement. Start the setting time machine and record (to the nearest minute) the time elapsed between starting to add the gauging solution at the beginning of the mixing procedure and the time at which the Westvaco needles first come into contact with the surface of the molded cement pat. The molds shall stay on the machine until the needles make a negligible (0.001 in.) impression on the surface of the cement.

(b) Select the punch mark corresponding to set as follows: Follow the line of marks on the pat past the point where the depth and character of the punch marks indicate that the cement has started to harden to the extent that two successive marks which show no indentation of the needle shoulder are reached. The first of these is the mark to be taken as indicating initial or final set, as the case may be.

> Note: Occasionally the pressure of the shoulder will cause a slight darkening of the cement around the print made by the needle tip without the formation of a shoulder indentation. In case of doubt, examine the punch mark with a low-power magnifying glass.

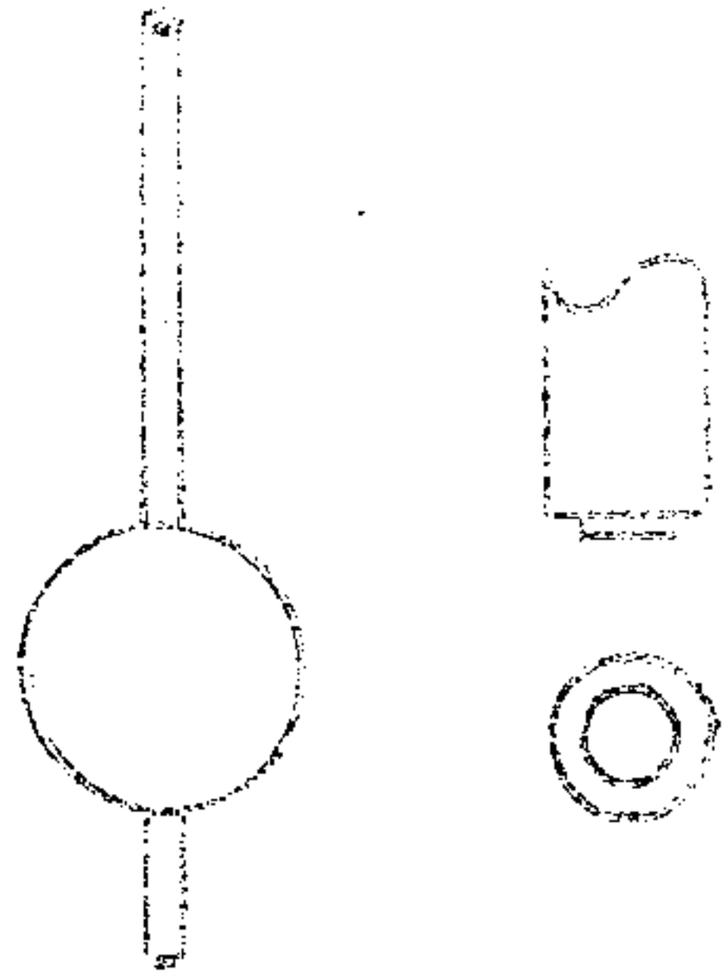
(c) Count the number of punch marks to the significant mark (taking the first mark as zero) and multiply by the average time per punch (previously determined for each setting time machine). Record the initial and final sets as the sum of (1) the time between commencement of addition of the gauging solution to the dry mix and the first punch mark on the pat, and (2) the length of time between the first punch and the mark selected as corresponding to set. Round off the value for time of set to the nearest minute as recommended in A.S.T.M. E 29.

Report

6. The report shall include the following:

(a) Initial setting time in minutes.
(b) Final setting time in minutes.

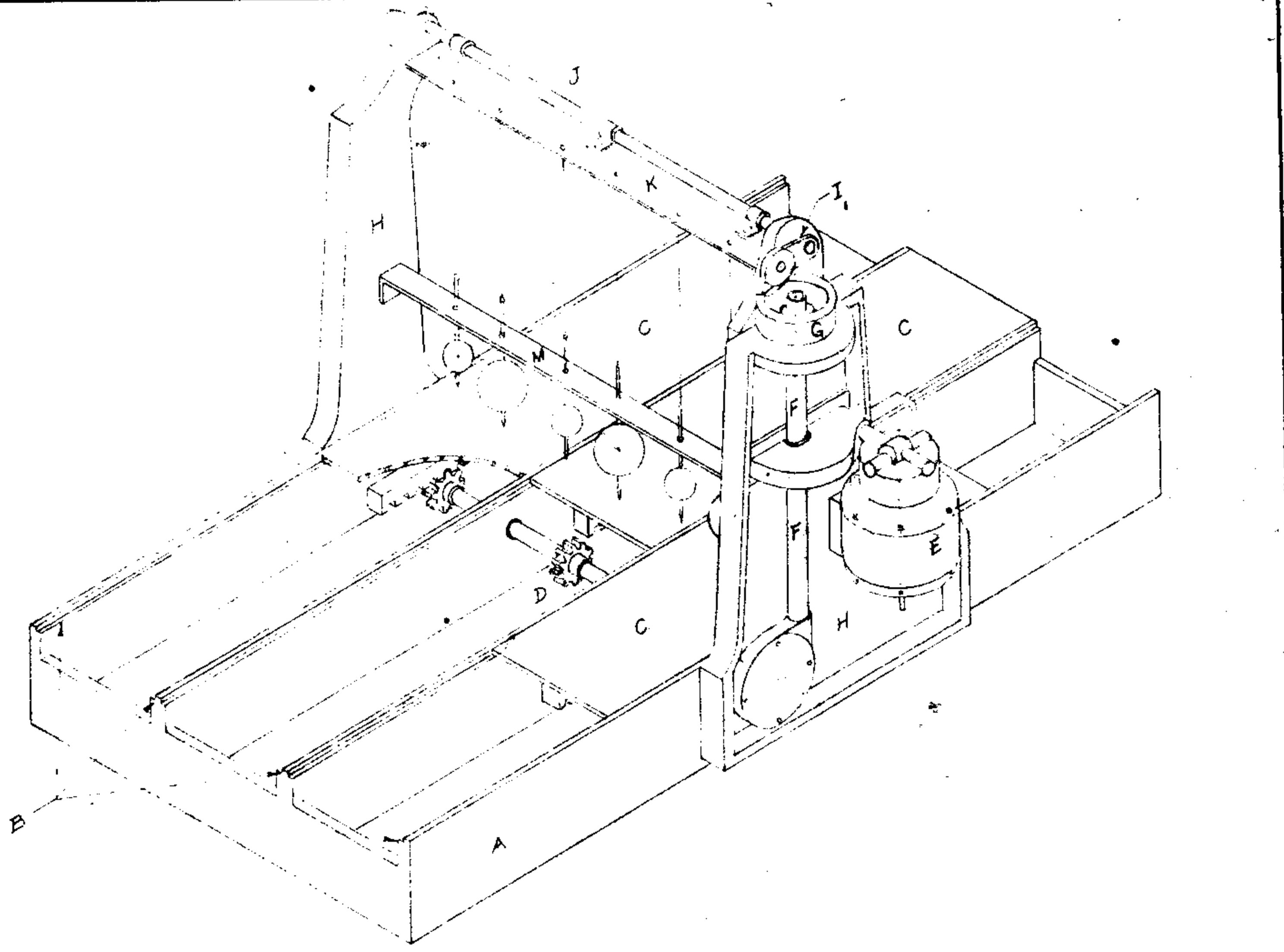
Final Setting
Time Needle



Initial Setting
Time Needle

Figure 1

Westvaco Setting Time Needles



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WESTVACO CHLORINE PRODUCTS CORP.
NEWARK, CALIFORNIA

MODIFIED HILL AUTOMATIC SETTING TIME MACHINE

DRAWING NO.
R 42

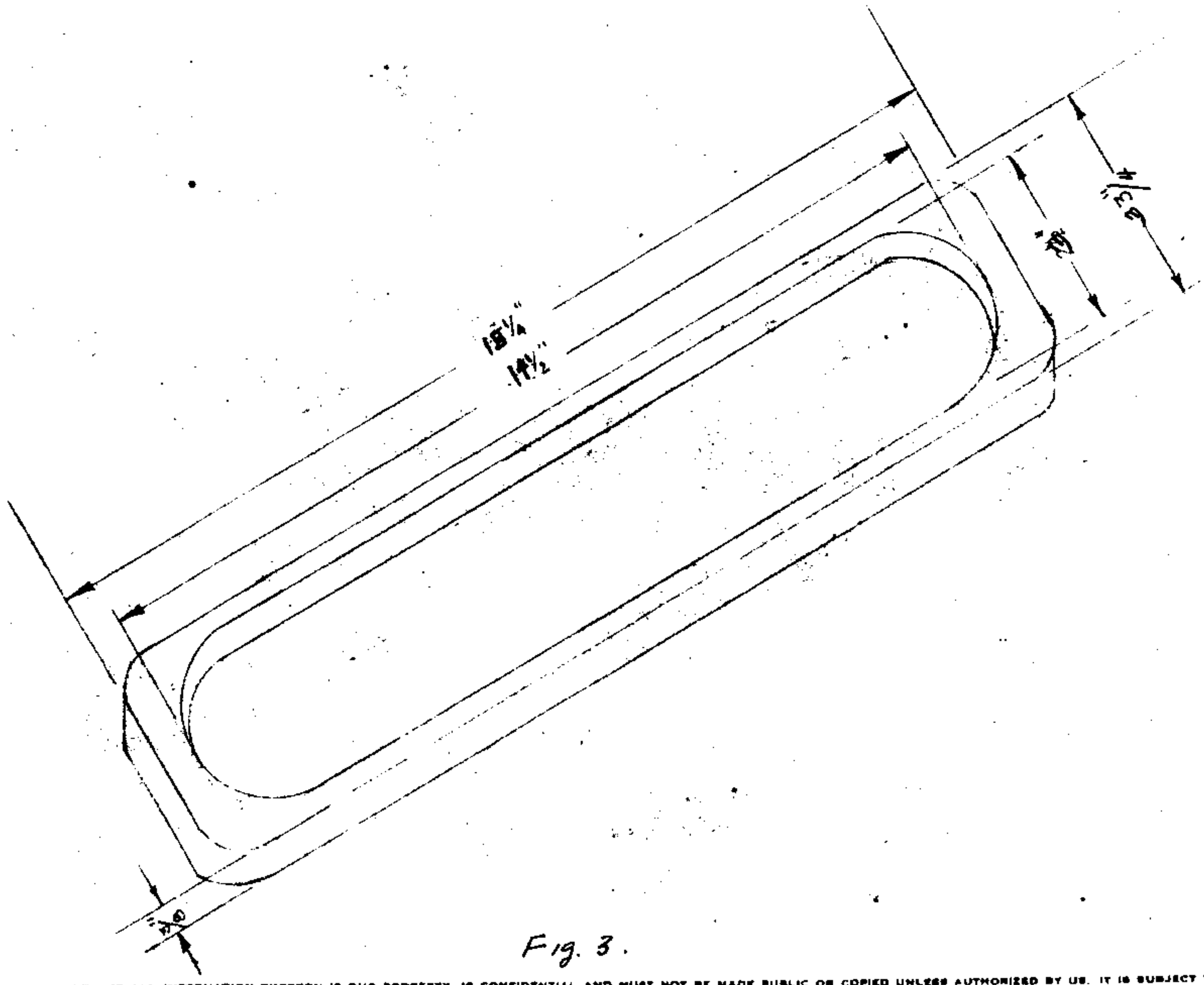

Fig. 3.

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SETTING TIME MOLD

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