HOMES PLANNED FOR COAL OR COKE

CIRCULAR SERIES
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NUMBER G3.61

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ISSUED BY THE SMALL HOMES COUNCIL

UNIVERSITY OF ILLINOIS BULLETIN
VOLUME 46, NUMBER 70, MAY, 1949. Published seven times each month by the University of Illinois. Entered as second-class matter December 31, 1912, at the post office at Urbana, Illinois, under the Act of August 24, 1912. Office of Publication, 350 Administration Building, Urbana, Illinois.
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This circular is one of a series on small homes. Other circulars are available for 10c each. For information, write to Small Homes Council, Mumford House, University of Illinois, Urbana.

MATERIAL IN THIS CIRCULAR BY RUDARD A. JONES
Editor: M. H. Kennedy

UNIVERSITY OF ILLINOIS
CHARTERED 1867
For the maximum convenience, comfort and cleanliness in heating with coal or coke, a house should be planned correctly for the use of these fuels. Many homeowners select their heating equipment with care, but neglect to plan for delivery, storage and handling of solid fuel, and for the removal of ashes. Because of this lack of planning, they needlessly carry shovelfuls of fuel from the bin across the basement to the furnace or boiler; they make fuel deliveries difficult by placing the driveway on one side of the house and the fuel bin on the other.

Arrangements for the use of solid fuel should be considered in the earliest stages of planning the house. Before plans are prepared, ask your fuel dealer about the types of solid fuel available in your locality; consult your architect or contractor about types and sizes of heating equipment.

In planning for convenient use of coal or coke, provide for:

- **Clean, rapid, economical fuel delivery.** Locate the bin so that delivery can be made directly from truck to bin; design the bin for easy filling.
- **Adequate storage of fuel.** Make the bin large enough to hold at least a half season's supply of fuel.
- **Efficient firing and burning of the fuel.** Design the bin so that fuel can be obtained without entering the bin; locate the heating unit near the bin; make sure the heating unit is designed to burn the type of solid fuel you will use.
- **Removal of the gases of combustion.** Build an adequate chimney near the heating unit. (See SHC circular, F7.0 — "Chimneys and Fireplaces."")

This circular is limited to these five considerations as they relate to the actual design of the house itself. All five are interrelated.

* Fuel consumption is reduced and comfort is increased by the use of insulation, weatherstripping, storm doors, storm sash and heat regulators. The over-all heating efficiency of the house can be increased by locating the chimney centrally so as to regain heat from the flue gases. Tests at the University of Illinois have shown that from 75% to 95% of the heat in solid fuel is utilized in heating a well-built house.

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**THE ABC'S OF PLANNING . . . For Coal or Coke Heat**

**In a well-planned house—**
- The driveway is next to the fuel bin;
- The fuel bin, next to the heater room;
- The heater room, next to the ash-removal route;
- The ash-removal route, next to the driveway.
The one-story basementless house is favored by many homeowners because living and utility areas are on the same level and all stairways are eliminated.

The house presented here is designed to be built on a concrete slab laid directly on the ground. (See SHC circular, F4.3—“Concrete Floors for Basementless Houses.”) It is, however, readily adaptable to standard floor-joist construction.

LOT PLAN: The house is designed for a 60-foot lot. The driveway is placed next to the fuel bins so that the bins can be conveniently filled directly from the fuel truck.

FIRST-FLOOR PLAN: The living room of this two-bedroom house has an adjoining dining alcove which connects directly to the corridor-type kitchen. A storage room is provided in order to compensate for the space lost by the omission of a basement. The heater room, fuel bins, laundry and garage form a separate utility wing of the house.

Its Solid-Fuel Features

HEATER ROOM: The heater room is designed for a boiler equipped with a binfeed stoker which drops the ashes to a pit below. The room may also be arranged for hand-fired equipment or for other types of stokers.

An indirect heater connected to the boiler furnishes hot water during the winter; a separate water heater is used during the summer. A warm-air furnace may be installed instead of the boiler. A lightweight chimney, suspended from the ceiling joists, has been selected for this house.

FUEL STORAGE: Two fuel bins are provided. The larger bin which holds fuel for the heating unit is 6'-0" wide and 6'-0" front-to-back. The smaller bin (3'-4" wide) holds fuel for the water heater. (See Pages 10 and 11.)

FUEL-DELIVERY WINDOW: Standard all-metal delivery windows are suitable for bins of this type. The sill of the window should be placed not higher than 5 feet from the driveway level. Mechanical conveyors or conveyor-type trucks are especially adapted for delivery to this bin.

ASH REMOVAL: To eliminate handling ashes, a gravity ash-storage pit can be constructed beneath the floor of the heater room under the boiler and water heater. The pit shown here is large enough to hold a season's accumulation of ashes and is accessible from the outdoors so that the ashman does not have to enter the house.

If the ash-storage pit is not built, a small door may be provided in the wall of the heater room so that filled ash cans may be pushed outside.

The real importance of the houses presented in this circular lies in the plans; these are developed from planning principles for the use of solid fuel. The principles may be successfully applied to other house designs.

Although each home shows a particular type of solid-fuel-burning equipment, other stokers and hand-fired furnaces or boilers may be used if slight changes are made in arrangement. Likewise, fuel storage and ash-removal facilities may be varied. Only one exterior can be shown here for each plan. Many variations in architectural expression are possible through the use of different roof types, materials, windows, and details.
The one-story house with basement offers the convenience of having all the living quarters on one floor, while the basement provides suitable space for recreation facilities, fuel storage, heating unit, laundry, and general storage. The house has been planned for convenience and utility within a limited budget.

LOT PLAN: The house is designed for a 50-foot lot. The driveway is placed in a space 10'-4" wide along one side of the house, permitting direct truck-to-bin fuel delivery. This leaves a 5-foot side yard on the opposite (bedroom) side of the house.

The plan may be reversed or rotated to take advantage of the orientation of the lot.

FIRST-FLOOR PLAN: A special feature of this house is the hall which leads from the front door directly to all the major rooms of the house. It is, therefore, not necessary to use the living room as a passageway. A partition of open shelves screens the entrance hall from the living room.

The dining space, in an alcove of the living room, affords privacy in dining and yet adds to the apparent size of the living room. The kitchen is an efficient U-arrangement.

In a small home, it is economical to combine the service entrance of the house with the basement stairway. In this house, the service entrance is at grade level, thus making outdoor steps unnecessary. The entrance is under the cover of the breezeway connecting the house and the garage. The service door opens onto an intermediate landing of the basement stairway. This landing is four steps below the first-floor level.

BASEMENT PLAN: The house has a partial basement. If a larger basement is desired, the area under the front portion of the house may be excavated.

The basement is only nine steps down from the service entrance landing. Near the foot of the stairway is the heater room—a separate room being recommended for the heating unit to insure cleanliness. The fuel bin is adjacent to the heater room.

The laundry room is at the end of the hall. Laundry tubs are placed as near to the main plumbing stack as possible. This area may also serve as a recreation room.
HEATER ROOM: The heater room is laid out for a hand-fired, gravity warm-air furnace. The heating unit is centrally located. A 6-foot clearance is provided between the firing door and the fuel bin. This distance makes it easy to handle the shovel and the poker when firing the heating unit.

The heater room may be adapted to mechanical firing. If a hopper stoker is to be installed, the clearance should be at least 7 feet.

In addition to the heating unit, a solid-fuel water heater is shown. Two flues are provided in the chimney — one each for the heating unit and the water heater.

Other types of standard central heating systems may be used — hot water (either gravity or forced circulation), or forced warm air.

If a boiler is chosen for the heating unit, an indirect water heater connected to the boiler may be used for the hot water supply during the heating season.

FUEL STORAGE: The fuel bin is adjacent to the heater room and is 7'-8" wide and 6'-0" from front-to-back. Three of the walls are masonry. The fourth wall, which contains the bin outlet-boxes, is of wood. This wall also has an access door to the bin. The bin is designed so that it is unnecessary for either the fuel deliveryman or the homeowner to enter the bin through the basement except in case of emergency. (For details of a typical bin, see Page 11.) All but a small percentage of the fuel may be removed through the bin outlet-boxes.

Only one bin is shown in this plan as both the furnace and the water heater can use the same size fuel. The bin may be divided if two sizes of fuel are to be used.

FUEL-DELIVERY OPENING: The most satisfactory type of fuel-delivery window for a basement bin is one of steel or malleable iron (unglazed). Such windows are manufactured in two common sizes, the dimensions varying slightly with the individual manufacturers. The rough wall opening for the larger size is approximately 22" high by 32" wide; for the smaller, 17" x 23". The larger size is recommended because it offers ready access to the bin when it is necessary to level the fuel in the bin.

Delivery windows should be equipped with hardware which can be unlatched from the outside so that it is unnecessary for anyone to go into the basement to open the window. The window may be padlocked on the outside.

ASH REMOVAL: Ashes can be removed from the heating unit either manually or by gravity. (See details, Page 12.)

The basement stairway is conveniently located for ash removal. Ashes can be carried out of the heater room, up nine steps of the basement stairway, and out the service entrance (at grade level).

If it is desired, locks may be placed on the stairway door at the first floor, and on the door at the end of the basement hall. (See plans, Page 4.) With locks on these doors, the service entrance may be left unlocked, permitting the various servicemen to enter a limited portion of the basement. The rest of the basement and house remains secure. This arrangement offers an opportunity for the owner to employ an ashman who will go directly to the basement for ashes.
The split-level house through its unusual design combines the advantages of both basement and basementless houses. In this plan, the living-dining and kitchen areas are on a concrete slab laid on the ground. They open onto a terrace at the rear of the house.

Privacy for the bedrooms and bath is gained by raising this portion of the house a half flight of stairs above the living area. Under the bedrooms, there is ample space for the well-lighted, partial basement which is only a few steps below ground level.

LOT PLAN: The house will have adequate side yards when placed on a 60-foot lot. On a wider lot, the living room can be extended if added living space is desired.

The driveway is located at one side of the house so that it can function as the service artery. The service door opens onto the driveway. The garage is separate from the house.

The orientation of the house may be adjusted to suit the particular site.

THE LIVING LEVEL: A large living-dining area is shown. This area may be divided into separate rooms by the use of the folding partition.

The kitchen has a serving arrangement in the form of a pass-through cupboard between the kitchen and dining area.

A central hall leads to all areas in the house.

THE SLEEPING LEVEL: Up seven steps from the central hall are two bedrooms, each with windows on two sides and with louvered ventilation openings on the third side above the closets. Generous storage space is provided in each bedroom.

THE UTILITY LEVEL: The partial basement is only six steps below the living-room level. This reduces stair climbing and makes the basement a more useful area.

The basement is divided into two sections: the workroom and laundry occupying one area, and the heating facilities, a smaller area.

Since the basement floor is only 3 feet below the outside grade level, it is possible to install full-size windows in the basement without the use of areaways. This feature makes the workroom an extremely light, airy and pleasant room—one which is especially adaptable for a recreation room or children's playroom.
**WITH PARTIAL BASEMENT**

*Its Solid-Fuel Features*

**HEATER ROOM:** The heater room is laid out for the use of a boiler equipped with a binfeed ash-removal stoker. A different type of stoker or a hand-fired unit may be used.

The stoker-fired boiler has an indirect storage-type water heater; hence, a separate water heater is not needed. During the summer, the heating mains are shut off and the boiler is operated to heat water only. If a separate water heater is installed, two flues are necessary.

A warm-air heating system may be installed. In this case, a separate water heater is required.

**FUEL STORAGE:** The fuel bin shown on the plan is 8'-0" wide and 6'-0" from front-to-back. The fuel screw of the stoker is placed in the center of the bin, and two sloping bottoms direct the flow of the fuel to the conveyor.

**FUEL-DELIVERY OPENING:** Since the floor of the basement is only 3 feet below grade, the upper 4 feet of the foundation wall is exposed. The delivery window, thus, can be placed in the wall without special grading. The sill of the delivery window will be approximately 2 feet above the level of the driveway. This is a convenient height for delivery with conveyors.

**ASH REMOVAL:** The stoker removes the ashes from the boiler and places them in a metal container through an inlet in the cover. A 10-gallon container is the maximum size recommended.

A covered ash-setout areaway (built outside the wall of the heater room) makes it possible for a person to place the ash containers outdoors without leaving the heater room. (See detail at right.) Such an areaway can be used in any house with basement where the grade line is not higher than 5 feet from the basement floor.

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**DRIVEWAY DESIGN**

Build a good driveway — one that will carry the weight of automobiles, delivery trucks and an occasional moving van without buckling. At least 6 inches of stone or gravel should be used. A black top (asphalt) surface is excellent. A concrete pavement 6 inches thick (not reinforced) will carry the usual 1 1/2-ton truck loaded with 5 tons of fuel. In many instances, 4-inch concrete pavements have proven satisfactory for lighter loads.

To accommodate the tread width of dual wheel trucks, a minimum pavement width of 9 feet is recommended. To allow for passage of the truck body, the clearance between walls, fences or trees should be 10 feet. Overhead clearance (to allow the elevation of dump and high-lift trucks) should be 16 feet.
The two-story house makes efficient use of the building site. For a given living area, less foundation and roof construction is required than in a one-story house.

This two-story house is designed for the convenient use of solid fuel. The full basement has ample space for recreation, laundry, general storage, and the heating facilities.

LOT PLAN: The house was designed for a 60-foot lot. In this plan, as in the previous plans, the driveway has been placed to provide efficient service access to the house. Rubbish, garbage and ash removal, fuel delivery, and general service can be easily handled from the driveway as both the kitchen door and the outside basement stairway are adjacent to it.

The garage is connected to the house by a breezeway—a convenient feature in bad weather.

FIRST-FLOOR PLAN: The living-dining area overlooks a terrace and garden in the rear yard. Through the use of full-height windows and sliding doors, the living space is extended to the outdoors.

The kitchen assembly is U-shaped and has more than adequate storage facilities. A table for informal meals serves as additional work surface.

The lavatory on the first floor is located so that it is convenient and yet shielded from the living room.

SECOND-FLOOR PLAN: On the second floor are three bedrooms, each with cross-ventilation. All three bedrooms have sliding-door closets.

The bathroom is located above the first-floor lavatory for economical plumbing installation.

BASEMENT PLAN: The basement is divided into two separate units: a recreation room (with laundry facilities at one end) at the rear of the house, and the heater room and fuel storage bins at the front. A portion of the heater room may be used as a hobby shop.

Two stairways lead to the basement. The inside one primarily serves the recreation room, but also gives the homeowner access to the heater room. The outside stairway, which is designed for service use, permits easy access from the outside to the heater room and the laundry. Although called an "outside" stairway, it is actually covered by the roof of the breezeway. Such a cover prevents snow, ice and debris from collecting on the steps.
HEATER ROOM: The heater room is laid out for use of a warm-air furnace equipped with a binfeed stoker of the type which fuses the ashes into clinkers. This stoker enters the side of the furnace, thus allowing a clear space in front of the firing door. For the convenient handling of clinker tongs, a clearance of 6 feet is provided. Domestic hot water is heated by a separate unit burning solid fuel. The chimney has separate flues for each unit.

By rearranging the heater room, a different type of stoker or a hand-fired unit may be accommodated.

A steam or hot-water system may be used equally as well as the warm-air system. In this case, the boiler may be equipped with an indirect water heater and operated the year-round. A separate water heater then becomes unnecessary.

The heater room has three doors. The door from the basement hall is designed for the use of the homeowner. The other doors connect the heater room with the outside service stairway and with the laundry.

FUEL STORAGE: An unusual but extremely efficient type of fuel storage bin has been designed for this house. This bin is two stories high, extending from the basement floor to the ceiling of the first story.

Fuel is stored to a height of 5 feet above the outside ground level, making the total height of fuel in the bin 11'-4". This “solid-fuel silo” has the advantage of allowing a higher percentage of the fuel to flow to the outlet of the bin than do other types of bins. Although considerable storage volume is gained by using the two-story bin, little area on the first floor is required.

The bin shown is divided into two sections so that a different size of fuel can be used for the water heater.

FUEL-DELIVERY OPENING: A special fuel-delivery opening is recommended for two-story bins. This opening is covered by a standard door and has removable fuel-retaining slats. When the bin is empty, the slats may be removed and the fuel delivered at a low angle so that the fuel drops only a short distance. As the bin is filled, the slats may be replaced to retain the fuel.

ASH REMOVAL: This house is designed so that the owner may take advantage of basement ash-removal service. Servicemen have access to the heater room but not to the rest of the basement because the other doors in the heater room can be locked.
HOW TO REMOVE ASHES

... From the Heating Units

BY HAND

Ashes

To avoid dust, remove all of the cold ashes from the ashpit before shaking the grate. Place the ashes in a covered metal container. Close the ash door and shake the grate, leaving the hot ashes to cool in the furnace until the next attention period. Never handle hot ashes; the heat of the ashes creates air currents which will scatter ash dust widely. Dampered ashes are dustless but will freeze in the ash can if left outside too long in cold weather. Special sprays for dampering ashes are available for installation in ashpits.

Clinkers

Some stokers form ashes into clinkers. Remove these from the firebed with clinker tongs (through the firing door of the heating unit). If the hot clinkers give off objectionable fumes, cool the clinkers on the fire-door shelf inside the heating unit. Remove them and place them in the ash container the next time you tend the fire. A few heating units have built-in clinker cabinets which vent the fumes to the furnace.

BY GRAVITY

Containers in Base of Heating Unit Under Grate

Some units hold standard bushel-sized metal ash cans; others are equipped with specially built containers.

Ash-Removal Pits in Floor Beneath Heating Unit

Floor pits may be built if a base container is not provided in the heating unit. Build large pits to hold a season’s accumulation of ashes (see Page 3), or small pits to hold a metal container.

Sometimes pits may be built with a service door to the outside so that ashes can be removed without anyone entering the house. (See Page 3.)

BY MACHINE

Stoker Removal

Some stokers have a mechanism which collects and deposits ashes in a container outside the heating unit. In basementless houses where the heating unit is close to an outside wall, it is possible to have the mechanism convey the ashes to outdoor containers.

BY CARRYING

Do not use ash containers that hold more than one bushel or 10 gallons. One 5-gallon can in each hand is a reasonable load for carrying.

If ashes are to be carried up the basement steps, be sure that:

- The foot of the stairway is in, or near, the heater room.
- The outside entrance to the stairway is at grade level and near the driveway or the service walk.
- The stairway is covered, if possible.
- The stairway and the heater room can be locked off from the rest of the house and the basement if they are to be entered by servicemen.

If the budget will permit, build a special stairway from the outside to the basement (without a connection to the first floor). Avoid an open outside stairway as it is a natural collecting place for snow, ice, and debris; include the stairway as part of the structure of the house or the breezeway. (See Page 8.)

BY ASH-SETOUT AREAWAY

This is a special ash-handling device built outside the foundation walls of the house. (See Page 7.)

BY ASH HOISTS

Place special pulley hoists or dumb-waiters near the service drive under cover if possible.

Some building codes prohibit the location of any ash-handling device in the garage on the basis that hot ashes coming in contact with gasoline fumes might cause an explosion.

... From the Premises

ASH-PICKUP SERVICES

Types of Service

The type of ash-removal service available in your locality governs your plans for ash removal. In general, services remove ashes:

- From the heater room.
- From the outside service area of the house.
- From the street curb or the alley.

For all of these, a direct route to the street or alley is needed. The driveway may serve as this route.

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