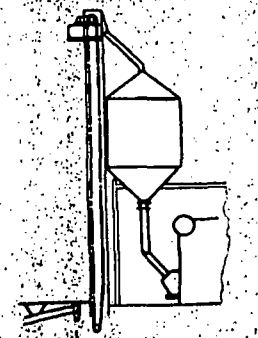
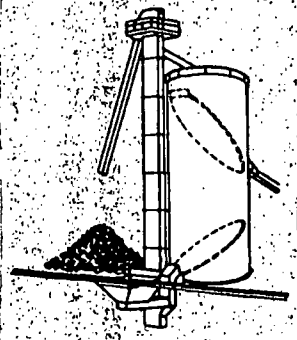
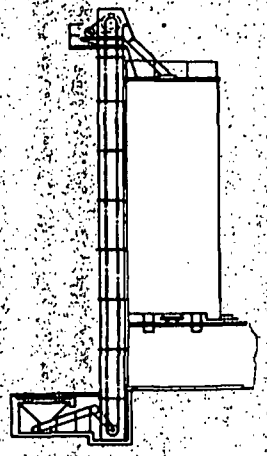


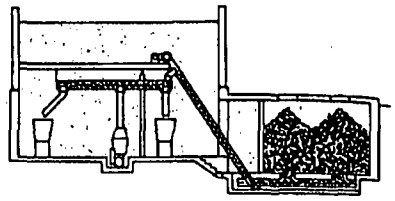
Cylindrical steel tank



Silos live and dead storage

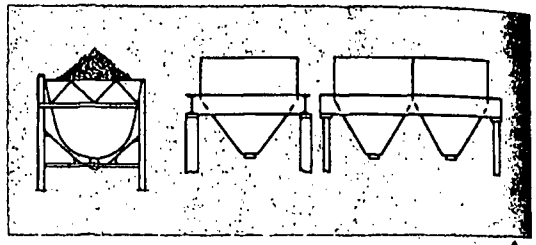


Silos single storage space



TYPICAL BIN ARRANGEMENT

Small plants, particularly in city locations, often use basement bins into which trucks dump directly. Simple conveying system moves coal from bin to firing units. If coal is sized, or turnover is frequent, there are usually no storage problems

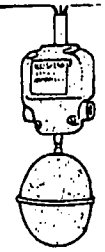


TANKS AND SILOS

Outside-the-plant storage structures include cylindrical steel tanks, silos. Silos may have live and dead storage, center, or single storage space, below

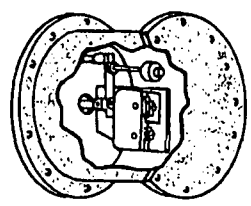
HORIZONTAL BUNKERS

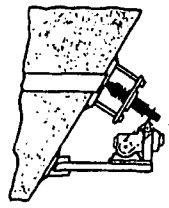
Horizontal overhead bunkers often are of suspended construction, left above. Multiple hopper-bottom design, right, eliminates dead spaces between outlets



LEVEL ALARMS AND SWITCHES

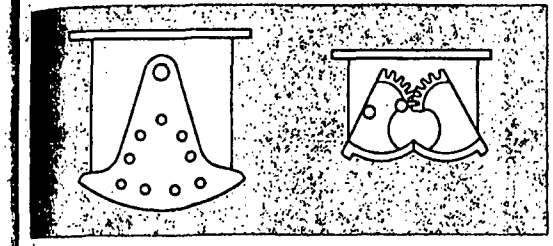
When coal reaches predetermined level in storage, units, above, sound an alarm or start and stop feed. Each contains a switch, actuated in the unit at left by the pendulum-like device and in the unit at right by a diaphragm on far side of casing





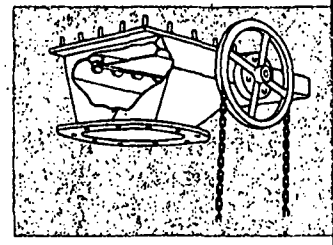
VIBRATORS

Agitation by vibrators, above, or air jets, poking, etc, keeps coal on move, breaks down arching at storage outlets



SWING-TYPE COAL GATES

Discharge outlets of storage units are fitted with gates to control flow of coal. These must open quickly and positively. Gates shown above are of the swing type, the unit on the left being a simplex design and that on the right being a duplex. Such gates are usually made of cast iron to resist abrasive action of moving coal



SLIDING GATE

Sliding design requires little headroom. Protected double rack and pinions drive the gate, which moves on roller bearings in side pockets away from flow of coal

For storing coal under cover... bins, silos and bunkers prove their versatility

Day-to-day supply for firing units nearly always comes from covered storage — bins, silos, bunkers. Sometimes these units provide the only storage so there is no separate reserve. Or, as in many silos, live and dead storage are included in same structure, but physically separate.

Capacity required often dictates type of storage unit. For small plants, the simple bin may serve. Larger capacity needs point to use of tanks, silos and bunkers designed to save ground space and give more convenient flow to firing units. Outside-the-plant structures include cylindrical tanks, and silos. Steel tanks, like the one pictured above, left, serve for storage up to about 100 tons where roof location is attractive. Silos, usually sized to hold a week's supply, are rarely used for less than 100 tons.

Silos. Often attractive costwise, silos are built of concrete (poured, block or stave construction) and of hollow tile. Usual practice puts a live-storage compartment above, for gravity flow to firing units, and a reserve section below. When live storage is full, coal spills over to reserve, which discharges to pickup point of elevator or conveyor. Thus coal can be fed to live storage directly from unloading point, or from reserve section. With relatively modest live-storage capacity (say, one day's supply) operator can recirculate often from reserve. Live-storage compartment is usually formed by a sloping shelf (about 50 deg). Some silos, however, have a cone-bottom steel hopper for live storage, diameter being about 2 ft less than silo's.

Alternative construction for silos has no separation of live and dead storage, and a flat bottom. Unit illustrated, left, has bottom above level of firing-unit hoppers and feeds them by a monorail system.

Suspended Bunkers. Overhead storage units of generally horizontal layout have been built of concrete, masonry and cast iron, but today's common construction is steel plate, often of the suspended design.

In its familiar form, the suspension bunker consists of plates (¼ to ½ in.) hung in a catenary between parallel side girders. Plates are in tension only. To protect against corrosive action of coal, steel bunkers are often lined with concrete or other protective coatings. Another suspended construction has steel straps on about 3-ft centers, acting as bearing members for light-gage preformed steel sheets. These are lined with concrete applied by guniting.

Discharge Efficiency. Horizontal bunkers of suspension and other types have discharge outlets and gates at intervals along the length. Gates, as illustrated above, may be of either swinging or sliding design. Discharge efficiency suffers because of dead spaces between outlets, and trimming these dead spaces can be difficult. One answer is to increase the number of outlets where practical. Another solution uses multiple hopper-bottom construction to eliminate dead spaces.

Moisture and compacting can raise coal's angle of repose from about 45 deg to 60 or 70 deg. This may lead to flow problems at storage outlets. Coal immediately above opening drops freely but the remainder arches over and hangs up, stopping flow.

How to Prevent Arching. If a good space above opening can be kept free of coal, say 3 ft or more, arch span becomes too great and flow usually can be maintained. Poke holes, looped chains reaching down to openings, and the modern vibrator all aim at keeping arches from forming. Another approach is to make slopes to outlets steeper. For existing bunkers, this effect can be achieved in some cases by putting a vertical plate above opening's centerline. In new bunkers this is a matter of design — some recommend bunkers with three vertical sides and one sloped.

Crushers. In these pages we've mentioned the common practice of crushing coal before putting it into storage. Limited space makes it necessary to confine this discussion to handling and storing equipment. For a comprehensive roundup on crushers, see POWER, July 1951, pp 73-75; Aug. pp 84-85.