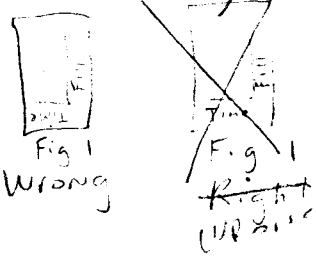
UNITED STATES PATENT AND TRADEMARK OFFICE.

Guide

FOR PATENT DRAFTSMEN



U.S. DEPARTMENT OF COMMERCE

Philip M. Klutznick
Secretary

PATENT AND TRADEMARK OFFICE

Sidney A. Diamond
Commissioner of Patents & Trademarks

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Selected Rules of Practice relating to Patent Drawings

THE DRAWINGS

35 U.S.C. 113. Drawings. The applicant shall furnish a drawing where necessary for the understanding of the subject matter to be patented. When the nature of such subject matter admits of illustration by a drawing and the applicant has not furnished such a drawing, the Commissioner may require its submission within a time period of not less than two months from the sending of a notice thereof. Drawings submitted after the filing date of the application may not be used (i) to overcome any insufficiency of the specification due to lack of an enabling disclosure or otherwise inadequate disclosure therein, or (ii) to supplement the original disclosure thereof for the purpose of interpretation of the scope of any claim. (NOTE.—The above language relates only to applications filed on and after January 24, 1978).

37 CFR 1.81. Drawings required. (a) The applicant for a patent is required to furnish a drawing of his invention where necessary for the understanding of the subject matter sought to be patented; this drawing must be filed with the application.

(b) Drawings may include illustrations which facilitate an understanding of the invention (for example, flow sheets in cases of processes, and diagrammatic views).

(c) Whenever the nature of the subject matter sought to be patented admits of illustration by a drawing without its being necessary for the understanding of the subject matter and the applicant has not furnished such a drawing, the examiner will require its submission within a time period of not less than two months from the date of the sending of a notice thereof.

(d) Drawings submitted after the filing date of the application may not be used to overcome any insufficiency of the specification due to lack of an enabling disclosure or otherwise inadequate disclosure therein, or to supplement the original disclosure thereof for the purpose of interpretation of the scope of any claim.

No names or other identification will be permitted within the "sight" of the drawing, and applicants are expected to use the space above and between the hole locations to identify each sheet of drawings. This identification may consist of the attorney's name and docket number or the inventor's name and case number and may include the sheet number and the total number of sheets filed (for example, "sheet 2 of 4").

37 CFR 1.83. Content of drawing. (a) The drawing must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g. a labeled rectangular box).

(b) When the invention consists of an improvement on an old machine the drawing must when possible exhibit, in one or more views, the improved portion itself, disconnected from the old structure, and also in another view, so much only of the old structure as will suffice to show the connection of the invention therewith.

(c) Where the drawings do not comply with the requirements of paragraphs (a) and (b) of this section, the examiner shall require such additional illustration within a time period of not less than two months from the date of the sending of a notice thereof. Such corrections are subject to the requirements of Section 1.81(d).

§ 1.84 STANDARDS FOR DRAWINGS.

(a) Paper and ink. Drawings must be made upon paper which is flexible, strong, white, smooth, non-shiny and durable. Two-ply or three-ply bristol board is preferred. The surface of the paper should be calendered and of a quality which will permit erasure and correction with India ink. India ink, or its equivalent in quality, is preferred for pen drawings to secure perfectly black solid lines. The use of white pigment to cover lines is not normally acceptable.

(b) Size of sheet and margins. The size of the sheets on which drawings are made may either be exactly 8½ by 14 inches (21.6 by 35.6 cm.) or exactly 21.0 by 29.7 cm. (DIN size A4). All drawing sheets in a particular application must be the same size. One of the shorter sides of the sheet is regarded as its top.

(1) On 8½ by 14 inch drawing sheets, the drawing must include a top margin of 2 inches (5.1 cm.) and bottom and side margins of ¼ inch (6.4 mm.) from the edges, thereby leaving

a "sight" precisely 8 by 11¾ inches (20.3 by 29.8 cm.). Margin border lines are not permitted. All work must be included within the "sight". The sheets may be provided with two ¼ inch (6.4 mm.) diameter holes having their centerlines spaced $^{11}/_{16}$ inch (17.5 mm.) below the top edge and 2¾ inches (7.0 cm.) apart, said holes being equally spaced from the respective side edges.

(2) On 21.0 by 29.7 cm. drawing sheets, the drawing must include a top margin of at least 2.5 cm., a left side margin of 2.5 cm., a right side margin of 1.5 cm., and a bottom margin of 1.0 cm. Margin border lines are not permitted. All work must be contained within a sight size not to exceed 17 by 26.2 cm.

(c) Character of lines. All drawings must be made with drafting instruments or by a process which will give them satisfactory reproduction characteristics. Every line and letter must be durable, black, sufficiently dense and dark, uniformly thick and well defined; the weight of all lines and letters must be heavy enough to permit adequate reproduction. This direction applies to all lines however fine, to shading, and to lines representing cut surfaces in sectional views. All lines must be clean, sharp, and solid. Fine or crowded lines should be avoided. Solid black should not be used for sectional or surface shading. Freehand work should be avoided wherever it is possible to do so.

(d) Hatching and shading. (1) Hatching should be made by oblique parallel lines spaced sufficiently apart to enable the lines to be distinguished without difficulty. (2) Heavy lines on the shade side of objects should preferably be used except where they tend to thicken the work and obscure reference characters. The light should come from the upper left-hand corner at an angle of 45°. Surface delineations should preferably be shown by proper shading, which should be open.

(e) Scale. The scale to which a drawing is made ought to be large enough to show the mechanism without crowding when the drawing is reduced in size to two-thirds in reproduction, and views of portions of the mechanism on a larger scale should be used when necessary to show details clearly; two or more sheets should be used if one does not give sufficient room to accomplish this end, but the number of sheets should not be more than is necessary.

(f) Reference characters. The different views should be consecutively numbered figures. Reference numerals (and letters, but numerals are preferred) must be plain, legible and carefully formed, and not be encircled. They should, if possible, measure at least one-eighth of an inch (3.2 mm.) in height so that they may bear reduction to one twenty-fourth of an inch (1.1 mm.); and they may be slightly larger when there is sufficient room. They should not be so placed in the close and complex parts of the drawing as to interfere with a thorough comprehension of the same, and therefore should rarely cross or mingle with the lines. When necessarily grouped around a certain part, they should be placed at a little distance, at the closest point where there is available space, and connected by lines with the parts to which they refer. They should not be placed upon hatched or shaded surfaces but when necessary, a blank space may be left in the hatching or shading where the character occurs so that it shall appear perfectly distinct and separate from the work. The same part of an invention appearing in more than one view of the drawing must always be designated by the same character, and the same character must never be used to designate different parts. Reference signs not mentioned in the description shall not appear in the drawing, and vice versa.

(g) Symbols, legends. Graphical drawing symbols and other labeled representations may be used for conventional elements when appropriate, subject to approval by the Office. The elements for which such symbols and labeled representations are used must be adequately identified in the specification. While descriptive matter on drawings is not permitted, suitable legends may be used, or may be required in proper cases, as in diagrammatic views and flow sheets or to show materials or where labeled representations are

employed to illustrate conventional elements. Arrows may be required, in proper cases, to show direction of movement. The lettering should be as large as, or larger than, the reference characters.

(h) [Reserved]

(i) Views. The drawing must contain as many figures as may be necessary to show the invention; the figures should be consecutively numbered if possible in the order in which they appear. The figures may be plain, elevation, section, or prespective views, and detail views of portions of elements, on a larger scale if necessary, may also be used. Exploded views, with the separated parts of the same figure embraced by a bracket, to show the relationship or order of assembly of various parts are permissible. When necessary, a view of a large machine or device in its entirety, may be broken and extended over several sheets if there is no loss in facility of understanding the view. Where figures on two or more sheets form in effect a single complete figure, the figures on the several sheets should be so arranged that the complete figure can be understood by laying the drawing sheets adjacent to one another. The arrangement should be such that no part of any of the figures appearing on the various sheets are concealed and that the complete figure can be understood even though spaces will occur in the complete figure because of the margins on the drawing sheets. The plane upon which a sectional view is taken should be indicated on the general view by a broken line, the ends of which should be designated by numerals corresponding to the figure number of the sectional view and have arrows applied to indicate the direction in which the view is taken. A moved position may be shown by a broken line superimposed upon a suitable figure if this can be done without crowding, otherwise a separate figure must be used for this purpose. Modified forms of construction can only be shown in separate figures. Views should not be connected by projection lines nor should center lines be used.

(j) Arrangement of views. All views on the same sheet should stand in the same direction and, if possible, stand so that they can be read with the sheet held in an upright position. If views longer than the width of the sheet are necessary for the clearest illustration of the invention, the sheet may be turned on its side so that the top of the sheet with the appropriate top margin is on the right-hand side. One figure must not be placed upon another or within the outline of another.

(k) Figure for Official Gazette. The drawing should, as far as possible, be so planned that one of the views will be suitable for publication in the Official Gazette as the illustration of the invention.

(l) Extraneous matter. Identifying indicia (such as the attorney's docket number, inventor's name, number of sheets, etc.) not to exceed 2¾ inches (7.0 cm.) in width may be placed in a centered location between the side edges within three-fourths inch (19.1 mm.) of the top edge. Authorized security markings may be placed on the drawings provided they are outside the illustrations and are removed when the material is declassified. Other extraneous matter will not be permitted upon the face of a drawing.

(m) Transmission of drawings. Drawings transmitted to the Office should be sent flat, protected by a sheet of heavy binder's board, or may be rolled for transmisison in a suitable mailing tube; but must never be folded. If received creased or mutilated, new drawings will be required. (See § 1.152 for design drawing, § 1.165 for plant drawings, and § 1.174 for reissue drawings.)

37 CFR 1.85. INFORMAL DRAWINGS. The requirements of § 1.84 relating to drawings will be strictly enforced. A drawing not executed in conformity thereto, if suitable for reproduction, may be admitted, but in such case the drawing must be corrected or a new one furnished, as required. The necessary corrections or mounting will be made by the Office upon applicant's request or permission and at his expense. (See §§ 1.21 and 1.165).

37 CFR 1.86. DRAFTSMAN TO MAKE DRAWINGS.

(a) Applicants are advised to employ competent draftsmen to make their drawings.

(b) The Office may furnish the drawings at the applicant's expense as promptly as its draftsmen can make them, for applicants who cannot otherwise conveniently procure them. (See § 1.21).

37 CFR 1.88. USE OF OLD DRAWINGS. If the drawings of a new application are to be identical with the drawings of a previous application of the applicant on file in the Office, or with part of such drawings, the old drawings or any sheets thereof may be used if the prior application is, or is about to be, abandoned, or if the sheets to be used are cancelled in the prior application. The new application must be accompanied by a letter requesting the transfer of the drawings, which should be completely identified.

37 CFR 1.123. AMENDMENTS TO THE DRAWING.

(a) No change in the drawing may be made except by permission of the Office. Permissible changes in the construction shown in any drawing may be made only by the Office. A sketch in permanent ink showing proposed changes, to become part of the record, must be filed. The paper requesting amendments to the drawing should be separate from other papers.

(b) Substitute drawings will not ordinarily be admitted in any case unless required by the Office.

DESIGN PATENTS

37 CFR 1.152 DRAWING. The design must be represented by a drawing made in conformity with the rules laid down for drawings of mechanical inventions and must contain a sufficient number of views to constitute a complete disclosure of the appearance of the article. Appropriate surface shading must be used to show the character or contour of the surfaces represented.

PLANT PATENTS

37 CFR 1.165 DRAWINGS.

(a) Plant patent drawings are not mechanical drawings and should be artistically and competently executed. Figure numbers and reference characters need not be employed unless required by the examiner. The drawing must disclose all the distinctive characteristics of the plant capable of visual representation.

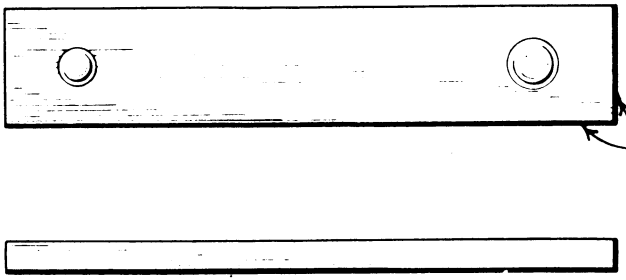
(b) The drawing may be in color and when color is a distinguishing characteristic of the new variety, the drawing must be in color. Two copies of color drawings must be submitted. Color drawings may be made either in permanent water color or oil, or in lieu thereof may be photographs made by color photography or properly colored on sensitized paper. Permanently mounted color photographs are acceptable. The paper in any case must correspond in size, weight and quality to the paper required for other drawings. See § 1.84. Nonpermanently mounted copies will be correctly mounted at applicant's expense, § 1.21(v).

REISSUE PATENTS

37 CFR 1.174 DRAWINGS.

(a) The drawings upon which the original patent was issued may be used in reissue applications if no change whatsoever are to be made in the drawings. In such cases, when the reissue application is filed, the applicant must submit a temporary drawing which may consist of a copy of the printed drawings of the patent or a photoprint of the original drawings securely mounted by pasting on sheets of drawing board of the size required for original drawing, or an order for the same.

(b) Amendments which can be made in a reissue drawing that is, changes from the drawing of the patent, are restricted.



ALWAYS USE PLAIN BLOCK LETTERING
FOR LEGENDS NAMES, ETC.

WATER
INSULATION
COPPER
OIL

1234567890

ALL FIGS. MUST BE SEPARATELY NUMBERED

SOME STYLES OF LETTERING
USED ON PATENT DRAWINGS

Fig. 1.

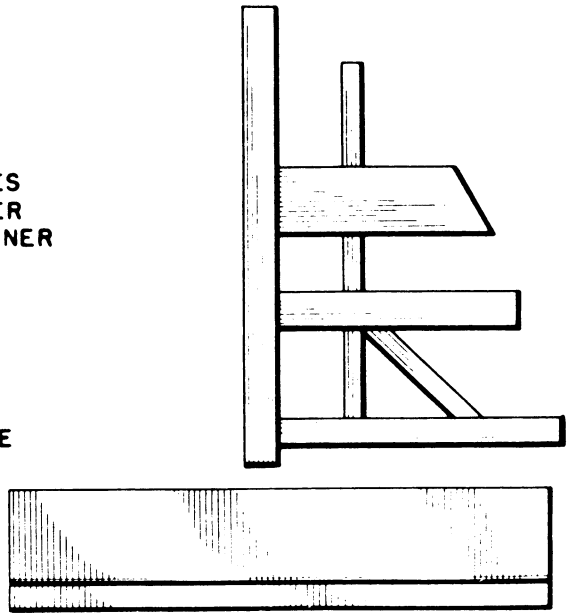
FIG. 1.

Fig. 1.

Fig. 1

THE LIGHT COMES
FROM THE UPPER
LEFT-HAND CORNER
AT AN ANGLE
OF 45°

ALWAYS MAKE
SHADE LINES
ON SHADOW SIDE



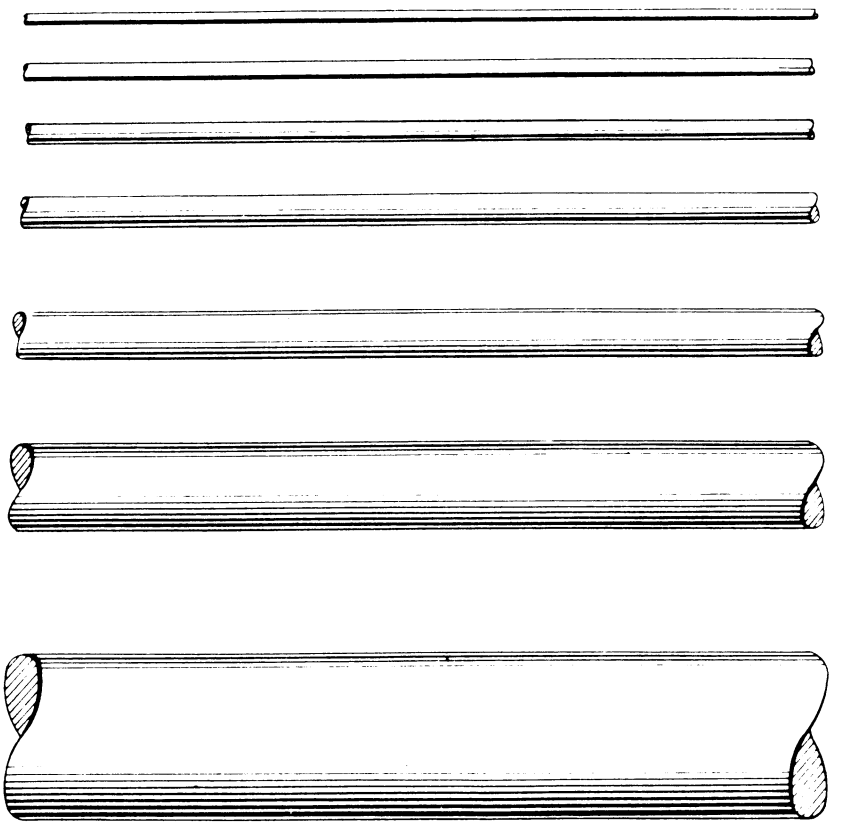
Letters and figures of reference must be carefully formed. Several types of lettering and figure marks are shown, however, the draftsman may use any style of lettering that he may choose.

Place heavy lines on the shade side of objects, assuming that the light is coming from the upper left-hand corner at an angle of 45°. Make these heavy lines the same weight throughout the various views on the drawing.

Descriptive matter is not permitted on patent drawings. Legends may be applied when necessary but only plain black lettering should be used.

The different views should be consecutively numbered.

SURFACE SHADING FOR VARIOUS SIZES OF PIPES & SHAFTS



SURFACE SHADING FOR SPHERICAL OBJECTS

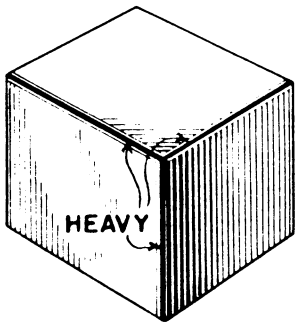
Surface delineations should be shown by proper shading. The figures show various types of surface shading. The amount of shading necessary depends on the size of the diameter of the shaft, etc. Note that a single heavy line on the shadow side is sufficient shading for small pipes, rods and shafts. When more than one shade line is used on cylindrical surfaces, the shading is blended from the second line. Note that the outer line is a light line. This rule on shading applies to spherical as well as cylindrical surfaces.

Make all lines clear and sharp so that they will reproduce properly.

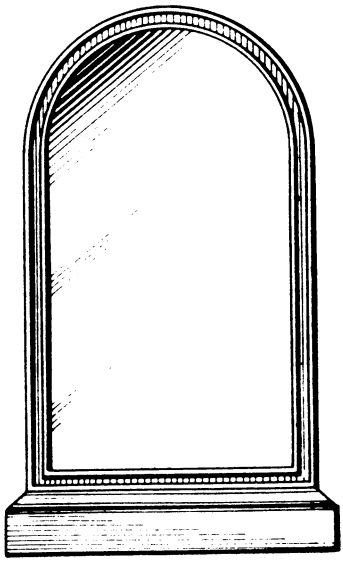
India ink, or its equivalent in quality, must be used for pen drawings to secure perfectly black solid lines.

SURFACE SHADING ILLUSTRATING A MIRROR

SHADING FOR A BLOCK IN PERSPECTIVE

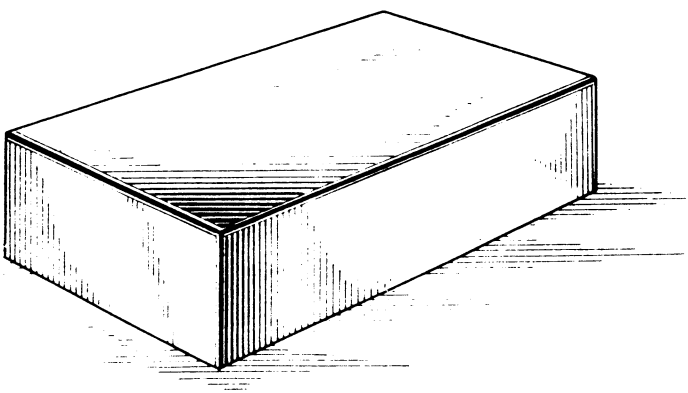


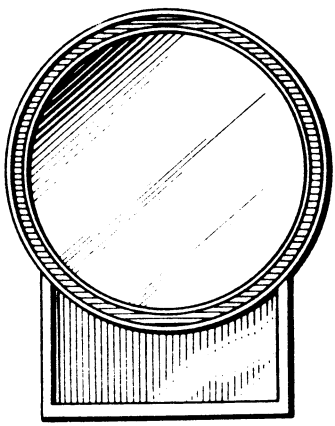
NOTE—THE HEAVY SHADE LINES ARE PLACED ON THE EDGES CLOSEST TO THE EYE



ROUND MIRROR

RECTANGULAR BLOCK IN PERSPECTIVE

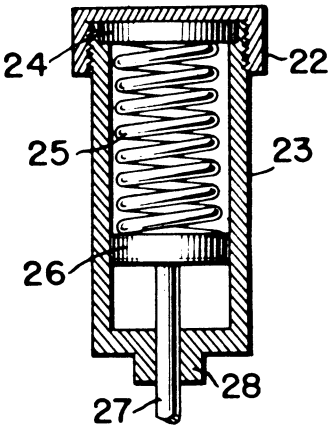




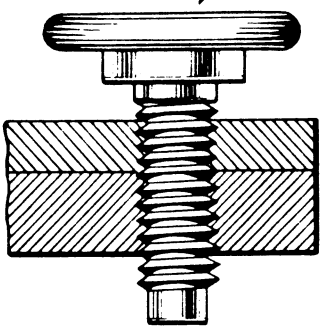
Heavy shade lines on perspective views are placed on the edges closest to the eye. The rule of the light coming from the upper left-hand corner at a 45° angle does not apply to perspective views. If a very light line is placed either side of the heavy line, a more finished appearance of the article is obtained. The addition of horizontal ground line as shown in the lower perspective view of the block emphasizes support for the same.

The appearance of a mirror or shiny surfaces can be illustrated by the oblique shading shown on the two views on the right-hand side of the page.

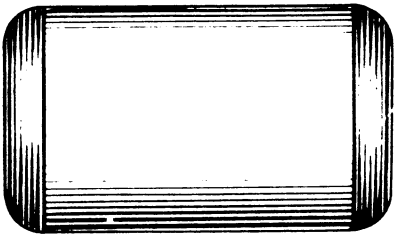
NUMERALS MUST BE PLACED AS CLOSE AS POSSIBLE TO THE PART TO WHICH THEY REFER

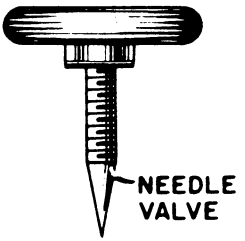


SHADING FOR ROUND HANDLES, ETC.

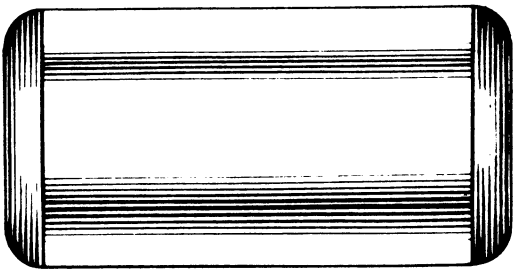


CYLINDRICAL SHADING CONVENTIONAL

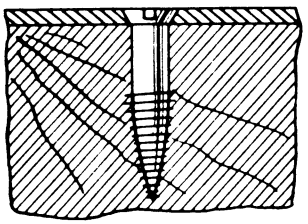




CYLINDRICAL SHADING HIGH LIGHT



WOOD SCREW

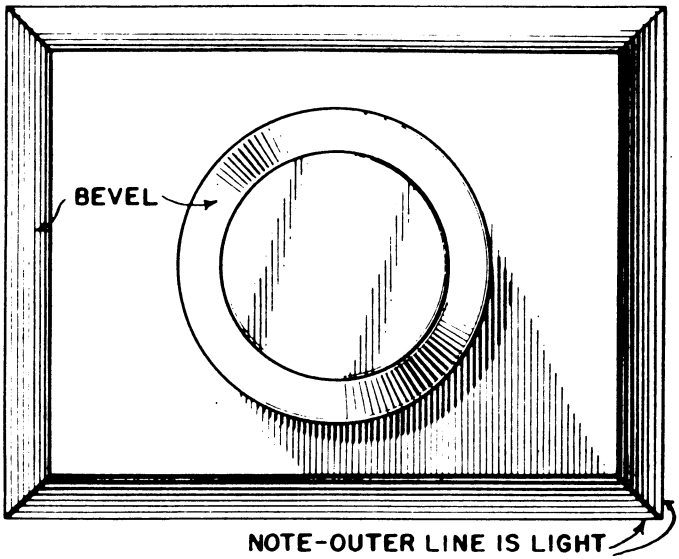


Reference characters should be placed at a little distance from the parts to which they refer. They should be connected with these parts by a short lead line, never by a long lead line. When necessary blank spaces must be left on shaded and hatched areas for applying the numerals.

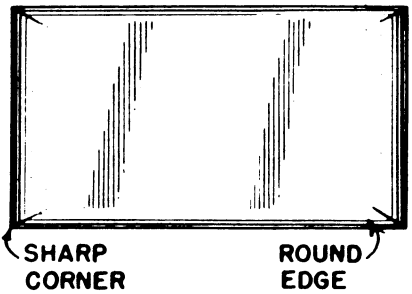
Use wood graining sparingly on parts of wood in section. Excessive wood graining is objectionable as it blurs the view and is very confusing.

Various methods of shading are shown, however, the conventional surface shading should be used until the draftsman has obtained enough experience to attempt the more involved types of shading.

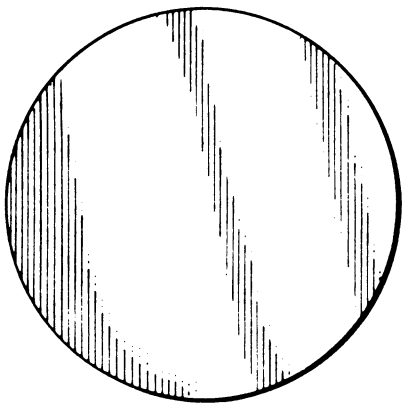
SURFACE SHADING ON BEVEL EDGES

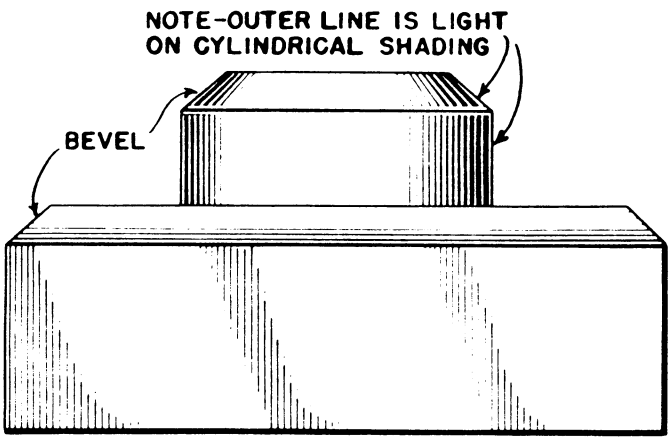


IRREGULAR SURFACE



SURFACE SHADING FOR A DISC, TABLE TOP, ETC.



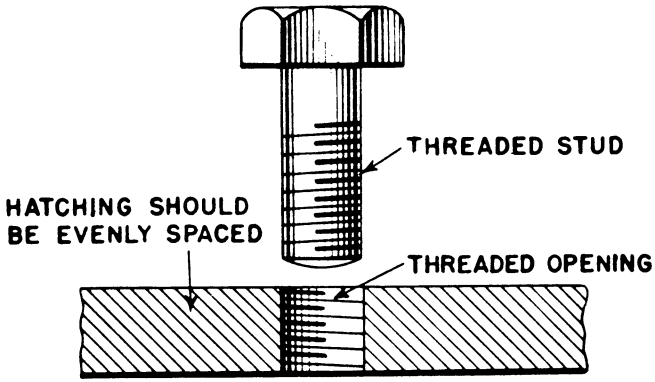


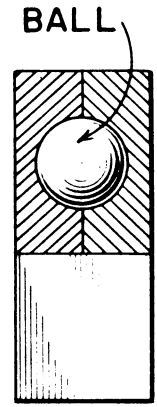
Inclined surfaces are distinguished from flat surfaces by using the shading shown on the illustration in the upper left-hand corner of the page. You will note that the outer line is always a light line. This gives a slanting effect to the surface as the heavy line is placed on the edge of the upper plane. The surface shading is blended from this heavy line giving the desired appearance.

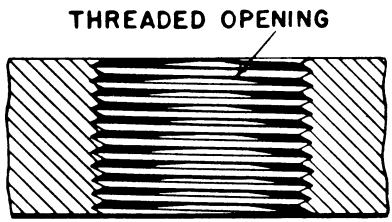
The other figures on the page show various methods of shading. Flat, shiny surfaces may be shown as illustrated in the circular figure.

The scale to which a drawing is made ought to be large enough to show the mechanism without crowding.

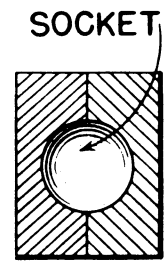
THREADS-CONVENTIONAL METHOD

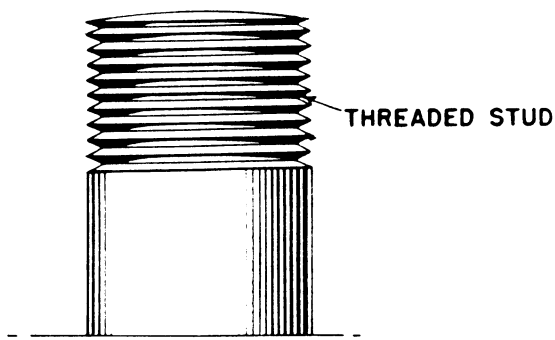


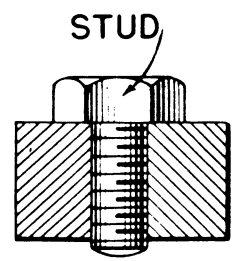




THREADS-DETAIL METHOD USED ON LARGE PIPES





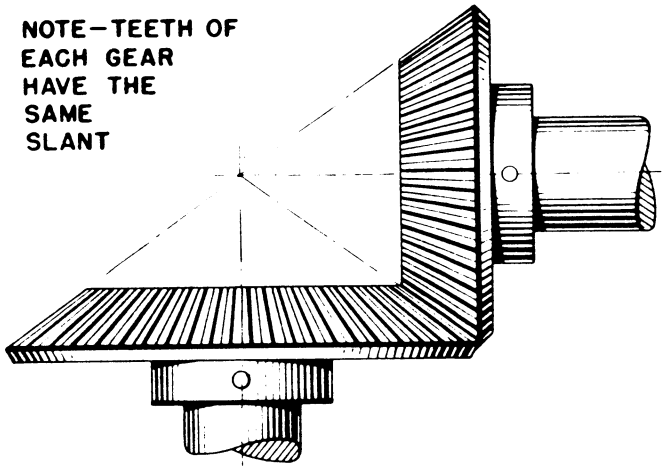


Several methods of illustrating threads are shown in the figures above. The conventional thread may be shown on small bolts and openings. The detail method should be used on large pipes and threaded portions. Solid black shading as shown is very effective in illustrating the threads but care should be used in applying same.

Convex and concave surfaces are defined by the shading shown in the illustrations of the ball and socket.

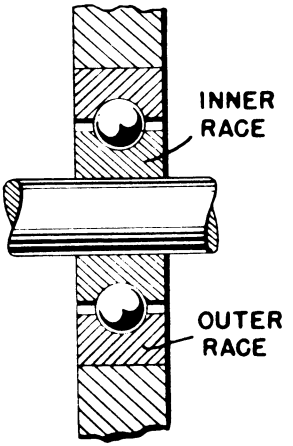
Plan the views properly so that one figure is not placed upon another or within the outline of another.

BEVEL GEARS

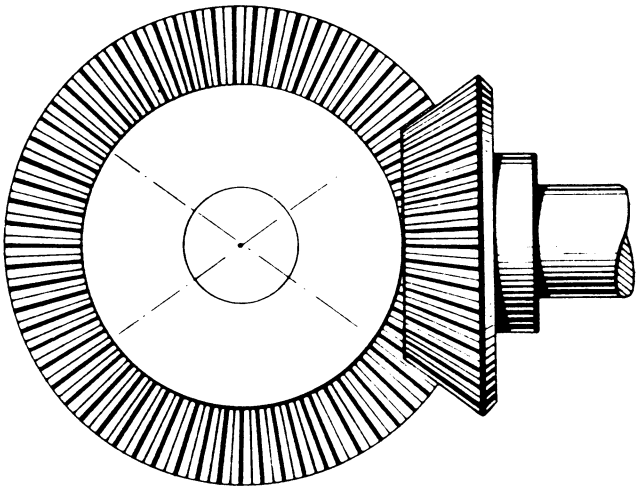


NOTE—ALL TEETH CONVERGE IN A CENTRAL POINT.—BROKEN LINES ARE FOR INSTRUCTION PURPOSES AND ARE NOT TO BE PLACED ON DRAWINGS

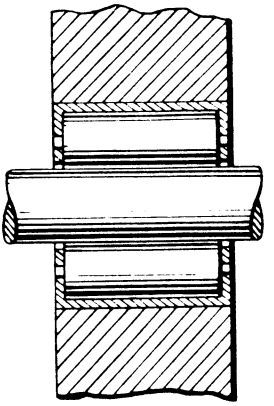
BALL BEARING



TOP PLAN VIEW



ROLLER BEARING

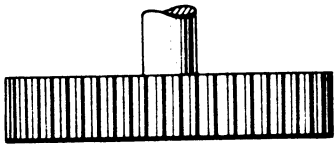


The conventional method of illustrating bevel gears is clearly shown on the two figures on the left-hand side of the page. Particular care must be given to the correct spacing between the gear teeth and also to the weight of the shade lines used. Both must be correctly shown to obtain the desired effect.

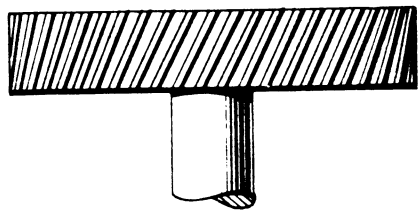
Two types of bearings are also shown. The roller bearing is clearly disclosed by the use of the conventional cylindrical shading. The fanciful black shading shown on the ball bearing is very effective in bringing out the idea of an object being shiny as well as round.

The use of white pigment to cover lines is not acceptable.

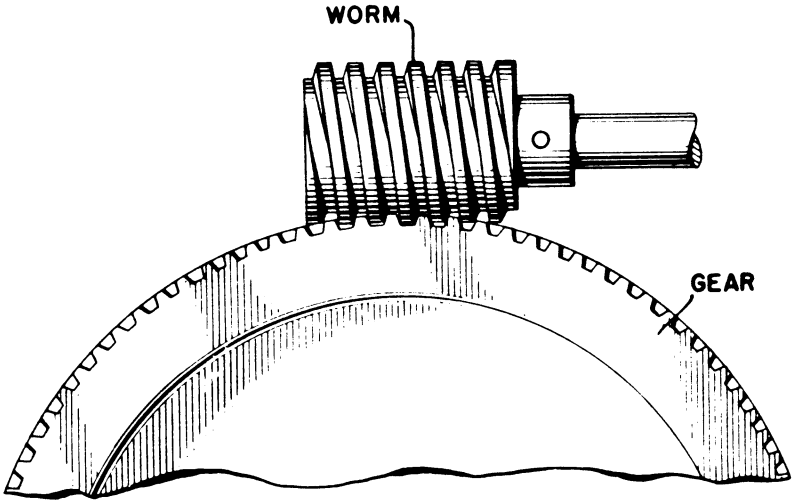
SPUR GEAR



HELICAL GEAR



TWO SPUR GEARS IN MESH

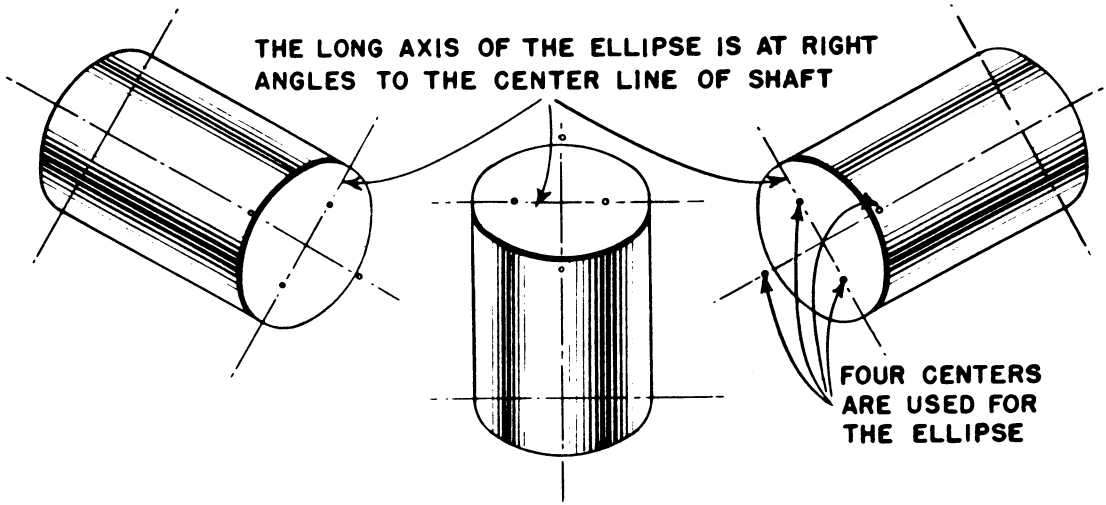


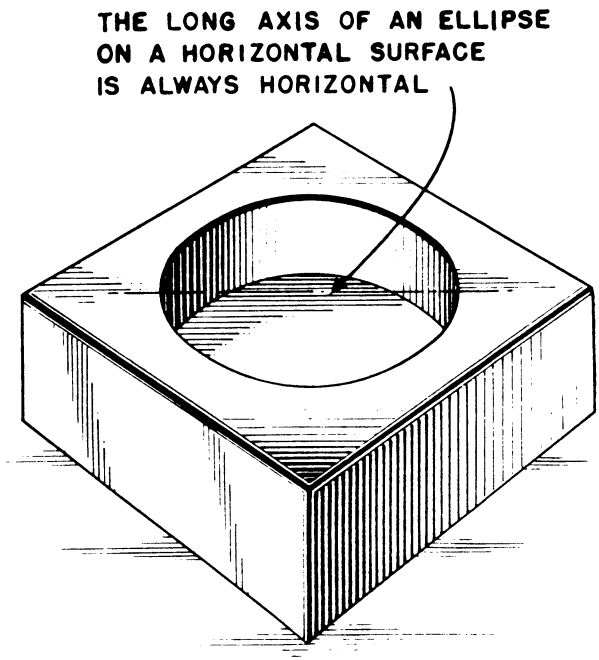
The conventional method of showing a spur gear and a helical gear is shown on the two illustrations at the top of the page. The proper spacing between the gear teeth is essential in illustrating gears in mesh as shown on the central figure.

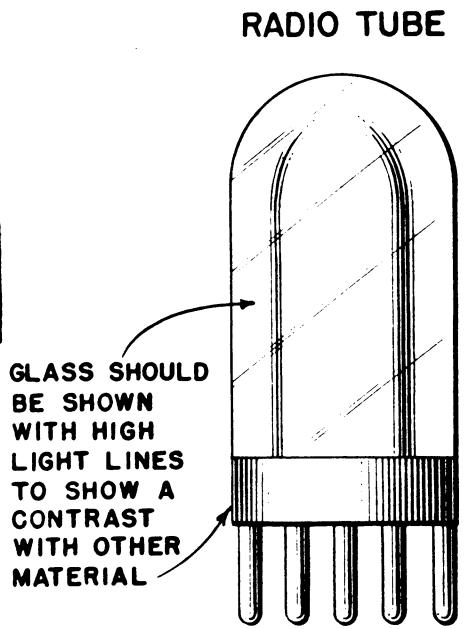
A worm and worm gear in mesh is clearly illustrated in the lower figure on the page. Do not add the legends on the drawing.

Every line and letter must be absolutely black. This direction applies to all lines however fine, to shading, and to lines representing cut surfaces in sectional views.

PERSPECTIVES





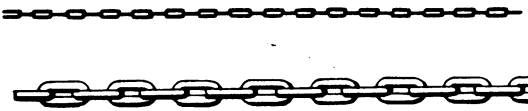


The four figures in perspective clearly explain the fundamental rules for determining the position of the long axis of the ellipse. Do not add the center lines as they are not permitted on patent drawings. These have been shown for instructive purposes only.

Different types of shading are used when it is desired to show a contrast between materials as shown in the illustration of the radio tube.

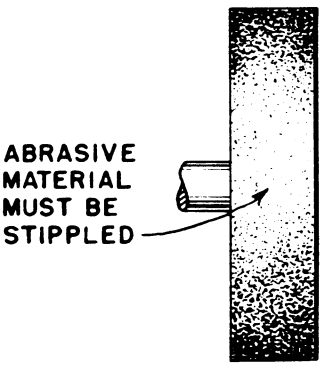
All drawings must be made with drafting instruments and every line and letter must be absolutely black. Free-hand work should be avoided wherever it is possible to do so.

LINK CHAIN
-SMALL-

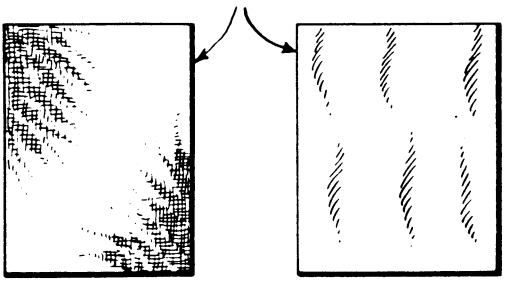


LINK CHAIN
-LARGE DETAIL-

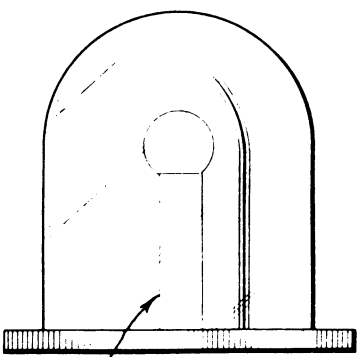
GRINDING WHEEL



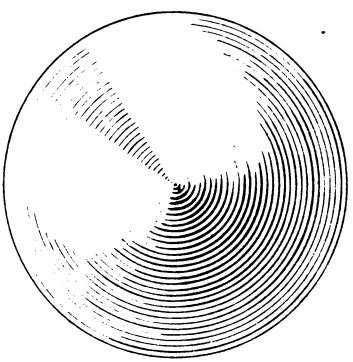
TWO METHODS OF
ILLUSTRATING FABRIC



LIGHT



ANOTHER METHOD OF
ILLUSTRATING A
CONICAL SURFACE



Two illustrations of link chains are shown at the top of the page, the size of the view being the guiding factor in determining the correct showing.

Abrasive material must be stippled as shown in the illustration of the grinding wheel. Irregular surfaces and objects that are impossible to properly show up with line shading must be stippled to bring out the desired effect.

Free-hand shading should be used to designate fabric material.

All elements behind glass should be shown in light full lines. The light oblique shade lines across the glass give the desired effect.

Symbols for Draftsmen

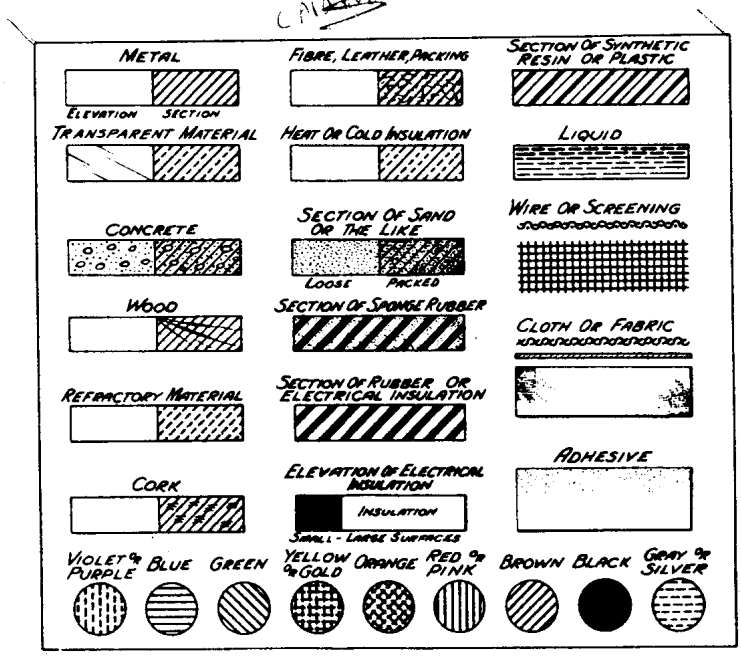
37 CFR 1.84(g) states that graphical symbols for conventional elements may be used on the drawing when appropriate, subject to approval by the Office. The symbols and other conventional devices which follow have been and are approved for such use. This collection does not purport to be exhaustive, other standard and commonly used symbols will also be acceptable provided they are clearly understood, are adequately identified in the specification as filed, and do not create confusion with other symbols used in patent drawings.

It should be noted that the American National Standards Institute Inc., 1430 Broadway, New York, N.Y. 10018, publishes a series of publications relating to graphic symbols under its Y32 and Z32 headings, the Office calls attention of patent applicants to these symbols for their consideration and use where appropriate in patent drawings. The listed publications have been reviewed by the Office and the symbols therein are considered to be generally acceptable in patent drawings. Although the Office will not "approve" all of the listed symbols as a group because their use and clarity must be decided on a case-by-case basis, these publications may be used as guides when selecting graphic symbols. Overly specific symbols should be avoided. Symbols with unclear meanings should be labeled for clarification. As noted in 37 CFR 184(g); the Office will retain final authority to approve the use of any particular symbols in any particular case.

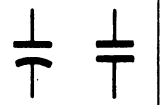
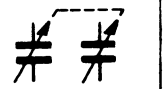
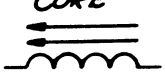
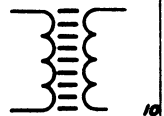
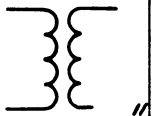
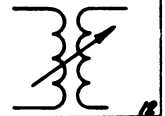
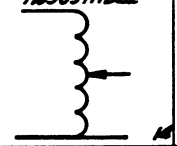
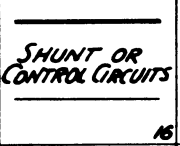
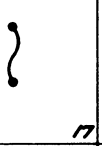
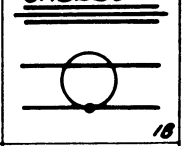
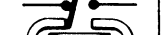
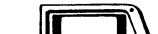
The reviewed publications are as follows:

Y32.2—1970. Graphic Symbols for Electrical and Electronics Diagram	$8.00
32.10—Graphic Symbols for Fluid Power Diagrams	4.00
Y32.11—1961. Graphic Symbols for Process Flow Diagrams in the Petroleum and Chemical Industries	2.25
Y32.14—1962. Graphic Symbols for Logic Diagrams	6.00
Z32.2.3—1949 (R1953). Graphic Symbols for Pipe Fittings, Valves and Piping	2.25
Z32.2.4—1949 (R1953). Graphic Symbols for Heating, Ventilating and Air Conditioning	2.25
Z32.2.6—1950. Graphic Symbols for Heat-Power Apparatus	2.25

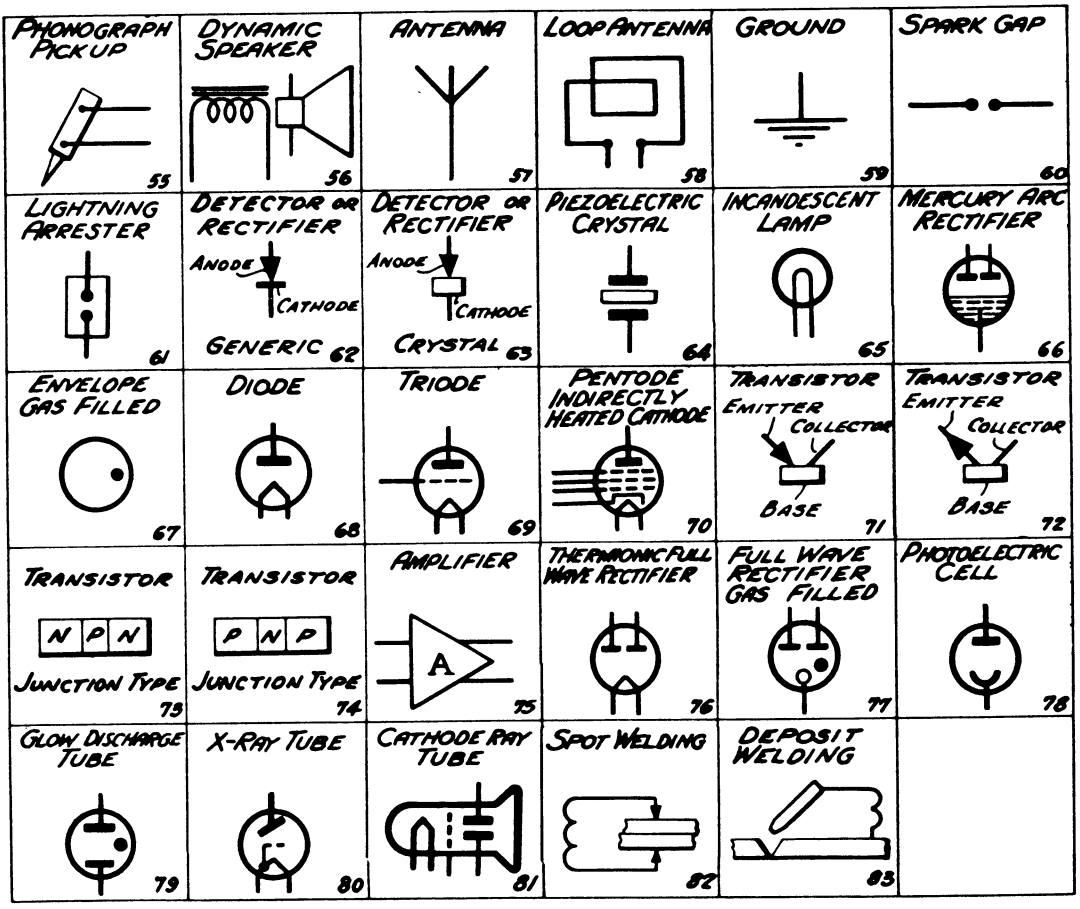
NOTES: In general, in lieu of a symbol, a conventional element, combination or circuit may be shown by an appropriately labeled rectangle, square, or circle; abbreviations should not be used unless their meaning is evident and not confusing with the abbreviations used in the suggested symbols. In the electrical symbols an arrow through an element indicates variability thereof, see for example symbols 2, 6, 12; dotted line connection of arrows indicates ganging thereof, see symbol 6; inherent property (as resistance) may be indicated by showing symbol (for resistor) in dotted lines.



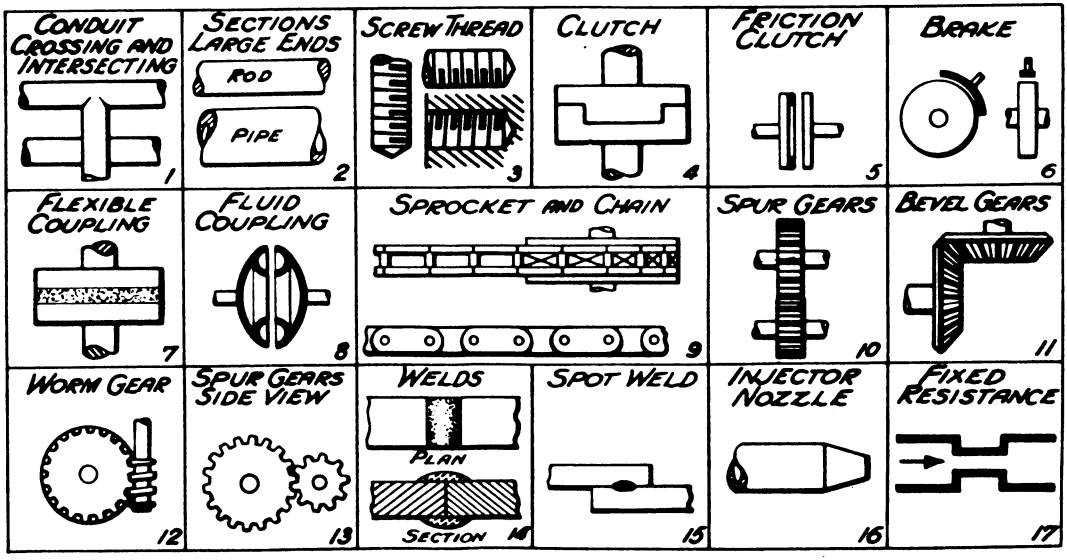
Electrical Symbols

RESISTOR  1	VARIABLE RESISTOR  2	POTENTIOMETER  3	RHEOSTATS  4	CONDENSERS  5	GANGED VARIABLE CONDENSERS  6
INDUCTORS  7	INDUCTOR ADJUSTABLE CORE  8	INDUCTOR OR REACTOR POWDERED MAGNETIC CORE  9	TRANSFORMER SATURABLE CORE  10	TRANSFORMER AIR CORE  11	VARIABLE TRANSFORMER  12
TRANSFORMER MAGNETIC CORE  13	AUTO-TRANSFORMER ADJUSTABLE  14	CROSSED AND JOINED WIRES  15	MAIN CIRCUITS  SHUNT OR CONTROL CIRCUITS 16	FUSE  17	COAXIAL CABLES  18
SHIELDING 19	BATTERY  20	THERMOELEMENT  21	BELL  22	AMMETER  23	MILLIAMMETER  24
VOLTMETER  25	GALVANOMETER  26	WATTMETER  27	SWITCH  28	DOUBLE POLE SWITCH  29	DOUBLE POLE DOUBLE THROW SWITCH  30
PUSH BUTTON TWO POINT MAKE  31	SELECTOR OR CONNECTOR OR FINDER SWITCH  32	CIRCUIT BREAKER OVERLOAD  33	RELAY  34	POLARIZED RELAY  35	DIFFERENTIAL RELAY  36
ANNUNCIATORS SIDE FRONT  37	DROP ANNUNCIATOR  38	DRUM TYPE SWITCH OR CONTROL 1 2 1 2  39	COMMUTATOR MOTOR OR GENERATOR  40	REPULSION MOTOR 41	INDUCTION MOTOR THREE PHASE SQUIRREL CAGE 42
INDUCTION MOTOR PHASE WOUND SECONDARY 43	SYNCHRONOUS MOTOR OR GEN. THREE PHASE 44	MOTOR GENERATOR 45	ROTARY CONVERTER THREE PHASE 46	FREQUENCY CHANGER THREE PHASE 47	TROLLEYS 48
THIRD RAIL SHOE 49	RECEIVERS 50	TRANSMITTER OR MICROPHONE 51	TELEPHONE HOOK 52	TELEGRAPH KEY 53	SWITCH BOARD PLUG AND JACK 54

Electrical Symbols – continued



Mechanical Symbols



PTO FORM 948
(REV. 5-90)

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

ATTACHMENT TO PAPER NUMBER 4

APPLICATION NUMBER 668939.

NOTICE OF DRAFTSMAN'S PATENT DRAWING REVIEW

THE PTO DRAFTSMEN REVIEW ALL ORIGINALLY FILED DRAWINGS REGARDLESS OF WHETHER THEY WERE DESIGNATED AS INFORMAL OR FORMAL.

The drawings filed 3/13/91

A. ☐ are approved.

B. ☒ are objected to under 37 CFR 1.84 for the reason(s) checked below. The examiner will require submission of new, corrected drawings at the appropriate time. Corrected drawings must be submitted according to the instructions listed on the back of this Notice.

1. Paper and ink. 37 CFR 1.84(a), ballpoint ink, pencil. marks obj.

☒ Sheet(s) all Poor.

2. Size of Sheet and Margins. 37 CFR 1.84(b)

Acceptable Paper Sizes and Margins

Margin	Paper Size: 8 1/2 by 14 inches	8 1/2 by 13 inches	DIN size A4 21 by 29.7 cm.
Top	2 inches	1 inch	2.5 cm.
Left	1/4 inch	1/4 inch	2.5 cm.
Right	1/4 inch	1/4 inch	1.5 cm
Bottom	1/4 inch	1/4 inch	1.0 cm.

☒ Proper Size Paper Required. too small
All Sheets Must be Same Size.
Sheet(s) all

☐ Proper Margins Required.
Sheet(s) _____
☐ TOP ☐ RIGHT
☐ LEFT ☐ BOTTOM

3. Character of Lines. 37 CFR 1.84(c)

☒ Lines Pale or Rough and Blurred.
Fig(s) 1-2.

☒ Solid Black Shading Not Allowed
Fig(s) 2

4. Hatching and Shading. 37 CFR 1.84(d)

☐ Shade Lines are Required.
Fig(s) _____

☐ Criss-Cross Hatching Not Allowed.
Fig(s) _____

☐ Double Line Hatching Not Allowed.
Fig(s) _____

☐ Parts in Section Must be Hatched.
Fig(s) _____

5. Reference Characters. 37 CFR 1.84(f)

☒ Reference Characters Poor or Incorrectly Sized. Some
Fig(s) 1-2. in f

☐ Reference Characters Placed Incorrectly.
Fig(s) _____

(8) Pen & Black India Ink dwg. req'd. Fig. 1-2.

6. Views. 37 CFR 1.84(i) & (j)

☐ Figures Must be Numbered Properly.
_____

☐ Figures Must Not be Connected.
Fig(s) _____

7. ☐ Photographs Not Approved.
_____

8. ☐ Other.

Telephone inquiries concerning this review should be directed to the Chief Draftsman at telephone number (703) 557-6404. Main # (703) 557-3158 (703)-305-8404

MT
Reviewing Draftsman

5/21/91
Date

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

Attachment to Paper Number
Serial No.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities—37 CFR 1.85; 1097 OG 36

IN APPLICATIONS FILED **BEFORE** JANUARY 1, 1989 OPTION a) OR b) MAY BE USED IN ORDER TO CORRECT ANY INFORMALITY IN THE DRAWING.

IN APPLICATIONS FILED **AFTER** JANUARY 1, 1989 ONLY OPTION a) **MAY BE USED.**

AFTER JANUARY 1, 1991 ONLY OPTION a) MAY BE USED REGARDLESS OF FILING DATE.

a) File new drawings with the changes incorporated therein. The art unit number, serial number and number of drawing sheets should be written on the drawings in accordance with 37 CFR 1.84(l). Applicant may delay filing of the new drawings until receipt of the "Notice of Allowability" (PTOL-37). If delayed, the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for response in the "Notice of Allowability" (PTOL-37). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). The drawing should be filed as a separate paper with a transmittal letter addressed to the Official Draftsman.

b) Request a commercial bonded drafting firm to make the necessary corrections. A bonded draftsman must be authorized, the corrections executed and the corrected drawings returned to the office during the **THREE MONTH** shortened statutory period set for response in the "Notice of Allowability" (PTOL-37). Extensions of time may be obtained under Provisions of 37 CFR 1.136(a).

Timing of Corrections

Applicant is required to submit **acceptable** corrected drawings within the three month shortened statutory period set in the "Notice of Allowability" (PTOL-37). Within that three month period, two weeks should be allowed for review by the Office of the correction. If a correction is determined to be unacceptable by the Office, applicant must arrange to have acceptable correction re-submitted within the original three month period to avoid the necessity of obtaining an extension of time and paying the extension fee. Therefore, applicant should file corrected drawings as soon as possible.

Failure to take corrective action within set (or extended) period will result in **ABANDONMENT** of the Application.

2. Corrections other than Informalities Noted by the Draftsman on the PTO-948

All changes to the drawings, other than informalities noted by the Draftsman, **MUST** be made in the same manner as above except that, normally, a red ink sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.