213. The problems relating to Figures 385 to 403 comprise a set of drawings for a 5" x 6" vertical steam engine. They may be worked as separate problems or as a class problem. Each problem is stated by itself so they may be used in any way desired by the instructor. In some cases one figure refers to another for dimensions or information. This will require the student to check his drawing. A sectional assembly of the engine is shown in Fig. 385. A 5" × 6" engine means that the diameter of the cylinder is 5" and the stroke of the piston is 6".

PROB. 257, Fig. 387.—From the sketch make a complete working drawing of the STEAM CHEST COVER. Give proper dimensions and indicate finished surfaces. Examine Figs. 385 and 400 to see where cover is used.

Fig. 385. Sectional Assembly.
PROB. 258, Fig. 388.—From the sketch make a complete working drawing of the CYLINDER HEAD. Show one view in section. Examine Figs. 385 and 400 to see where head is used.

Fig. 386. Prob. 262. Slide Valve.

PROB. 259, Fig. 389.—From the sketch make a complete working drawing for the PISTON. Supply complete dimensions.

Fig. 387. Prob. 257. Steam Chest Cover.

PROB. 260, Fig. 390.—Make a complete working drawing of the FLY WHEEL. Show one view in section.

PROB. 261, Fig. 391.—Make a complete working drawing of the BASE. Show front and side views as half sections.

PROB. 262, Fig. 386.—Make a working drawing of the SLIDE VALVE. Show one view in section.
Fig. 388. Prob. 258. Cylinder Head.

Fig. 389. Prob. 259. Piston.
Fig. 390. Prob. 260. Flywheel.

Fig. 391. Prob. 261. Base.
PROB. 263, Fig. 392.—Make a complete working drawing for the BEARING CAP. Show front and side views as half sections. Note babbitt and \( \frac{1}{4} \)" oil pipe. Compare radii at A, B, and C with text and illustrations in Art. 133.

PROB. 264, Fig. 393.—Make a detail working drawing for the valve rod STUFFING BOX and piston rod GLAND.

PROB. 265, Fig. 394.—From the given sketch make an assembly drawing of the ECCENTRIC, with or without dimensions as directed by the instructor.

PROB. 266, Fig. 394.—From the given sketch make detail drawings of the eccentric sheave, eccentric straps, bolts and shim. Give all dimensions. Use two 11" x 14" sheets or one large sheet, Fig. 266.

PROB. 267, Fig. 395.—From the given sketch make a detail drawing of the valve and eccentric rods.

PROB. 268, Fig. 396.—From the sketch make a complete detail drawing of the CRANK SHAFT, PISTON ROD, etc. Distance between center lines for crank shaft is one-half of the stroke, or \( \frac{6}{2} = 3 " \).

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**Fig. 392. Prob. 263. Bearing Cap**
Fig. 393. Prob. 264. Stuffing Box Details.

Fig. 394. Probs. 265 and 266. Eccentric.
Fig. 395. Prob. 287. Eccentric Rod, etc.

Fig. 396. Prob. 288. Crank Shaft, Piston Rod, etc.
PROB. 269, Fig. 397.—Make a complete working drawing of the CONNECTING ROD.

PROB. 270, Fig. 398.—Make a working drawing of the CONNECTING ROD DETAILS. Draw views as given, complete top view of wedge and draw top view of bronze box. Give complete dimensions. Obtain the bolt dimensions by reference to the places where they are used. Figs. 397 and 399.

PROB. 271, Fig. 399.—Make working drawing of the CRANK END BOXES for the connecting rod. Show the end views with all full lines, but without all dotted lines. Select dotted lines in all views carefully, omitting such as tend to confuse. Show front view in half section. Determine a few points in curve of intersection shown at A in top view.

PROB. 272, Figs. 397, 398, and 399.—Make a two view assembly drawing of the complete connecting rod, either with full views or part sections. Give such dimensions as would be necessary for machining or assembling. Use a large size sheet (Fig. 266) for this problem.

PROB. 273, Fig. 400.—Make a working drawing of the STEAM CYLINDER showing the front view in section. Use regular sheet.

PROB. 274, Fig. 400.—Make a working drawing of the STEAM CYLINDER with following views. Front view as section on plane A-A; end view in full; complete top view in full; section on plane B-B. Use large sheet (Fig. 266).

Fig. 397. Prob. 269. Connecting Rod.
Fig. 398. Prob. 270. Connecting Rod Details.

Fig. 399. Probs. 271 and 272. Crank End Boxes.
PROB. 275, Fig. 401.—Make a working drawing of the CROSSHEAD SHOE. Show front view in section.

PROB. 276, Fig. 402.—Make a working drawing of the CROSSHEAD BODY. Show views given and two end views. Use judgment as to dotted lines on end views.

PROB. 277, Figs. 401 and 402.—Make an assembly drawing of the Crosshead and Shoe. Adjusting screw will be found on Fig. 396.

PROB. 278, Fig. 403.—Make a working drawing of the FRAME. Work out curves at A very carefully to give good appearance. Curves at C and D are to be found by projection and should be analyzed carefully. Show all views as half sections. Detail for Bearing Cap is given on Fig. 392.

PROB. 279.—Make a sectional assembly of the 5" x 6" Engine as shown in Fig. 385.

PROB. 280.—Make a sectional assembly of the 5" x 6" Engine taken through the vertical axis but at right angles to section shown in Fig. 385.

PROB. 281.—Make an exterior assembly of the 5" x 6" Engine, which will show the crosshead, connecting rod, etc.

PROB. 282.—Make an exterior assembly of the 5" x 6" Engine, which does not show the crosshead, connecting rod, etc.
Fig. 401. Prob. 275. Crosshead Shoe.

Fig. 402. Prob. 276. Crosshead Body.