Stairways - 2015 IRC Section 311.7

R311.7.1 Width. Stairways shall be not less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 41/2 inches (114 mm) on either side of the stairway and the clear width of the stairway at and below the handrail height, including treads and landings, shall be not less than 311/2 inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are provided on both sides.
Exception: The width of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.2 Headroom. The headroom in stairways shall be not less than 6 feet 8 inches (2032 mm) measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.
Exceptions: 1. Where the nosings of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall be allowed to project horizontally into the required headroom not more than 43/4 inches (121 mm).
2. The headroom for spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 147 inches (3734 mm) between floor levels or landings.

R311.7.5 Stair treads and risers. Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.

R311.7.5.1 Risers. The riser height shall be not more than 73/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below do not permit the passage of a 4-inch-diameter (102 mm) sphere.
Exceptions: 1.The opening between adjacent treads is not limited on spiral stairways.
2. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.5.2 Treads. The tread depth shall be not less than 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

R311.7.5.3 Nosings. The radius of curvature at the nosing shall be not greater than 9/16 inch (14 mm). A nosing projection not less than 3/4 inch (19 mm) and not more than 11/4 inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed 1/2 inch (12.7 mm).

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The width perpendicular to the direction of travel shall be not less than the width of the flight served. Landings of shapes other than square or rectangular shall be permitted provided that the depth at the walk line and the total area is not less than that of a quarter circle with a radius equal to the required landing width. Where the stairway has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

R311.7.7 Stairway walking surface. The walking surface of treads and landings of stairways shall be sloped not steeper than one unit vertical in 48 inches horizontal (2-percent slope).

R311.7.8 Handrails. Handrails shall be provided on not less than one side of each continuous run of treads or flight with four or more risers.

Stairways - 2015 IRC Section 311.7

R311.7.8.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

R311.7.8.2 Continuity. Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 11/2 inches (38 mm) between the wall and the handrails.
Exceptions: 1. Handrails shall be permitted to be interrupted by a newel post at the turn.

R311.7.8.3 Grip-size. Required handrails shall be of one of the following types or provide equivalent graspability.
1. Type I. Handrails with a circular cross section shall have an outside diameter of not less than 11/4 inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than 61/4 inches (160 mm) with a cross section of dimension of not more than 2-1/4 inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).
2. Type II. Handrails with a perimeter greater than 6-1/4 inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4 inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than
5/16 inch (8 mm) within 7/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than 3/8 inch (10 mm) to a level that is not less than 13/4 inches (45 mm) below the tallest portion of the profile. The width of the handrail above the recess shall be not less than 11/4 inches (32 mm) and not more than 23/4 inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

R311.7.11 Alternating tread devices. As per local amendment, Alternating tread stairways may serve as an exit from an area not to exceed 200 square feet. Alternating tread stairways shall have a minimum tread depth of 10.5 inches (276 mm). The rise to the next alternating tread surface should not be more than 8 inches (203 mm). The initial tread of the stairway shall begin at the same elevation as the platform, landing or floor surface. An approved handrail shall be provided on each side.

R311.7.12 Ships ladders. As per local amendment, an interior fire escape stairway may serve as an exit from an area not to exceed 200 square feet. The pitch of the stairway shall not exceed 60 degrees with a minimum width of 24 inches. Treads shall not be less than 4 inches in width and the rise between treads shall not exceed 10 inches. An approved handrail shall be on both sides.

Routt County Regional Building Department

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HANDRAILS - EQUIVALENT GRIPPING SURFACE REQUIREMENTS

TO MEET THE EQUIVALENT GRIPPING SURFACE PROVISIONS OF THE BUILDING CODE–THE HANDGRIP PORTION OF A HANDRAIL MUST MEET THE FOLLOWING REQUIREMENTS:

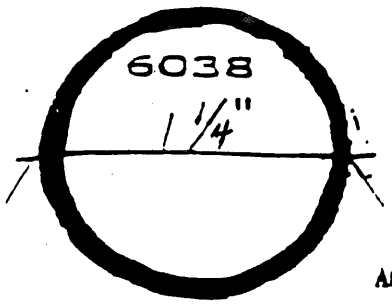
1. The handgrip portion of the handrail shall have a smooth surface with no sharp corners.

2. At its maximum horizontal cross-section, the handgrip portion of the handrail shall have a minimum dimension of 1-1/4" and a maximum dimension of 3".

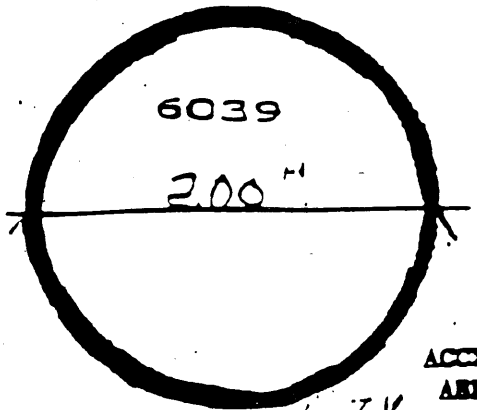
3. The narrowest horizontal section of the handgrip portion of the handrail shall have a minimum dimension of 3/4" less than the maximum horizontal cross-section.

4. The surface of the handgrip portion of the handrail shall have a minimum dimension of 4" and a maximum 6-1/4" measured to the centerline of the narrowest horizontal cross-section.

The following illustrations and examples are provided to assist in clarifying the above requirements. The illustrations are based on standard handrail designs manufactured by R/W Specialties and are meant only to illustrate intent for equivalent gripping surface.

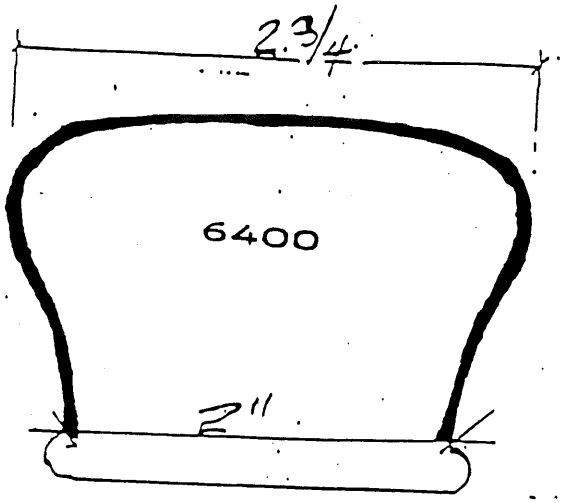


		ACCEPTABLE
GRIPPING SURFACE	4" 3/4	YES
CROSS SECTIONAL DEM.	1 1/2	YES
OPPOSING GRIP DEM.	3/4	YES
SMOOTH SURFACE	—	YES

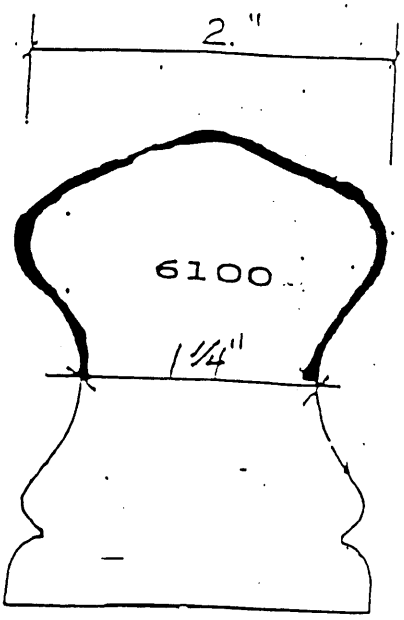


		ACCEPTABLE
GRIPPING SURFACE	6 1/4	YES
CROSS SECTIONAL DEM.	2"	YES
OPPOSING GRIP DEM.	1"	YES
SMOOTH SURFACE	—	YES

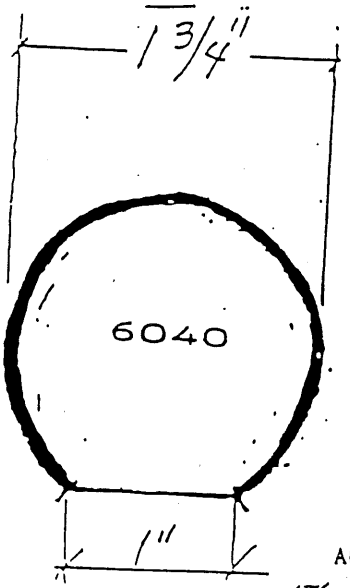
HEAVY LINES INDICATE
"EQUIVALENT GRIPPING SURFACE"



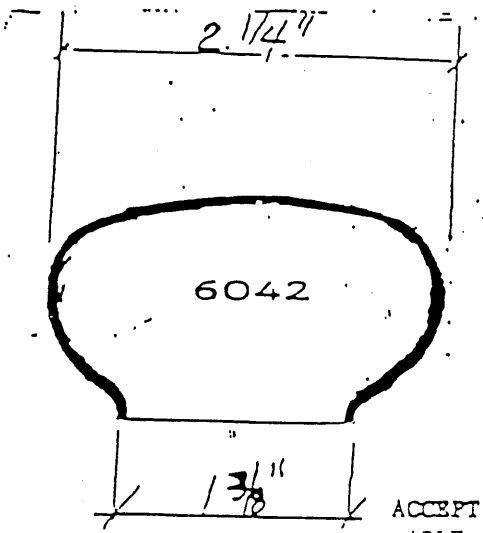
		ACCEPTABLE
GRIPPING SURFACE	5 1/8	YES
CROSS SECTIONAL DIM.	2 3/4	YES
OPPOSING GRIP DIM.	2"	YES
SMOOTH SURFACE		YES



		ACCEPTABLE
GRIPPING SURFACE	4 1/2	YES
CROSS SECTIONAL DIM.	2"	YES
OPPOSING GRIP DIM.	1 1/4	YES
SMOOTH SURFACE		YES

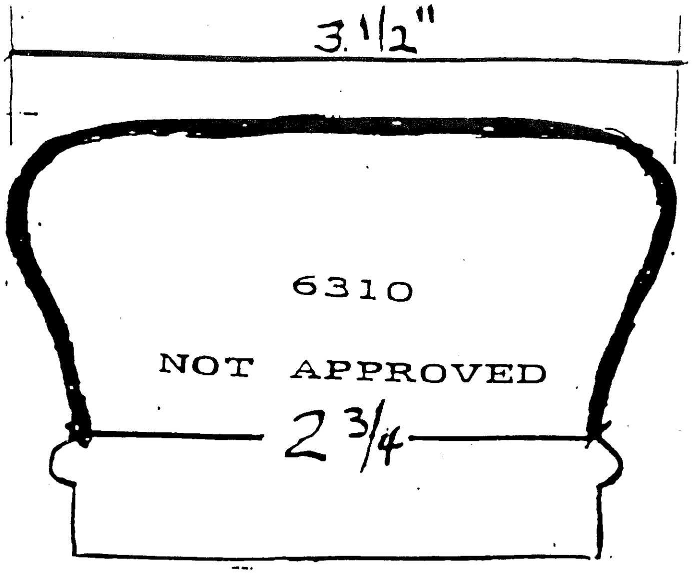


		ACCEPTABLE
GRIPPING SURFACE	4 7/8	YES
CROSS SECTIONAL DIM.	1 3/4	YES
OPPOSING GRIP DIM.	1"	YES
SMOOTH SURFACE		YES

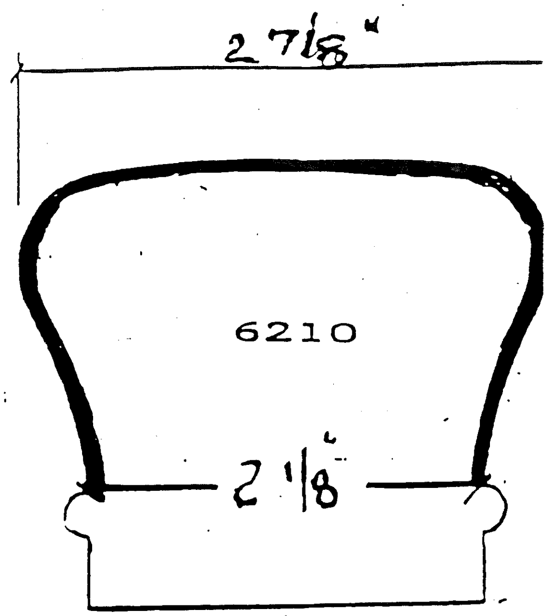


		ACCEPTABLE
GRIPPING SURFACE	4 3/4	YES
CROSS SECTIONAL DIM.	2 1/4	YES
OPPOSING GRIP DIM.	1 3/8	YES
SMOOTH SURFACE		YES

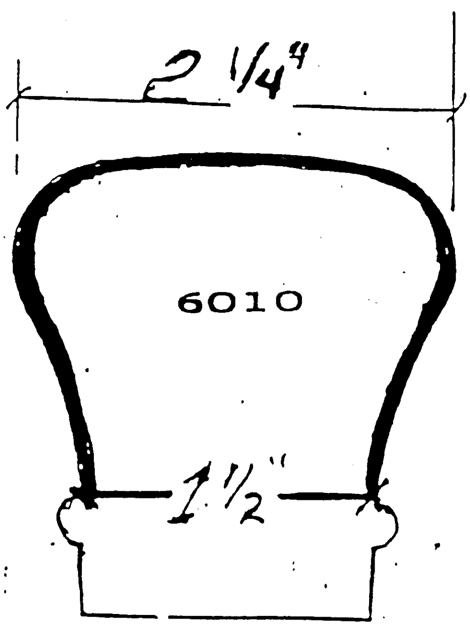
HEAVY LINES INDICATE
"EQUIVALENT GRIPPING SURFACE"



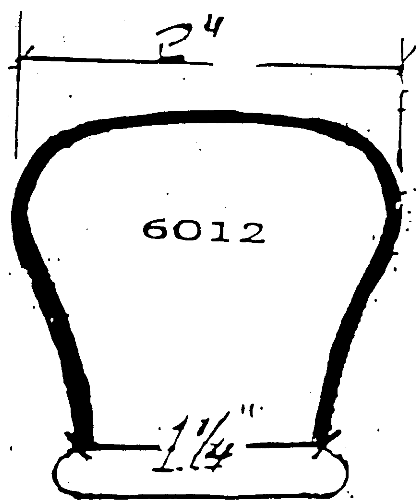
		ACCEPT ABLE
GRIPPING SURFACE	[illegible]	[illegible]
CROSS SECTIONAL DEM.	3 1/2	[illegible]
OPPOSING GRIP DEM.	2 3/4	[illegible]
SMOOTH SURFACE		[illegible]



		ACCEPT ABLE
GRIPPING SURFACE	6"	YES
CROSS SECTIONAL DEM.	2 7/8	YES
OPPOSING GRIP DEM.	2 1/8	YES
SMOOTH SURFACE		YES

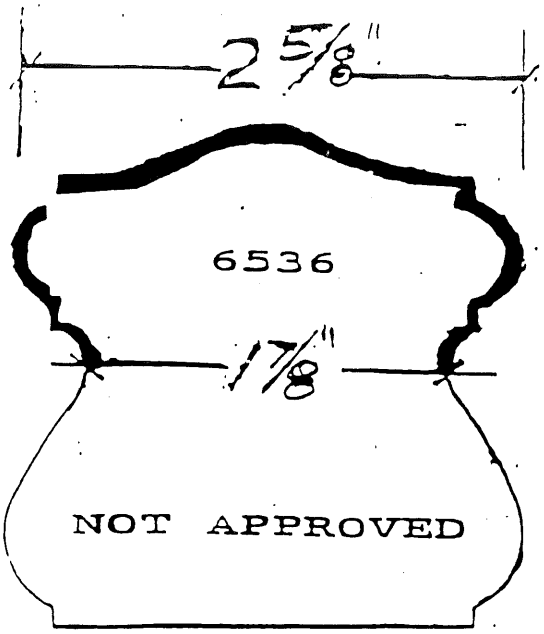


		ACCEPT ABLE
GRIPPING SURFACE	5 3/8	YES
CROSS SECTIONAL DEM.	2 1/4	YES
OPPOSING GRIP DEM.	1 1/2	YES
SMOOTH SURFACE		YES

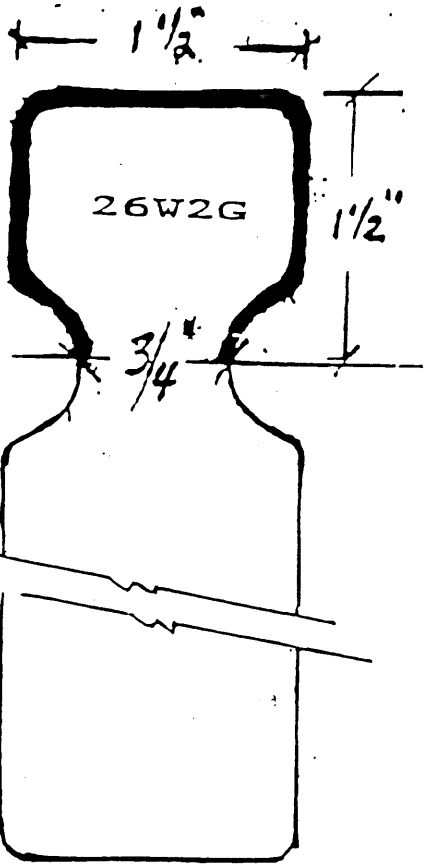


		ACCEPT ABLE
GRIPPING SURFACE	5 1/8	YES
CROSS SECTIONAL DEM.	2"	YES
OPPOSING GRIP DEM.	1 1/4	YES
SMOOTH SURFACE		YES

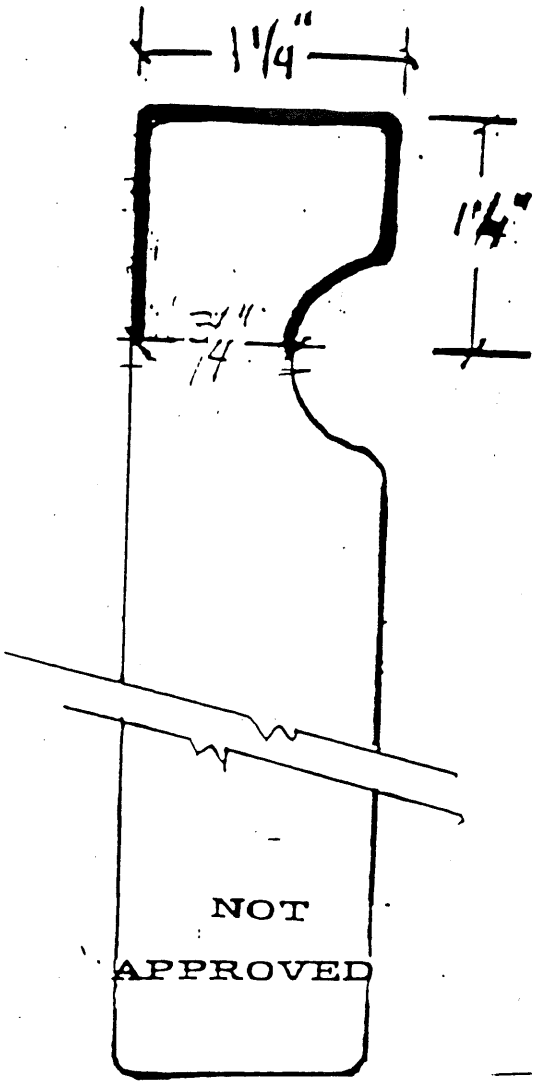
HEAVY LINES INDICATE
'EQUIVALENT GRIPPING SURFACE'



		ACCEPTABLE
GRIPPING SURFACE	5"	YES
CROSS SECTIONAL DEM.	2 5/8	YES
OPPOSING GRIP DEM.	1 7/8	YES
SMOOTH SURFACE		NO

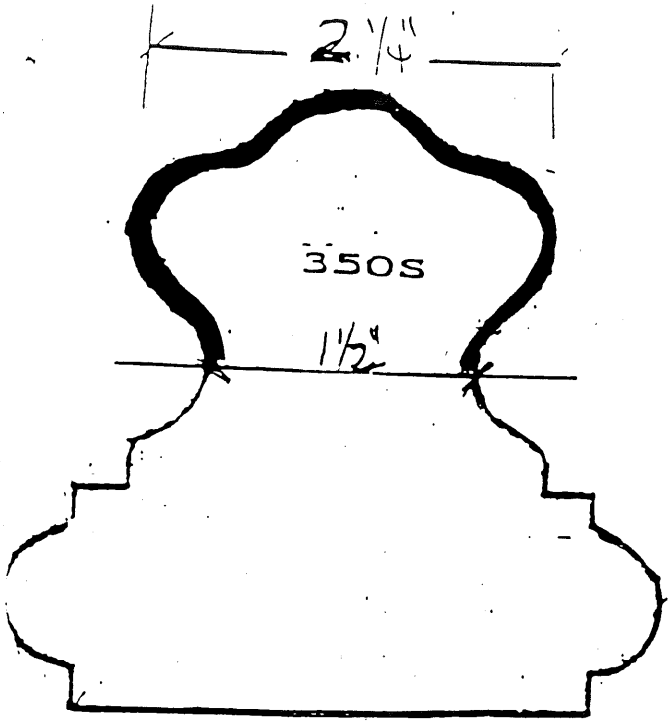


		ACCEPTABLE
GRIPPING SURFACE	5"	YES
CROSS SECTIONAL DEM.	1 1/2	YES
OPPOSING GRIP DEM.	3/4	YES
SMOOTH SURFACE		YES

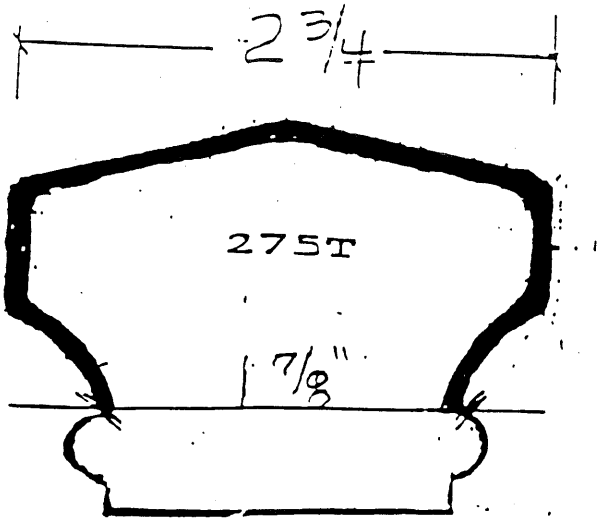


		ACCEPTABLE
GRIPPING SURFACE	4"	YES
CROSS SECTIONAL DEM.	1 1/4	NO
OPPOSING GRIP DEM.	3/4	NO
SMOOTH SURFACE		YES

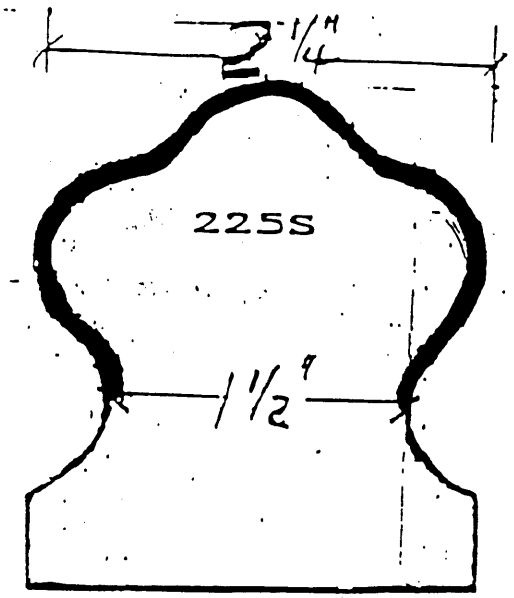
HEAVY LINES INDICATE
'EQUIVALENT GRIPPING SURFACE'



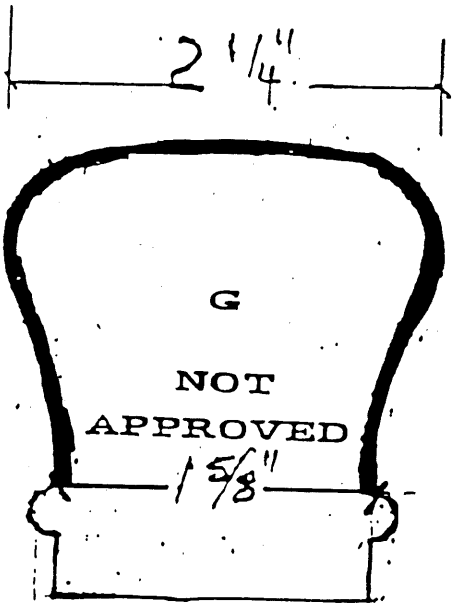
		ACCEPTABLE
GRIPPING SURFACE	4 3/4	YES
CROSS SECTIONAL DIM.	2 1/4	YES
OPPOSING GRIP DIM.	1 1/2	YES
SMOOTH SURFACE		YES



		ACCEPTABLE
GRIPPING SURFACE	5 1/2	YES
CROSS SECTIONAL DIM.	2 1/4	YES
OPPOSING GRIP DIM.	1 7/8	YES
SMOOTH SURFACE		YES

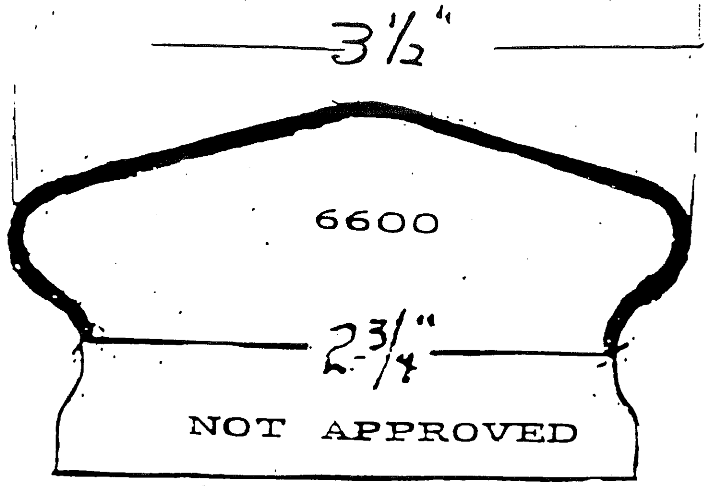


		ACCEPTABLE
GRIPPING SURFACE	4 3/4	YES
CROSS SECTIONAL DIM.	2 1/4	YES
OPPOSING GRIP DIM.	1 1/2	YES
SMOOTH SURFACE		YES

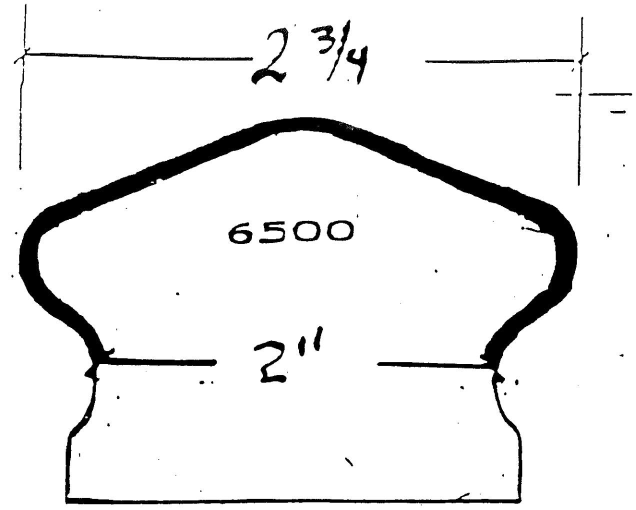


		ACCEPTABLE
GRIPPING SURFACE	5 1/4	YES
CROSS SECTIONAL DIM.	2 1/4	YES
OPPOSING GRIP DIM.	1 5/8	NO
SMOOTH SURFACE		YES

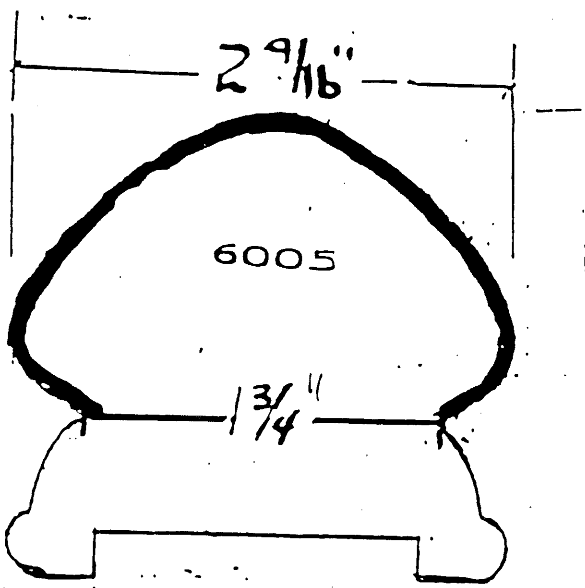
HEAVY LINES INDICATE EQUIVALENT GRIPPING SURFACE.



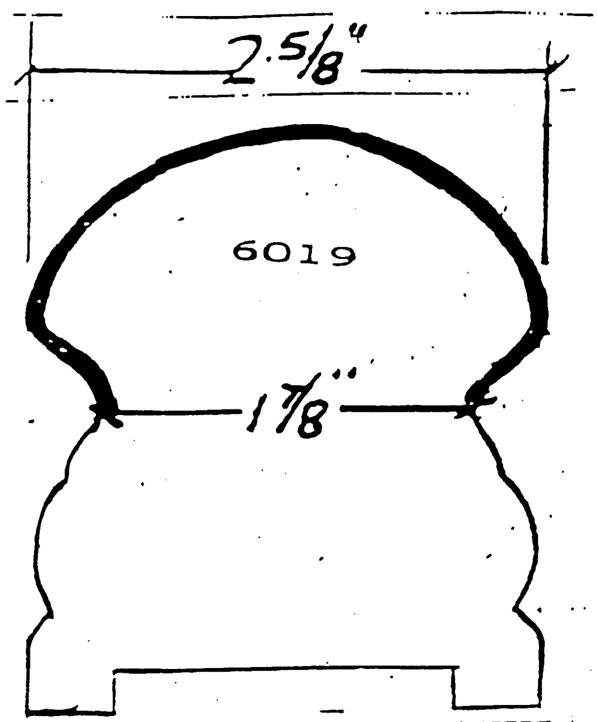
		ACCEPT ABLE
GRIPPING SURFACE	5 1/2	YES
CROSS SECTIONAL DEM.	3 1/2	NO
OPPOSING GRIP DEM.	2 3/4	YES
SMOOTH SURFACE	--	YES



		ACCEPT ABLE
GRIPPING SURFACE	4 5/8	YES
CROSS SECTIONAL DEM.	2 3/4	YES
OPPOSING GRIP DEM.	2"	YES
SMOOTH SURFACE	-	YES

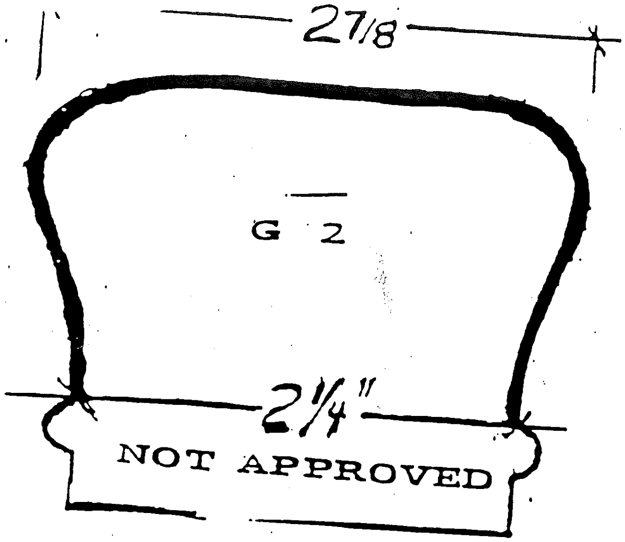


		ACCEPT ABLE
GRIPPING SURFACE	4 5/8	YES
CROSS SECTIONAL DEM.	2 9/16	YES
OPPOSING GRIP DEM.	1 3/4	YES
SMOOTH SURFACE		YES

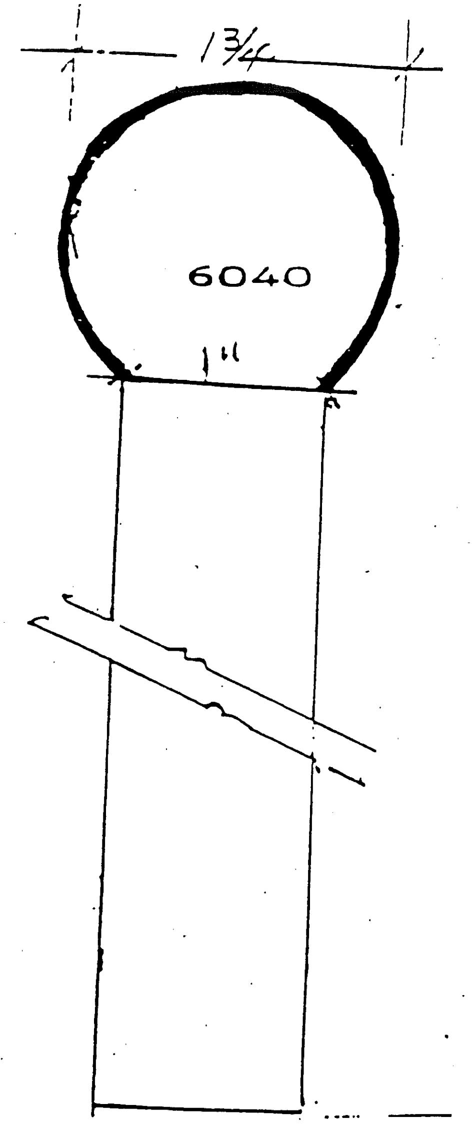


		ACCEPT ABLE
GRIPPING SURFACE	4 3/4	YES
CROSS SECTIONAL DEM.	2 5/8	YES
OPPOSING GRIP DEM.	1 7/8	YES
SMOOTH SURFACE	--	YES

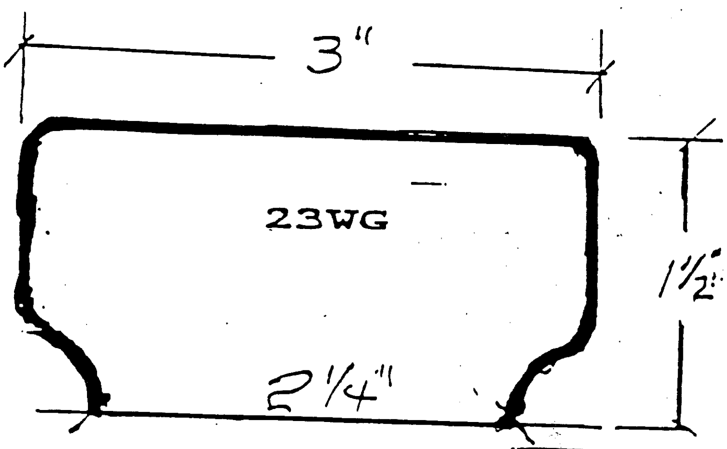
HEAVY LINES INDICATE
'EQUIVALENT GRIPPING SURFACE'



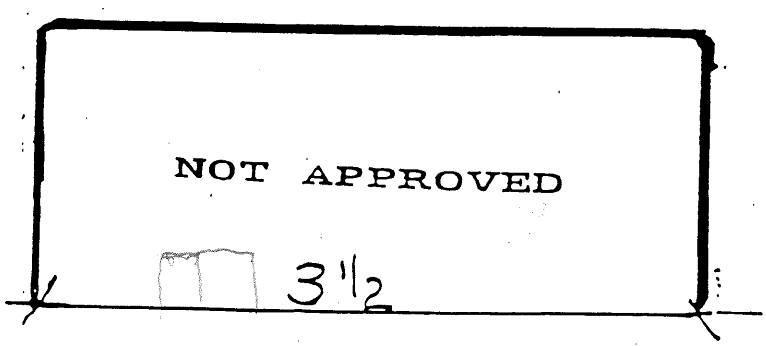
		ACCEPT ABLE
GRIPPING SURFACE	5 7/8	yes
CROSS SECTIONAL DEM.	2 7/8	yes
OPPOSING GRIP DEM.	2 1/4	no
SMOOTH SURFACE		yes



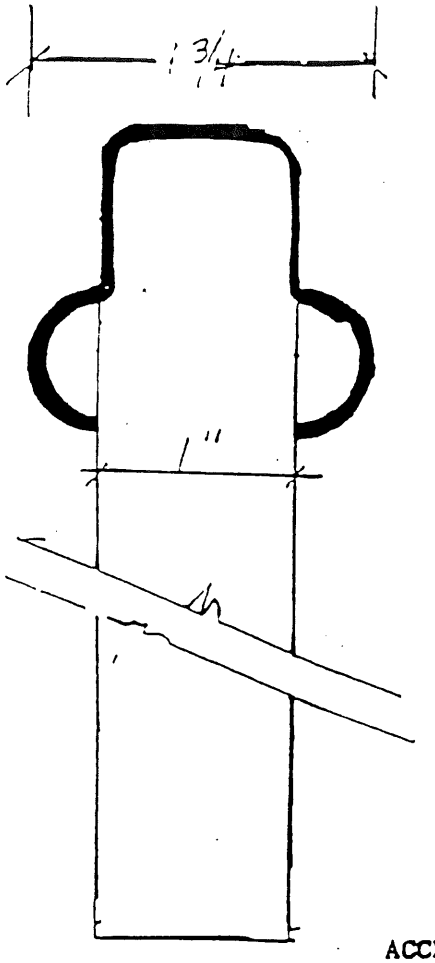
		ACCEPT ABLE
GRIPPING SURFACE	4 3/4	yes
CROSS SECTIONAL DEM.	1 3/4	yes
OPPOSING GRIP DEM.	1"	yes
SMOOTH SURFACE		yes



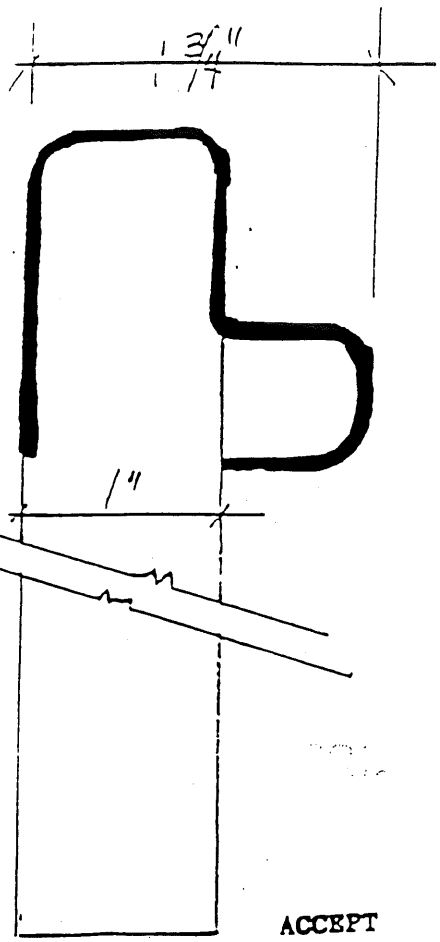
		ACCEPT ABLE
GRIPPING SURFACE	6 1/4	yes
CROSS SECTIONAL DEM.	3"	yes
OPPOSING GRIP DEM.	2 1/4"	yes
SMOOTH SURFACE		yes



		ACCEPT ABLE
GRIPPING SURFACE	6 1/2	NO
CROSS SECTIONAL DEM.	3 1/2	NO
OPPOSING GRIP DEM.	3 1/2	NO
SMOOTH SURFACE		yes

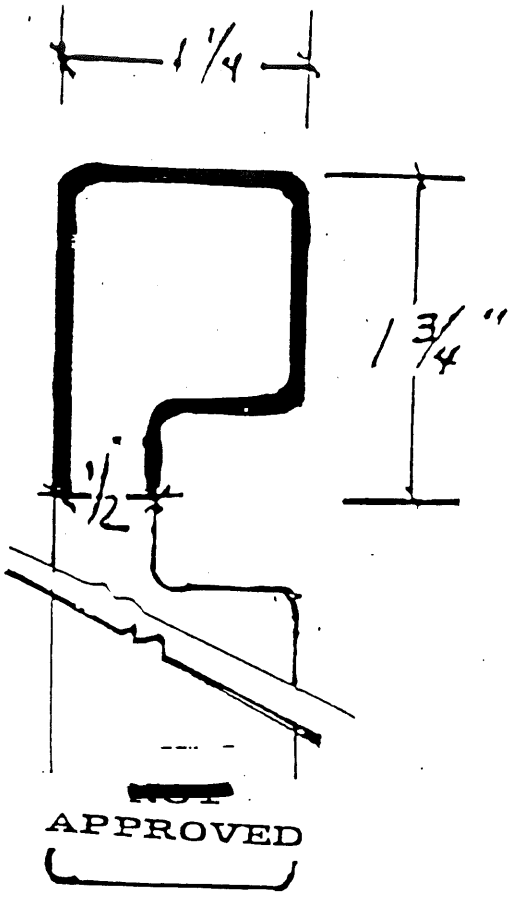


		ACCEPTABLE
GRIPPING SURFACE	5 1/2"	YES
CROSS SECTIONAL DEM.	1 3/4"	YES
OPPOSING GRIP DEM.	1"	YES
SMOOTH SURFACE	___	YES

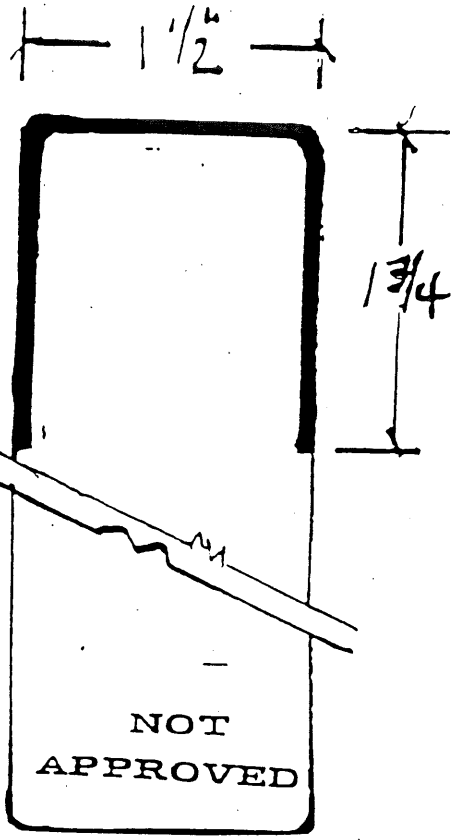


		ACCEPTABLE
GRIPPING SURFACE	5 1/4"	YES
CROSS SECTIONAL DEM.	1 3/4"	YES
OPPOSING GRIP DEM.	1"	YES
SMOOTH SURFACE		YES

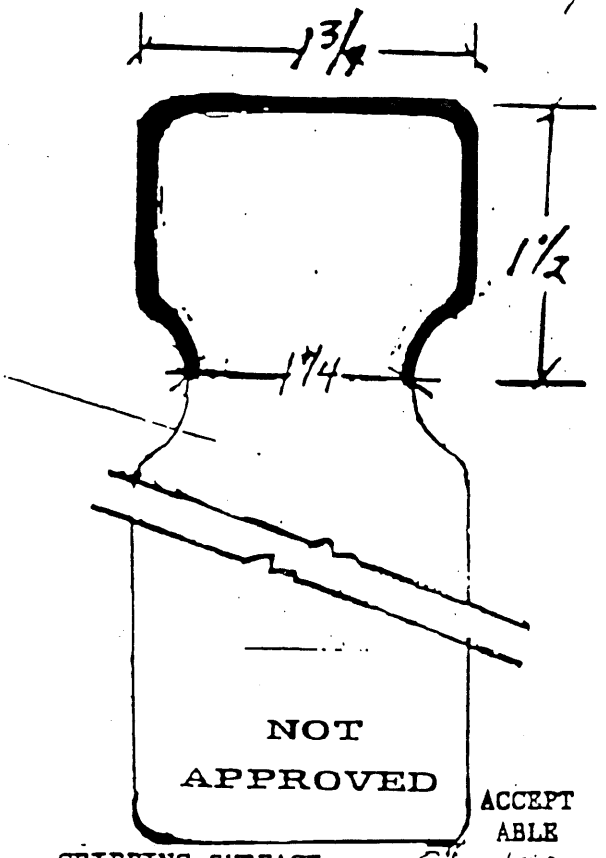
HEAVY LINES INDICATE
'EQUIVALENT GRIPPING SURFACE'



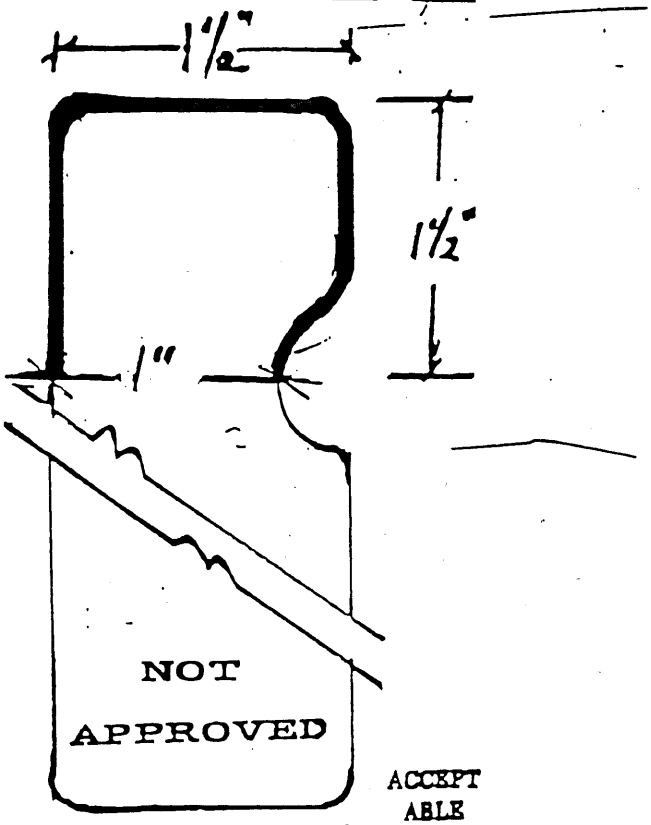
		ACCEPTABLE
GRIPPING SURFACE	5"	YES
CROSS SECTIONAL DIM.	1 1/4	YES
OPPOSING GRIP DIM.	1/2"	YES
SMOOTH SURFACE	—	YES



		ACCEPTABLE
GRIPPING SURFACE	5	YES
CROSS SECTIONAL DIM.	1 1/2	YES
OPPOSING GRIP DIM.	1 1/2	NO
SMOOTH SURFACE	—	YES



		ACCEPTABLE
GRIPPING SURFACE	5 1/2	YES
CROSS SECTIONAL DIM.	1 3/4	YES
OPPOSING GRIP DIM.	1 1/4	NO



		ACCEPTABLE
GRIPPING SURFACE	5	YES
CROSS SECTIONAL DIM.	1 1/2	YES
OPPOSING GRIP DIM.	1	NO
SMOOTH SURFACE		YES