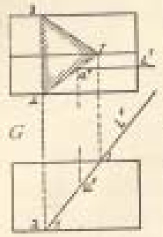
177. Drawing G represents the same conditions as D.

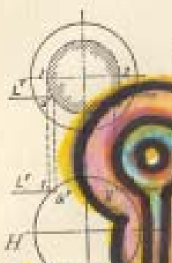


The intersection may be found without drawing the end view, by means of a cutting plane used as explained in E and F.

The cutting plane used in the illustration is perpendicular to the front plane; and in the front view points $1, 2, 3$ of the section, which are in the edges of the prism, are seen. When these points are projected to the top view and connected, the triangular section is represented by a triangle, and the point a^T, where L^T intersects the triangle, is the top view of the required point a.

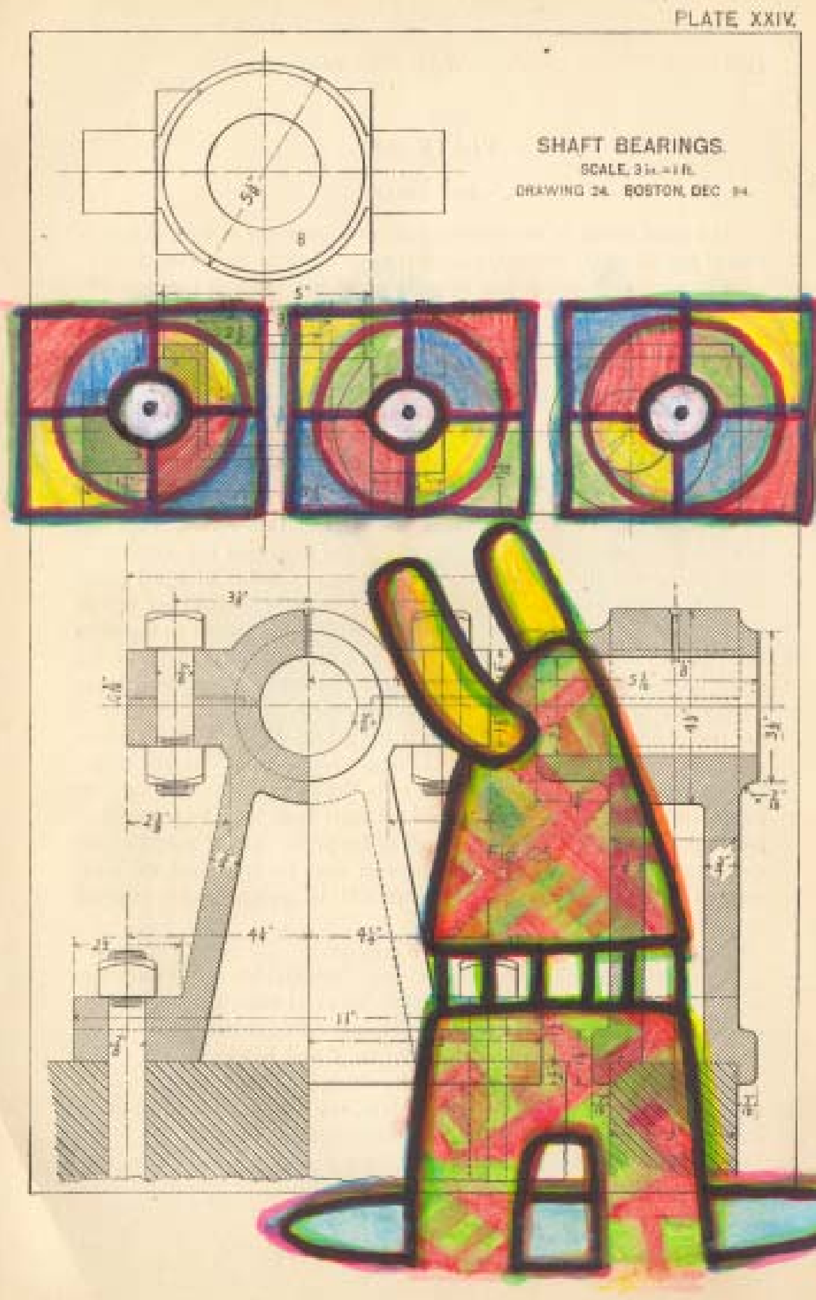
INTERSECTIONS OF A LINE AND A CURVED SURFACE.

178. Drawing H represents a sphere intersected by a horizontal line L, in front of the centre of the sphere.



If th[illegible] plane passing through [illegible] and parallel to the fron[illegible] would give the in-tersecti[illegible]re. If the line [illegible] through the [illegible] would give the [illegible] here. As the [illegible] positions, the [illegible] either view. [illegible] horizontal c[illegible] plane may be passed through the line. This plane gives a circular section whose diameter [illegible] is seen in the front view. The circle appears a circle in the top view; hence its intersections a^T and b^T with L^T are seen, and may be projected to the front view.

179. Drawing I solves the same problem, except that the line is parallel to the front plane only. An auxiliary cutting plane parallel to the front plane is used. The plane gives a circle on the sphere



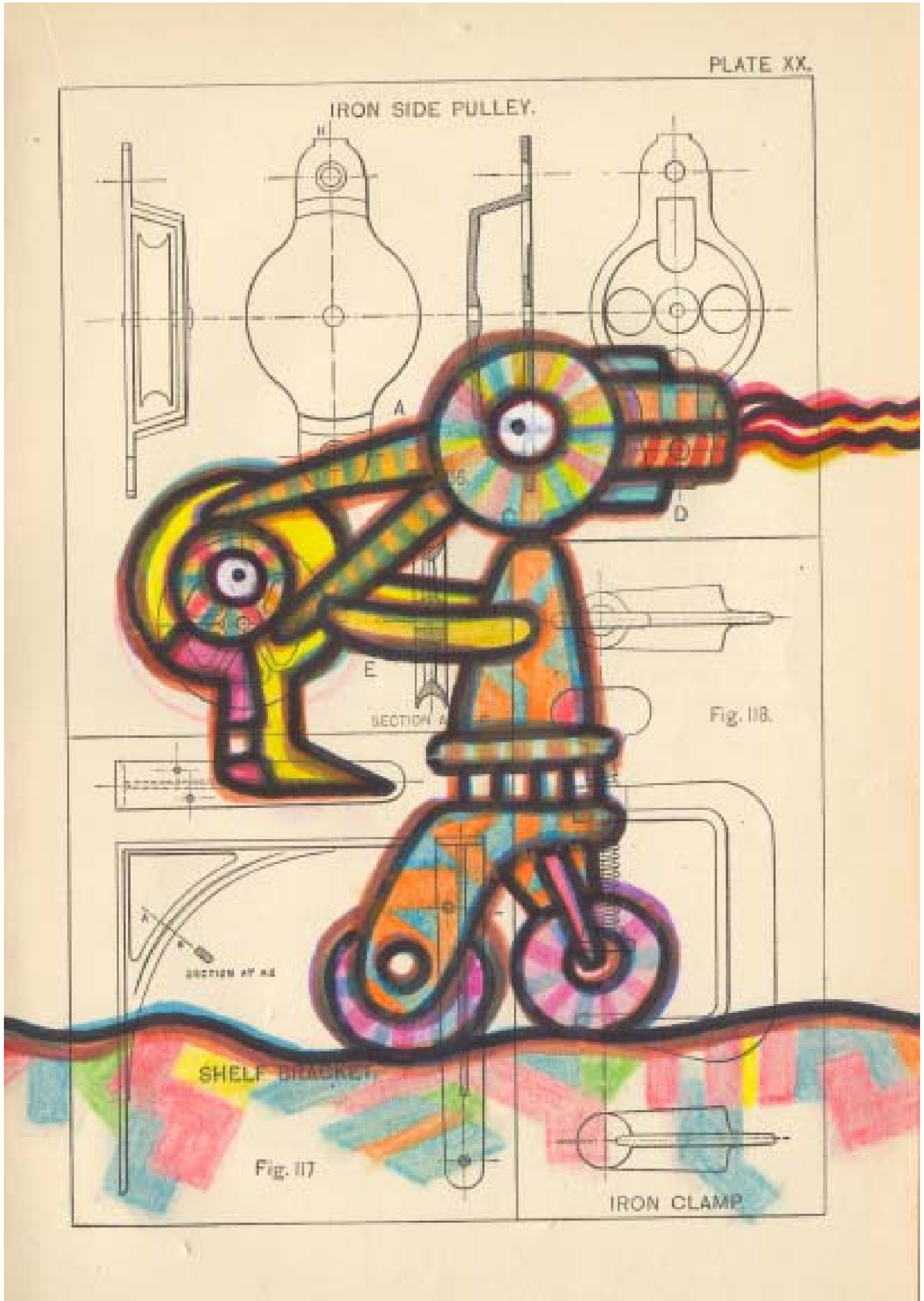


PLATE XX.
IRON SIDE PULLEY.
A
D
E
SECTION A
Fig. 118.
SECTION AT AB
SHELF BRACKET.
Fig. 117
IRON CLAMP.

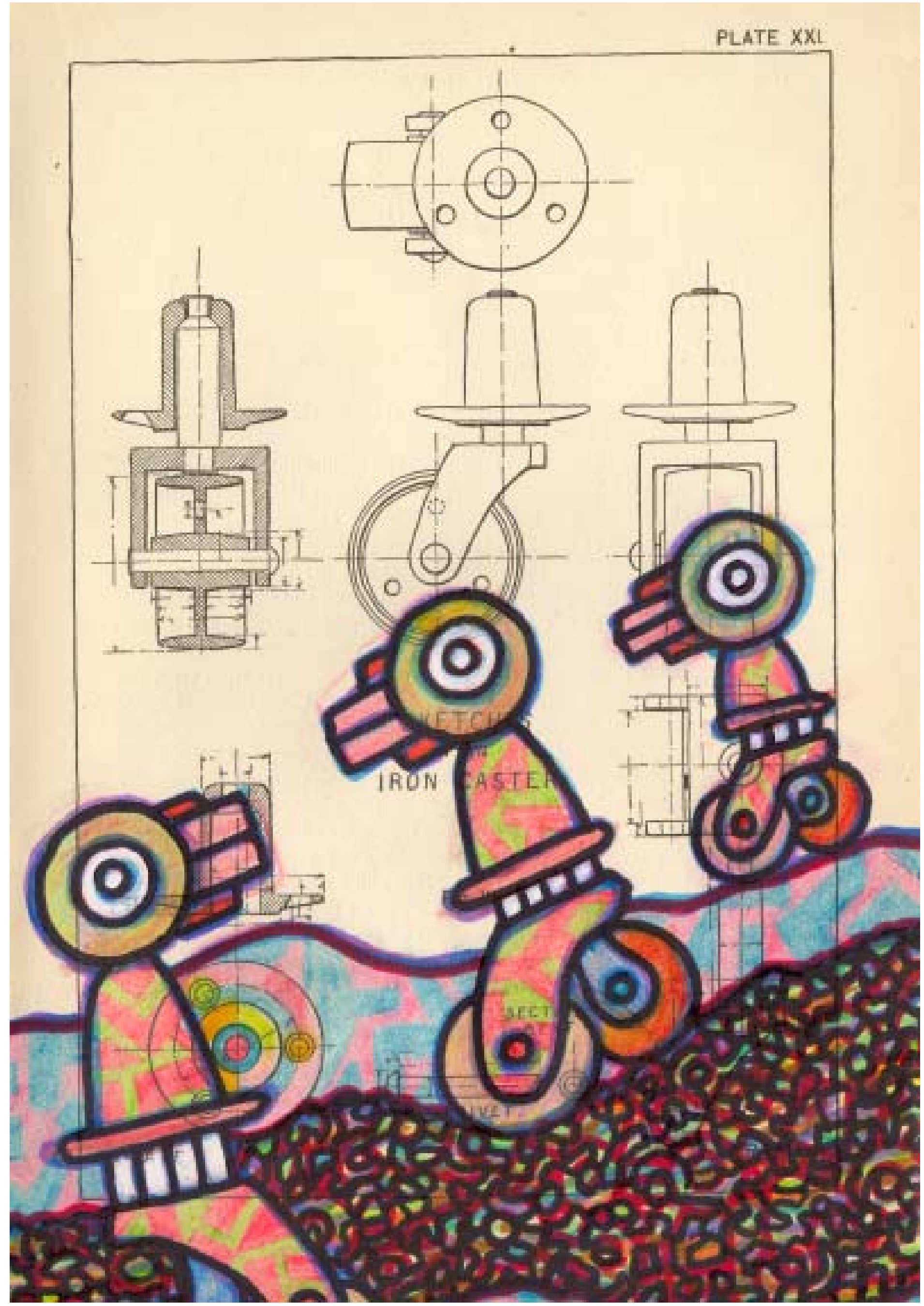


PLATE XXI.
IRON CASTER

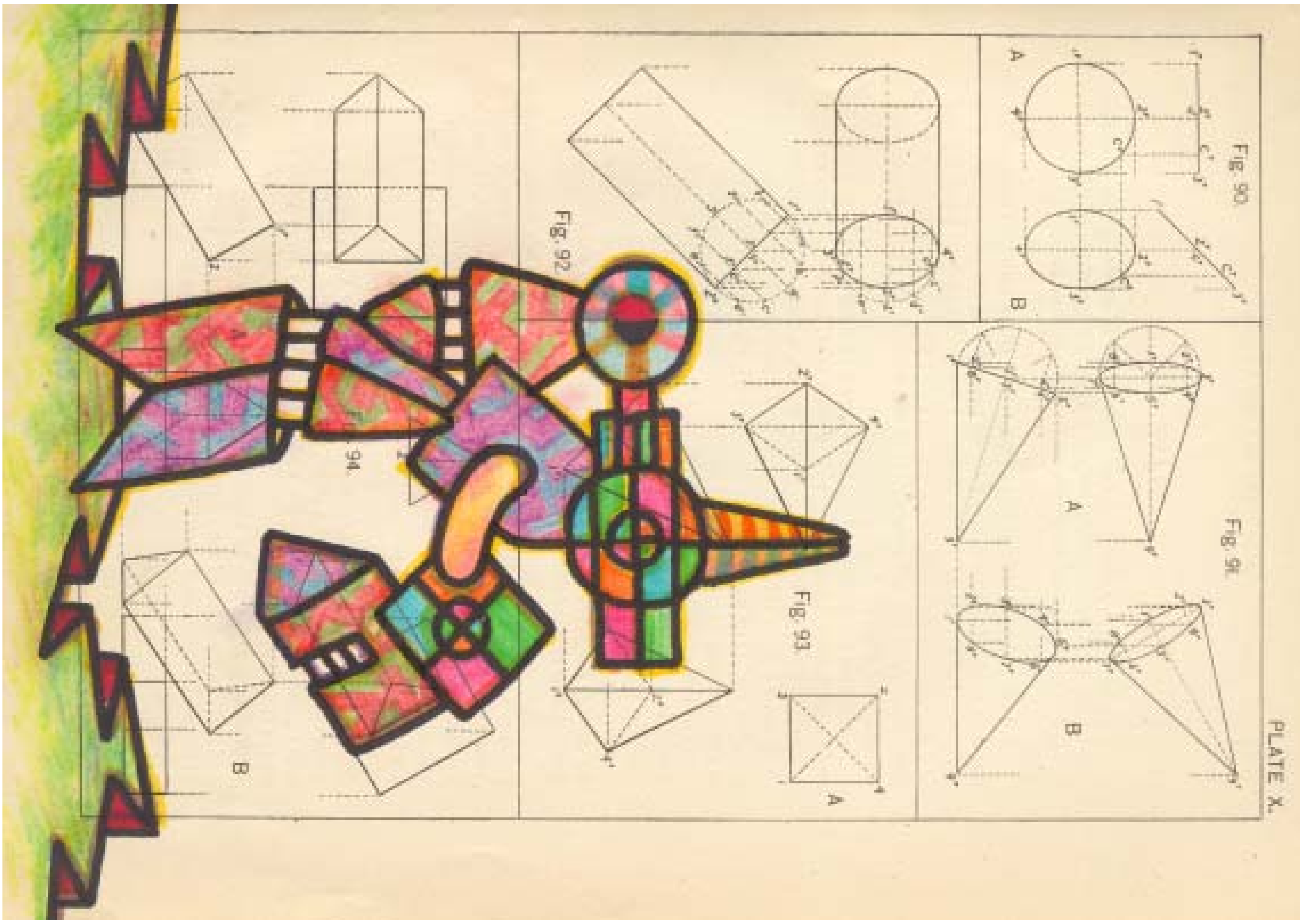


PLATE X.
Fig. 90.
Fig. 91.
Fig. 92.
Fig. 93.
94.

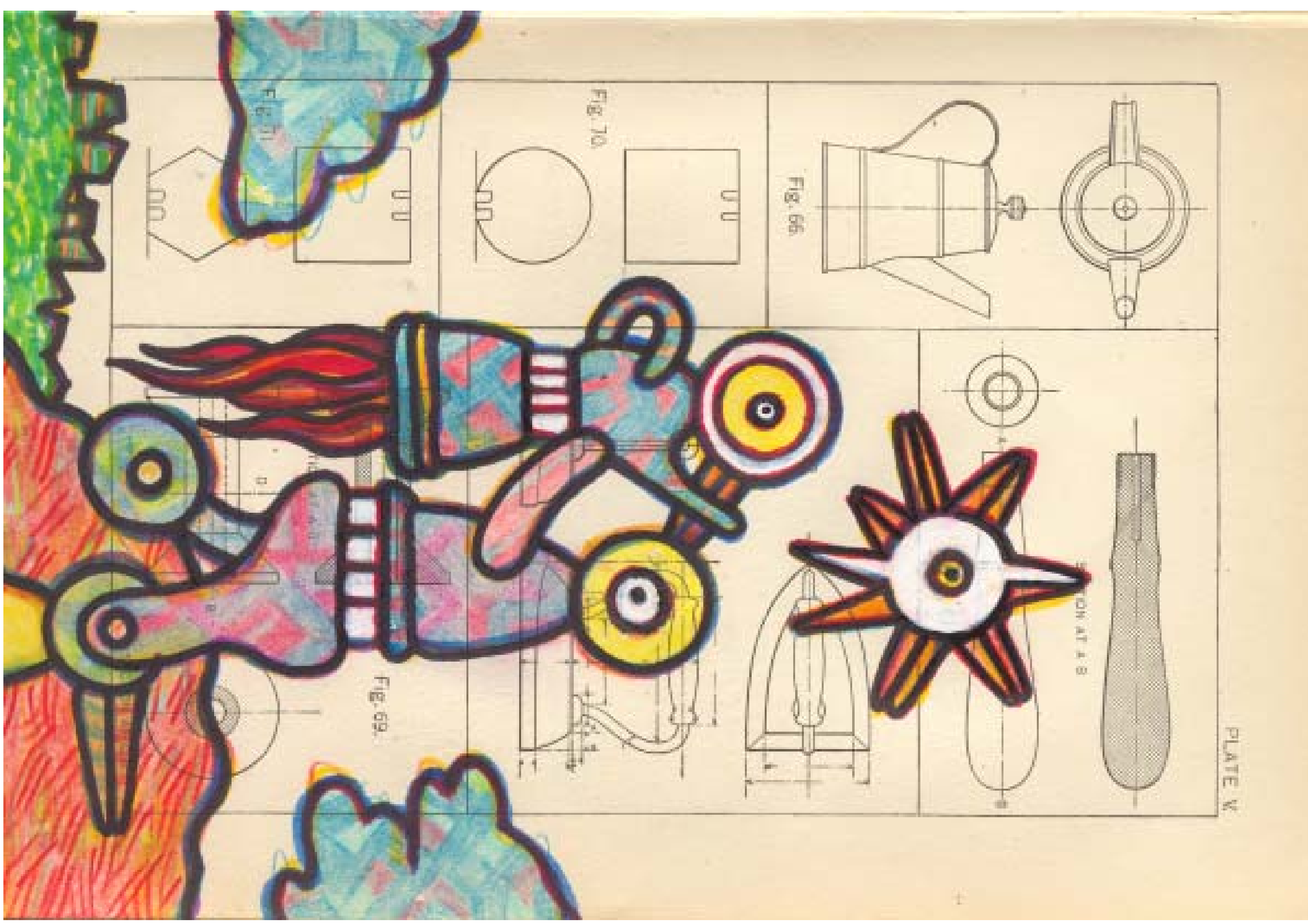


PLATE V.
Fig. 66.
Fig. 69.
Fig. 70.

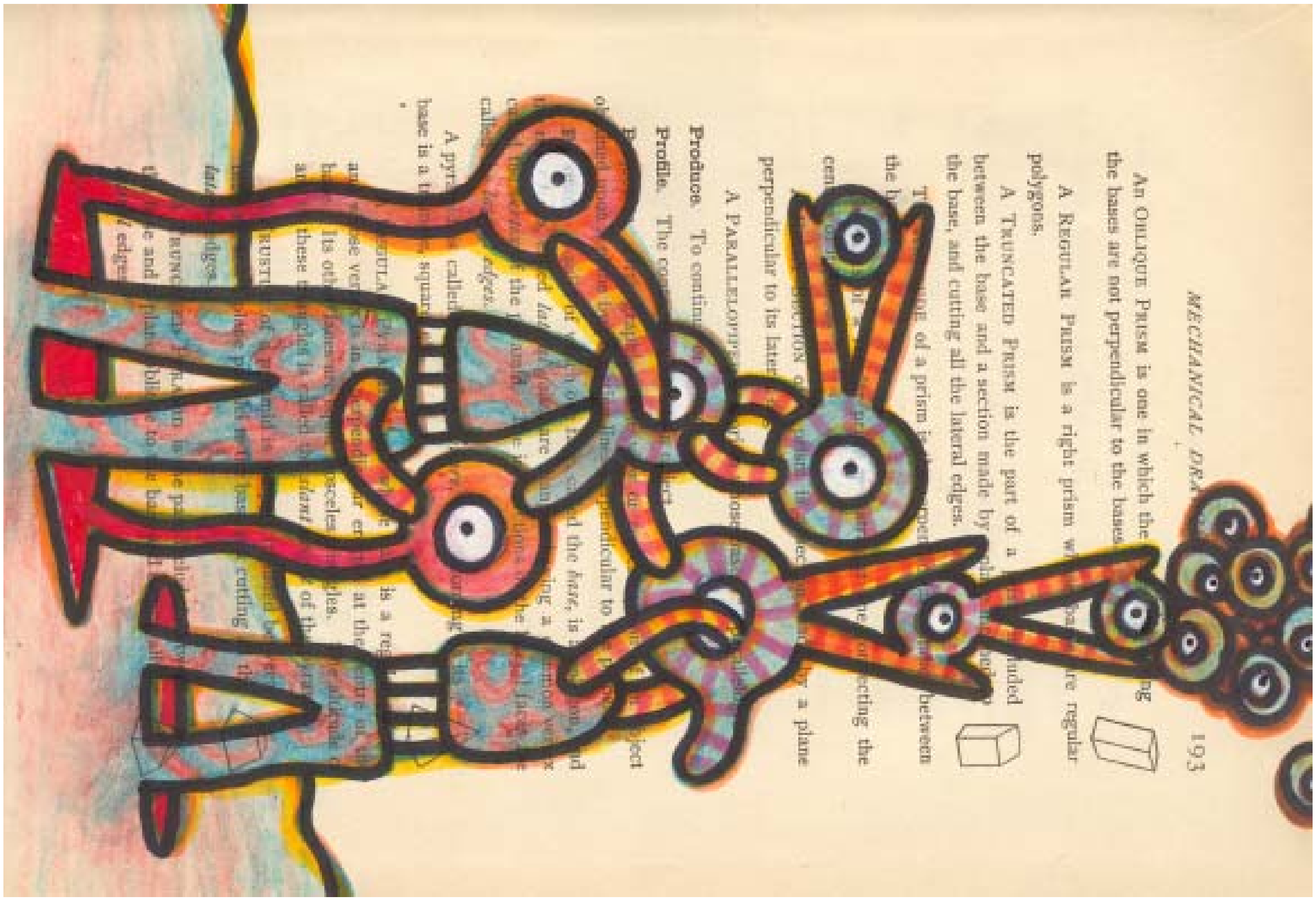

193
the bases are not perpendicular to the bases
the base, and cutting all the lateral edges.
between the base and a section made by


PLATE XXIII.
WASHER
STUFFING BOX GLAND
Fig. 121.
ROD
Fig. 122
Fig. 123.

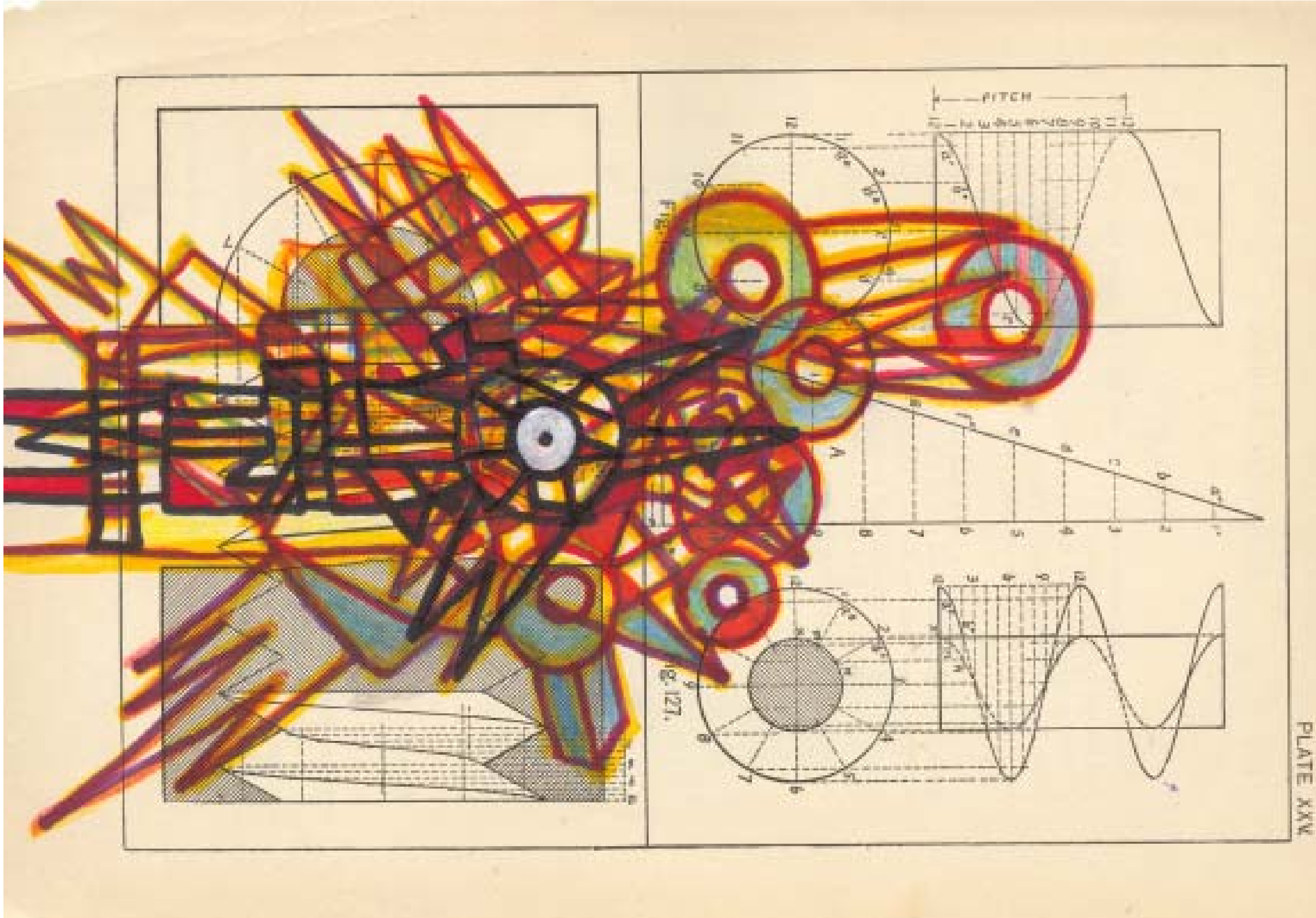


PLATE XXV.

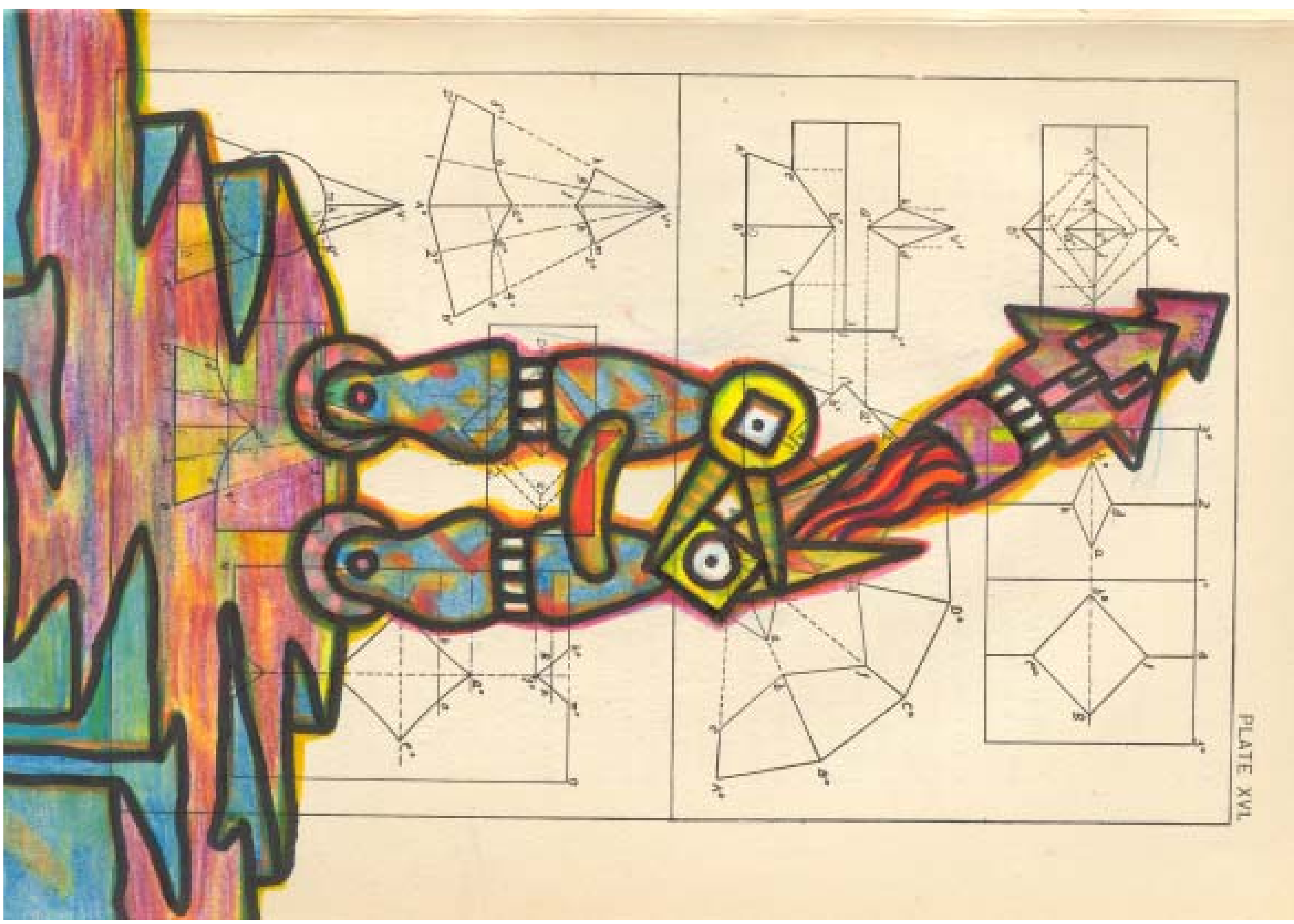


PLATE XVI.

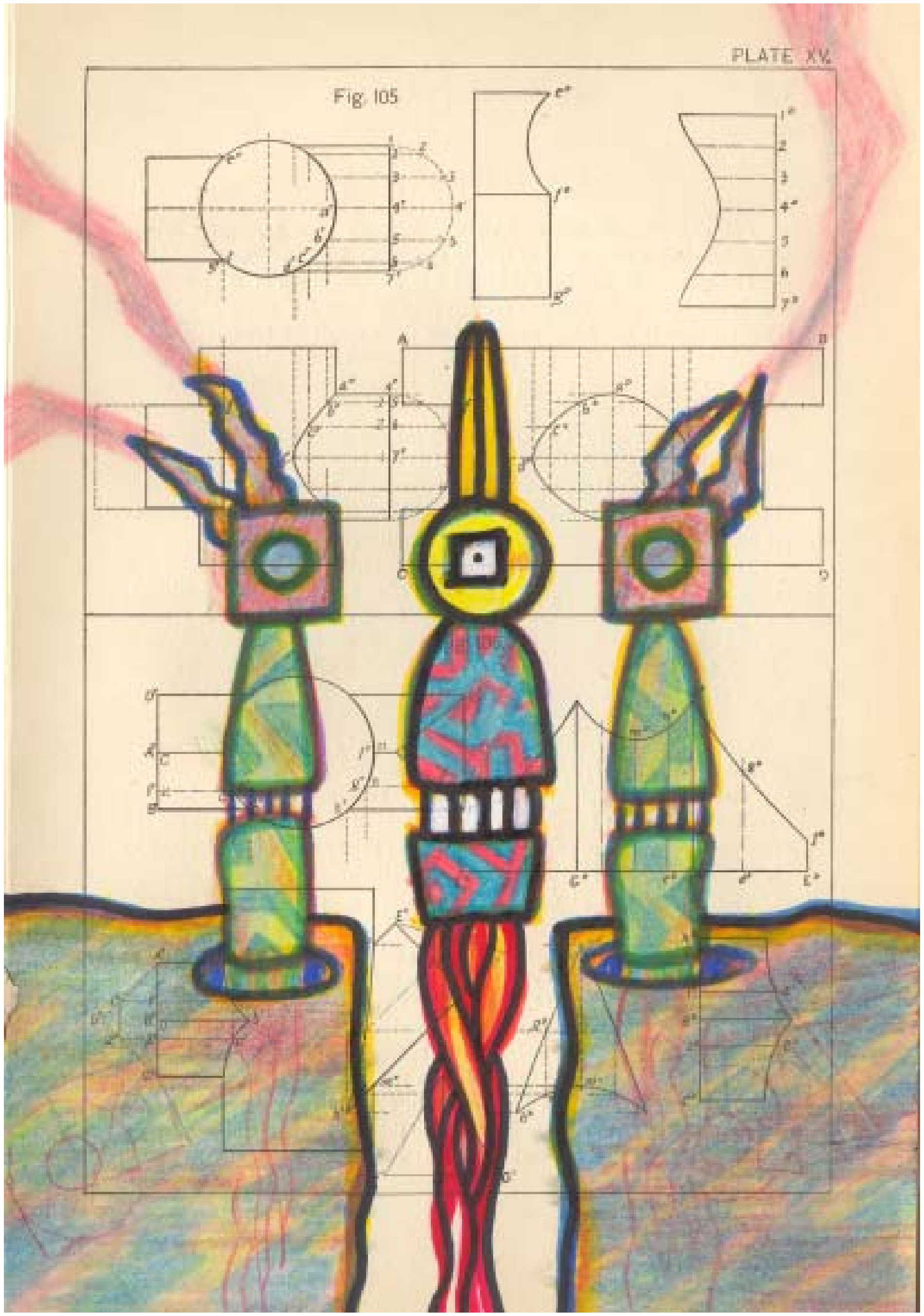
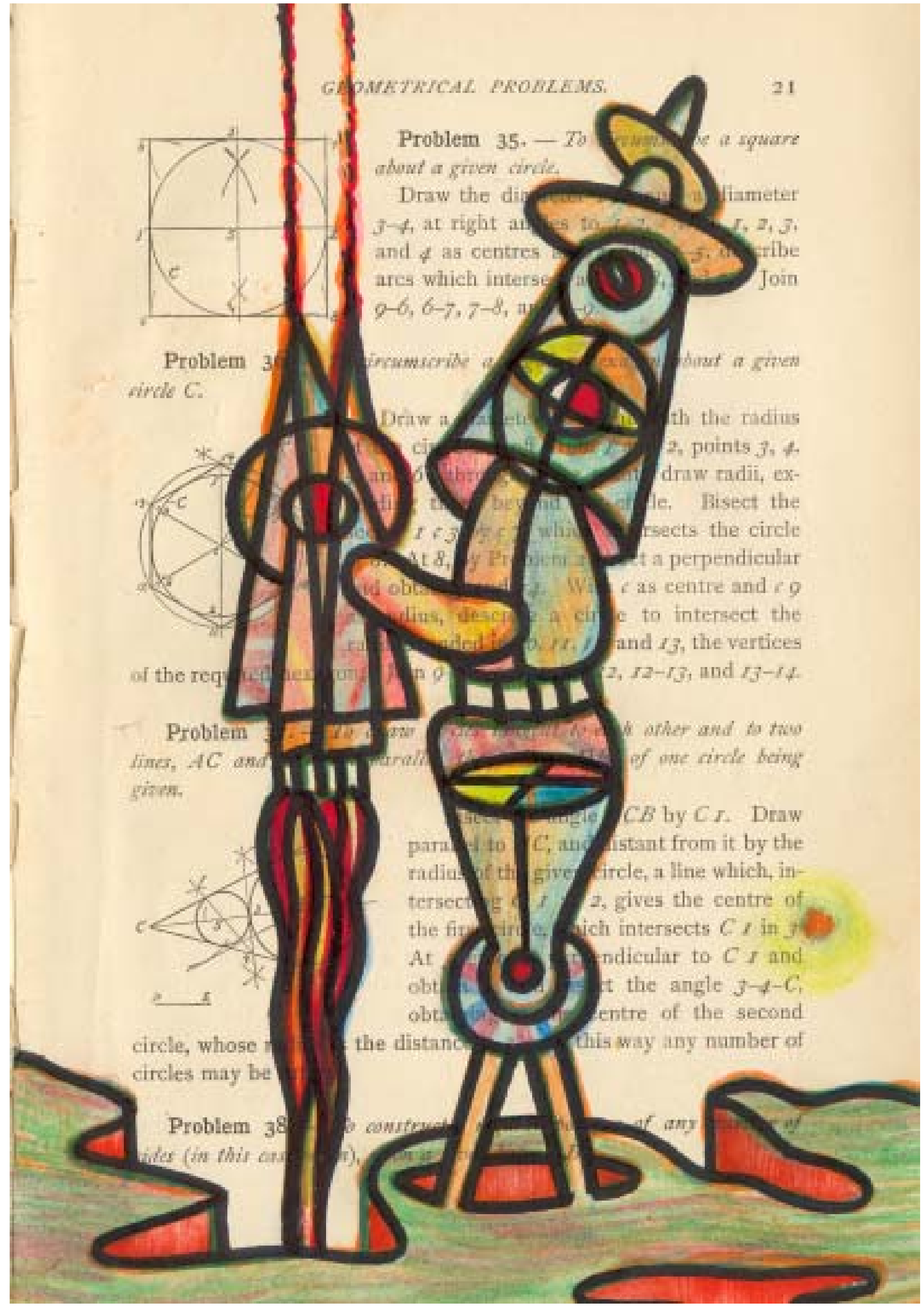


PLATE XV.
Fig. 105


GEOMETRICAL PROBLEMS.
21
Problem 35.
about a given circle.
Join
9–6, 6–7, 7–8,
circle C.
draw radii, ex-
Bisect the
a perpendicular
c as centre and c 9
to intersect the
and 13, the vertices
of the required
2, 12–13, and 13–14.
other and to two
lines, AC and
of one circle being
given.
CB by C 1. Draw
circle, a line which, in-
2, gives the centre of
the first circle, which intersects C 1 in
At
dicular to C 1 and
the angle 3–4–C,
entre of the second
circle, whose
the distance
this way any number of
circles may be
Problem 38

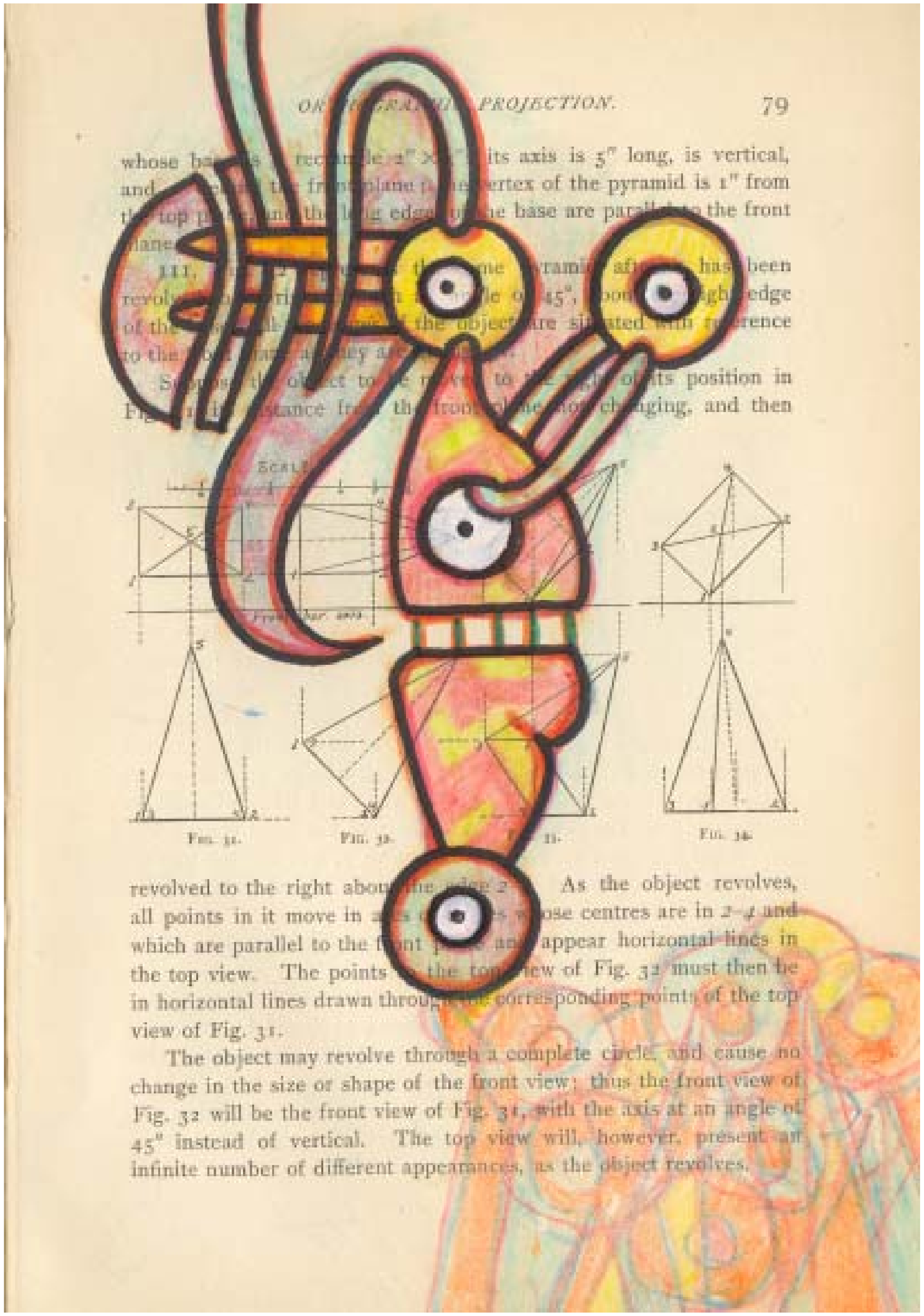
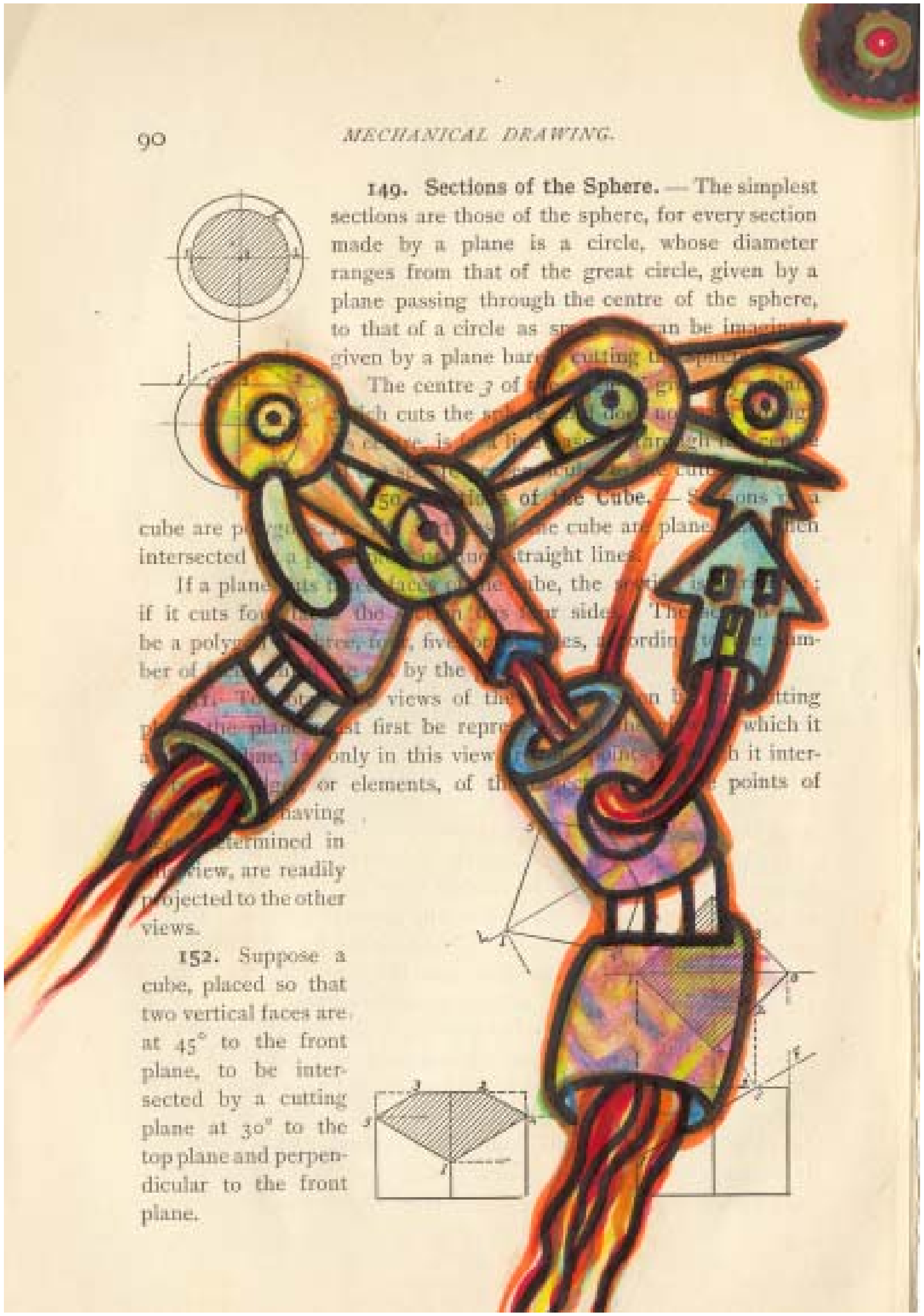
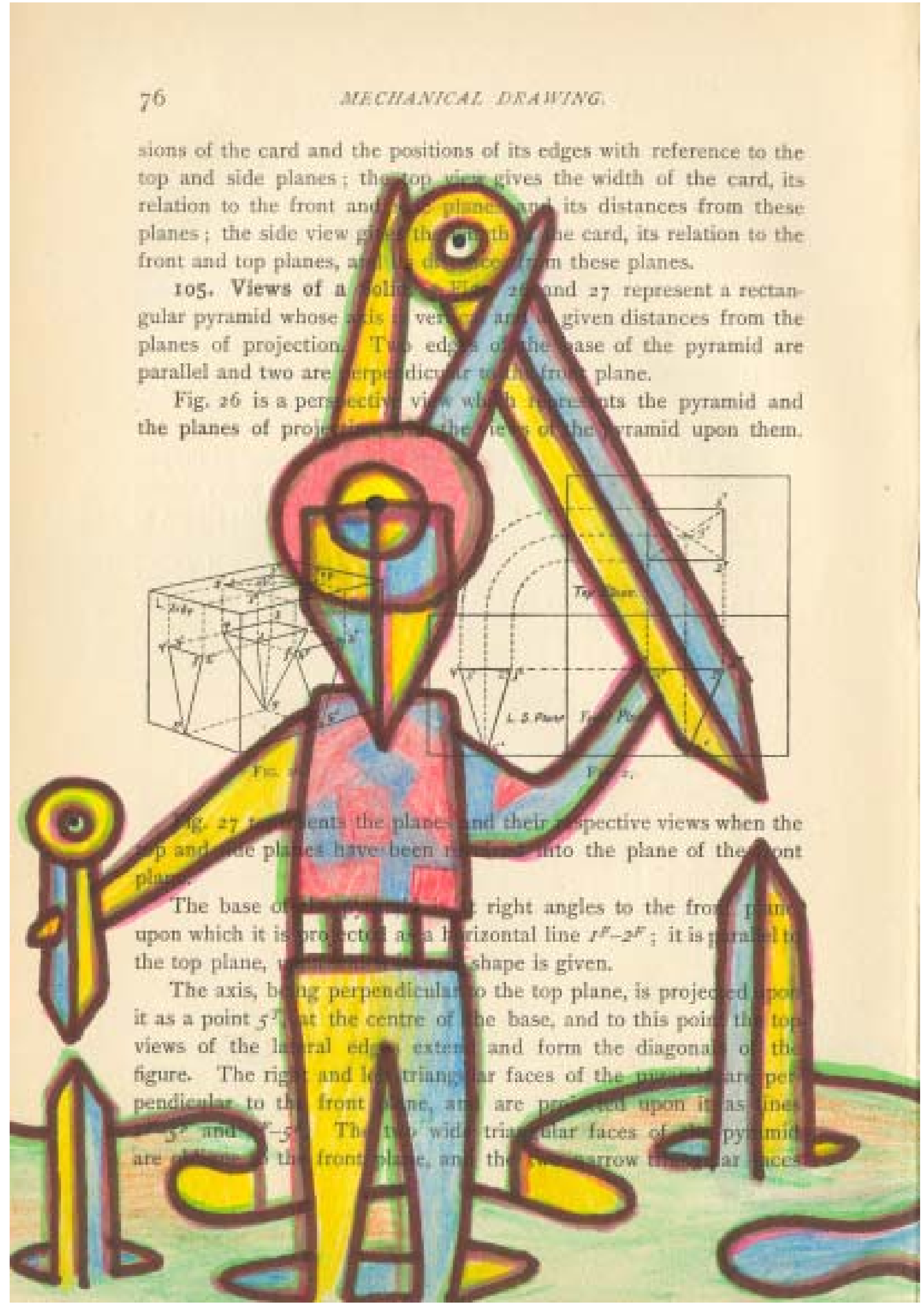
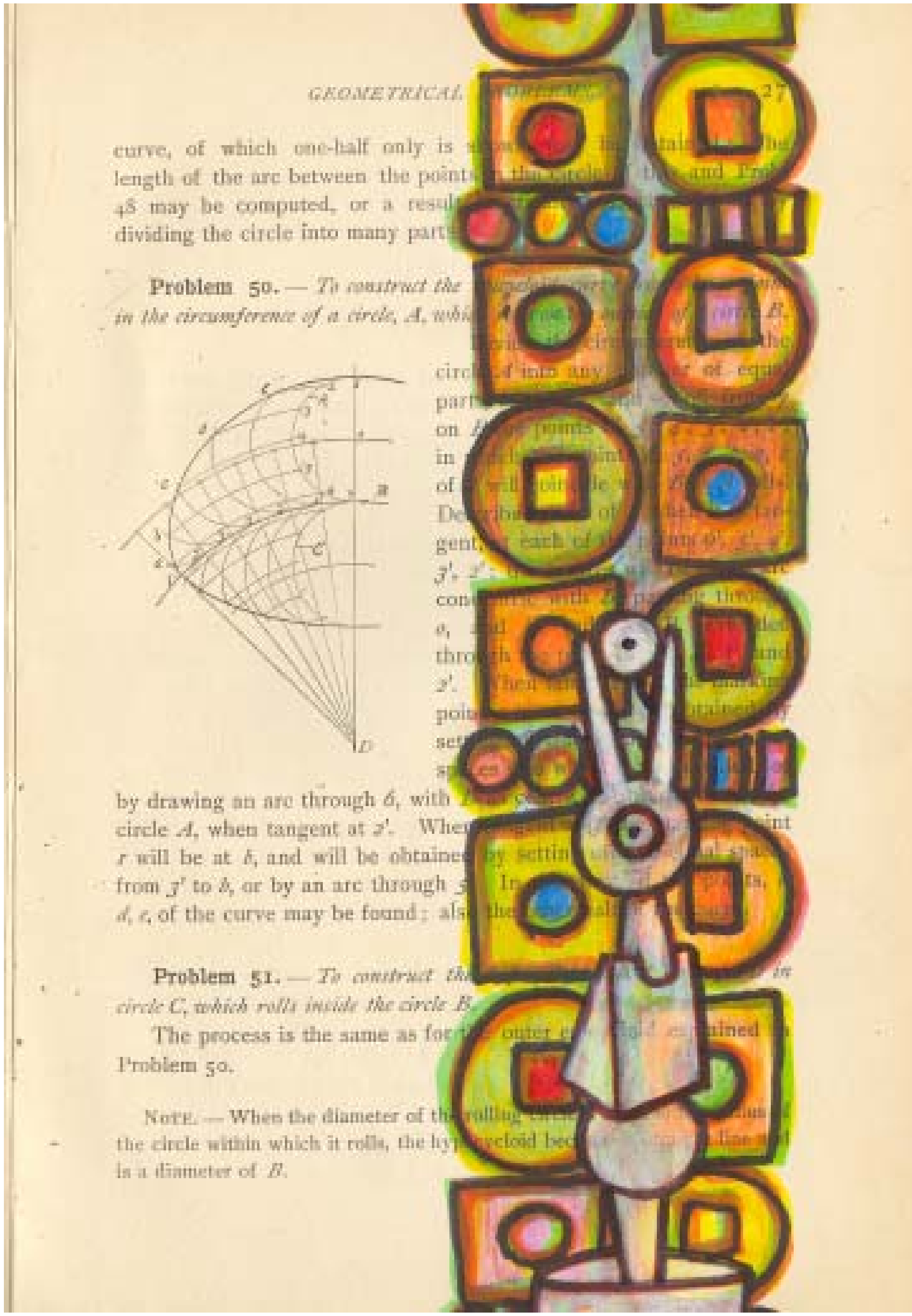
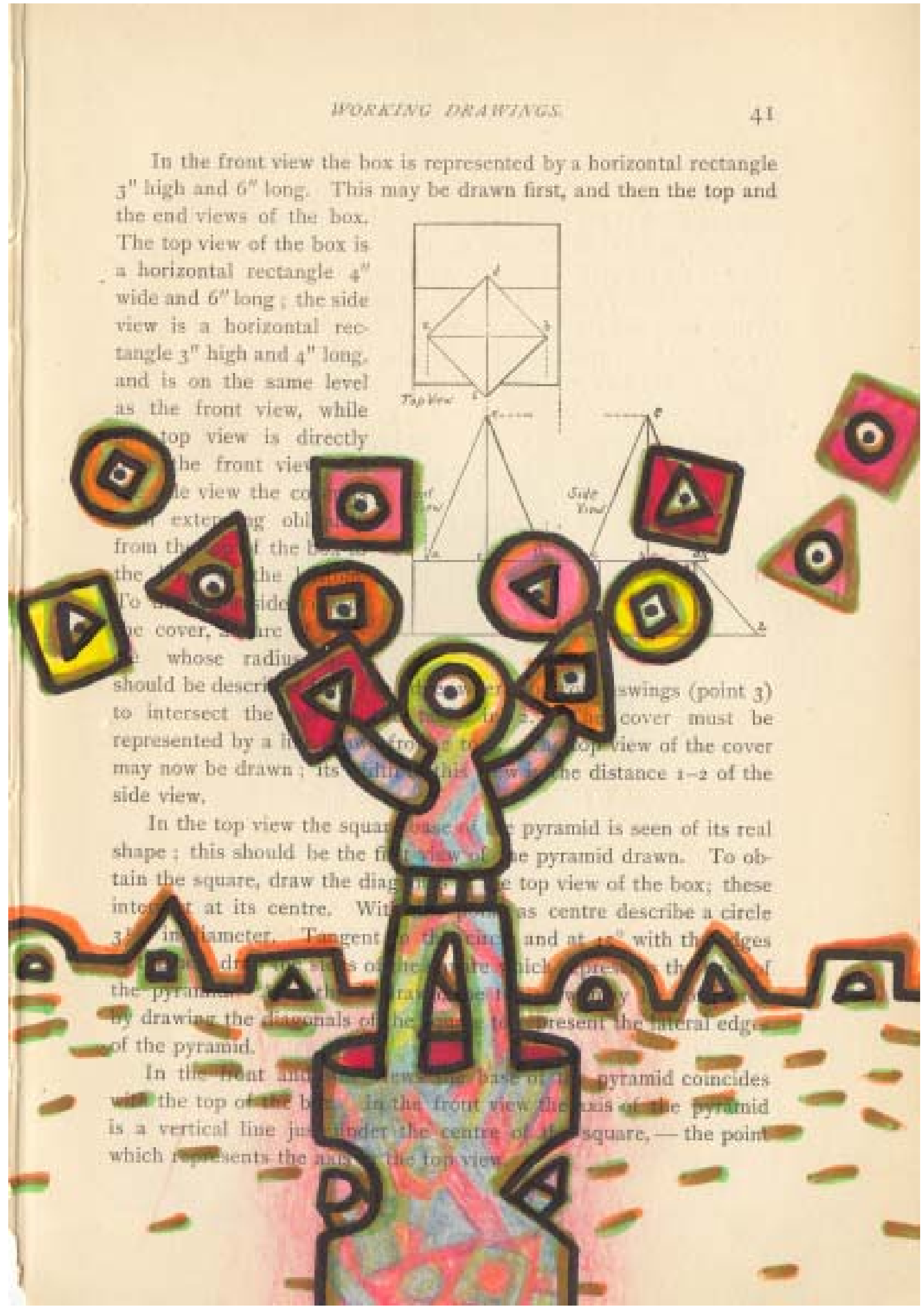

PROJECTION.
79
its axis is 5" long, is vertical,
the base are parallel to the front
As the object revolves,
appear horizontal lines in
the top view. The points
in horizontal lines drawn
view of Fig. 31.
The object may revolve
change in the size or shape of the front view;
Fig. 32 will be the front view of Fig. 31,
45" instead of vertical. The top
infinite number of different

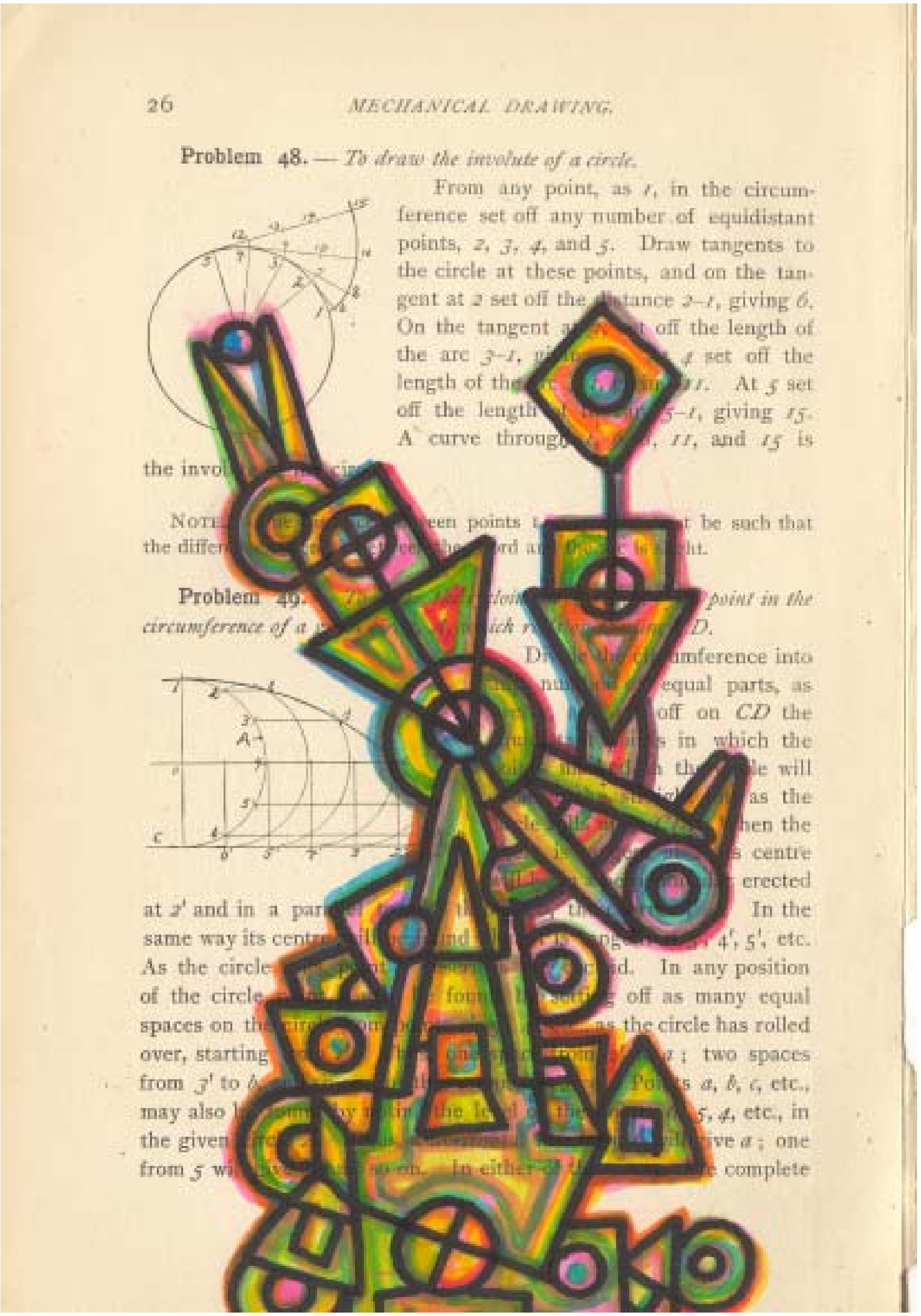
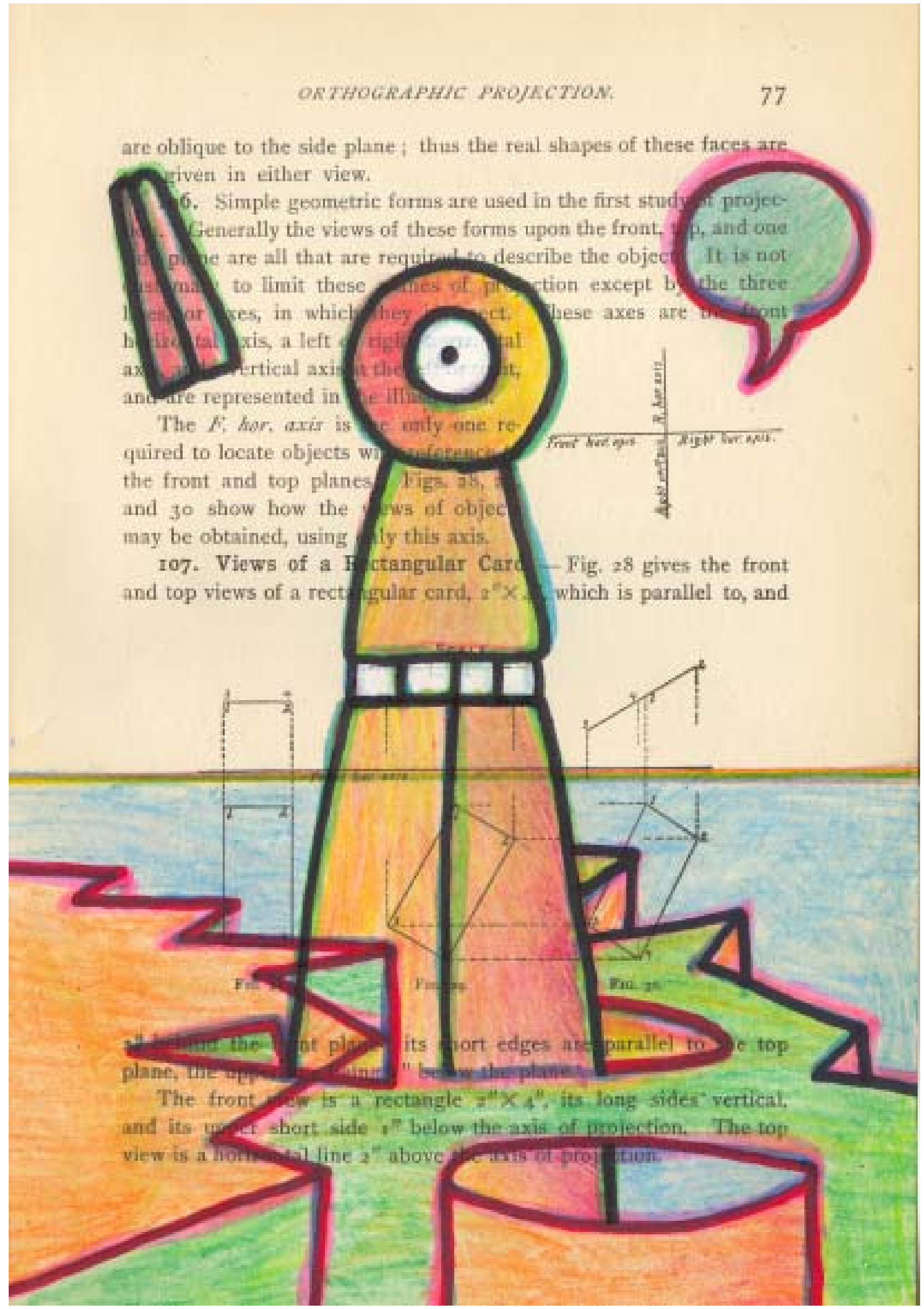

PLATE XVIII.
LOOSE JOINT HINGE.

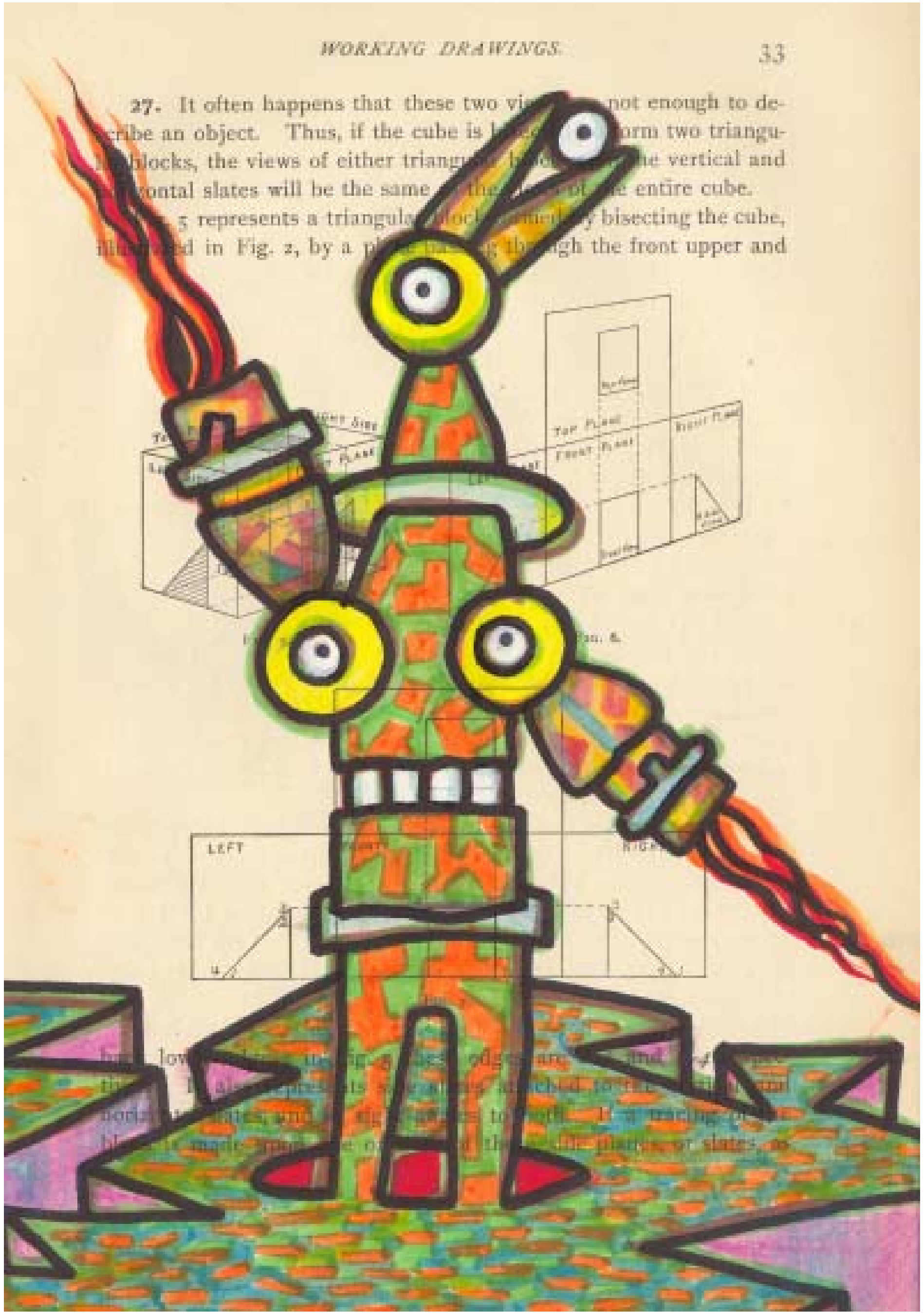

90
MECHANICAL DRAWING.
149. Sections of the Sphere. — The simplest
sections are those of the sphere, for every section
made by a plane is a circle, whose diameter
ranges from that of the great circle, given by a
plane passing through the centre of the sphere,
to that of a circle as
given by a plane
The centre
cube are
intersected
straight lines
If a plane
if it cuts
be a polyg
ber of
views of
first be repre
only in this view
or elements, of
which it
h it inter-
points of
termined in
view, are readily
projected to the other
views.
152. Suppose a
cube, placed so that
two vertical faces are
at 45° to the front
plane, to be inter-
sected by a cutting
plane at 30° to the
top plane and perpen-
dicular to the front
plane.


76
MECHANICAL DRAWING.
sions of the card and the positions of its edges with reference to the
top and side planes; the top view gives the width of the card, its
relation to the front and
its distances from these
planes; the side view
the card, its relation to the
front and top planes,
these planes.
105. Views of a
and 27 represent a rectan-
gular pyramid whose
given distances from the
planes of projection.
base of the pyramid are
parallel and two are
plane.
Fig. 26 is a perspective
the pyramid and
the planes of proj
pyramid upon them.
Top Plane
L. S. Plane
spective views when the
into the plane of the
The base
right angles to the fro
upon which it is
horizontal line
the top plane,
shape is given.
The axis, being perpendicular to the top plane, is projected
it as a point
the centre of
the base, and to this point
views of the
and form the diagonal
figure. The right and left
faces of the


GEOMETRICAL
27
curve, of which one-half only is
length of the arc between the points
48 may be computed, or a resul
dividing the circle into many part
Problem 50. — To construct the
in the circumference of a circle, A, whi
by drawing an arc through b, with
circle A, when tangent at 2'. When
r will be at b, and will be obtaine
from 3' to b, or by an arc through
d, e, of the curve may be found; als
Problem 51. — To construct th
circle C, which rolls inside the circle B
The process is the same as for
Problem 50.
Note. — When the diameter of th
the circle within which it rolls, the hyp
is a diameter of B.


WORKING DRAWINGS.
41
In the front view the box is represented by a horizontal rectangle
3" high and 6" long. This may be drawn first, and then the top and
the end views of the box.
The top view of the box is
a horizontal rectangle 4"
wide and 6" long; the side
view is a horizontal rec-
tangle 3" high and 4" long,
and is on the same level
as the front view, while
top view is directly
Top View
Side View
should be descri
to intersect the
represented by a
may now be drawn; its
side view.
swings (point 3)
cover must be
view of the cover
the distance 1–2 of the
In the top view the squa
pyramid is seen of its real
shape; this should be the fi
e pyramid drawn. To ob-
tain the square, draw the diag
e top view of the box; these
at its centre.
as centre describe a circle
by drawing the
of the pyramid.
pyramid coincides
the top of
is a vertical line
square, — the point
which


26
MECHANICAL DRAWING.
Problem 48. — To draw the involute of a circle.
From any point, as 1, in the circumference set off any number of equidistant points, 2, 3, 4, and 5. Draw tangents to the circle at these points, and on the tangent at 2 set off the
On the tangent
the arc 3–1,
length of the
off the length
A curve through
Problem 49.
circumference of a
erected
In the
In any position
off as many equal
the circle has rolled
two spaces
may also
complete

ORTHOGRAPHIC PROJECTION.
77
are oblique to the side plane; thus the real shapes of these faces are given in either view.
Simple geometric forms are used in the first study of projection.
Generally the views of these forms upon the front,
are all that are required to describe the object.
It is not
The F. hor. axis is
quired to locate objects
the front and top planes
and 30 show how the
may be obtained, using
107. Views of a Rectangular Card. — Fig. 28 gives the front and top views of a rectangular card, which is parallel to, and
The front view is a rectangle 2" × 4", its long sides vertical, and its short side below the axis of projection. The top view is a line 2" above


WORKING DRAWINGS.
33
distance 7–5.
LEFT


GEOMETRICAL
length of a radius.
Problem 41.
Problem 42.
distance 13–2.
given.