



SECTION VI Nos. 81—96

Household devices, coal breaker rolls, stone crusher, four early types of power devices.

## Section VI

**81.** Electric door bell. When the button is pushed, the current flows through the green coils. This produces a magnetic pull which attracts the red iron bar, causing the clapper to strike the bell. As the red bar swings, it pulls the spring away from the screw contact and breaks the circuit. This stops the current so that there is no longer a magnetic pull and the bar is released. In springing back, the circuit is closed again and the process is repeated to produce a continuous ringing bell.

**82.** Compression faucet. The faucets in our houses are merely valves for opening and closing pipes. The compression faucet is the common type. The handle operates a screw which forces a disk faced with a fiber washer against a circular opening, and so shuts off the water. If the handle is turned the other way, the disk is raised, leaving an opening so that the water flows. When the washer wears out, the connection is faulty, causing a leakage.

**83.** Fuller ball faucet. In this model, a crank is used to open the valve instead of a screw. When crank is turned, stop washer A is forced back against water pressure and water rushes through the spigot. When crank is released, pressure of water in pipe closes stop A.

**84.** "S" trap or water seal. Correct drainage in a house is very essential. A trap is a fixture placed in a waste pipe below the plumbing fixture to prevent gases from entering the house from the soil pipe or sewer. Advantage is taken

of the fact that a gas will not force its way into water to a lower point. The water is represented by the green color. This type of trap is universally used.

**85.** Flush tank. As the handle is operated, the stop washer connected to it by a long rod is raised, opening a valve and forcing the water to leave the tank. See valve connections in faucets Nos. **82** and **83**. The float ball descends with the water, thus opening the inlet valve to get a fresh supply of water. As water enters inlet valve, float rises, closing it to prevent overflow.

**86.** Hot water boiler. The little red arrows will show you the course of the water through the boiler. It enters cold water inlet on left from street mains and flows through a pipe which reaches nearly to the bottom of the tank. From here it is led off to the heater where it flows through coils, is heated and returns to the tank nearer the top, leaving at hot water outlet. This causes a circulation which continues until all the water in the tank has passed through the heater and the whole tankful is hot.

**87.** Pipeless furnace. Pipeless furnace is a device for circulating warm air through a house. Air is warmed by coming in contact with heated walls around fire box A, and rises through passages B. As warm air rises through the center of registers the cold air is automatically drawn downward through outer ring of registers into cold air duct C where it is warmed and returned, causing continual circulation of warm air through the house. An inlet pipe from out-of-doors may be used and regulated for desired fresh air.

**88.** Steam or hot water heater. Heat generated in fire box A, heats walls of furnace and surfaces going to smoke pipe, raising water in red sections to steam heat. Steam rising in steam dome is transmitted to steam pipes and radiators in building for heat desired.

**89.** Coal breaker rolls. Connected with every commercial coal mine is a breaker plant for breaking and sorting the coal. Rolls of this type are placed in the top of the breaker building. The coal is led to the rollers and dumped in the top or hopper where it is broken by the rotation of the toothed rolls.

**90.** Piano action. When ivory end of key bar is pressed down, hammer A is caused to strike a quick blow on piano string, rebounding to allow string to vibrate. A quick rebound is caused by the elasticity of both the compressed felt in the hammer-head and the steel piano string. Under normal conditions of playing, the damper immediately touches string, causing vibrations to cease, thereby stopping tone. When full volume of piano is needed, the loud pedal is pressed with the foot to cease operation of damper, allowing string to vibrate fully, giving large and sustained tones. The intricate mechanism is necessary to cause a quick return of hammer for rapid playing and to prevent resonance when repeating action is desired.

**91.** Sewing machine. This is the lock stitch type machine. To show complete operation, material for sewing must operate through machine. As needle goes through material, foot bar presses foot down. When needle rises and draws

thread up through material the foot rises and the toothed feeder under foot advances material the required distance for next stitch. On first operation, when needle goes downward through material, the loop of thread is caught by revolving thread hook, which pulls thread taut in material. The repeating of this cycle, produces a series of stitches continuously along a desired line. Desired length of stitch is regulated by feed adjustment.

**92.** Stone crusher. This mechanism requires a very heavy pressure. Therefore a toggle joint is employed which is attached to the hinged jaw and is driven by an eccentric (See No. 23). In a toggle joint, two bars are joined together end to end but not in line, so that when a force is applied which tends to straighten out the arrangement, a great pressure is exerted, in this case, to the hinged jaws. A large stone or boulder is placed in the hopper and, as it moves by its own weight to the lower end of the jaws, it is crushed smaller and smaller till it falls through.

**93.** Horse power wheel. The weight of the horse attempting to climb the side of the wheel causes the wheel to rotate. To the shaft of this wheel a belted pulley may be attached for transmission of power. This is a very early source of power but is still in use in isolated parts of the world.

**94.** Wind power mill. The velocity of the wind drives the wheel, which has blades that can be set at various angles in order to obtain a desired speed. The revolving shaft having one

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grinder attached to it works against the other. This early type was used for grinding grain.

**95. Chinese wheel for power.** This wheel was first known as the "Chinese" wheel and was used to punish criminals and slaves. They were forced to tread the rungs in the wheel and so work out their punishment in labor. Then the wheel was equipped with a belt and pulley for transmitting power.

**96. Tread wheel for power.** The power in this device is obtained by the action of animals traveling on the inclined plane. It was generally used in the early days in rural districts for churning and light work. Animals most generally adapted to this were dogs, goats, and sheep.