2-1926

EC723 Water Supply and Sewage Disposal Systems

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THE UNIVERSITY OF NEBRASKA
AGRICULTURAL COLLEGE EXTENSION SERVICE

February, 1926 | Extension Circular 723 C

Water Supply and Sewage Disposal Systems

UNITED STATES
DEPARTMENT OF AGRICULTURE
COOPERATING

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By IVAN D. WOOD

When the well "goes dry" or when the windmill or pump breaks down, every one in the household immediately appreciates the value of plenty of water. In other words, "you never miss the water until the well runs dry." Fortunately, in most sections of this state, plenty of pure water may be obtained by sinking wells of moderate depth, yet surprisingly few farm homes are supplied with running water in the kitchen even though the barn yards are equipped with hydrants and tanks.

THE NEED OF ADEQUATE WATER SUPPLY

According to the 1925 assessors' reports, compiled by precincts, only 12,482 farm homes have water piped to the kitchen and only 7,629 farm homes have bath facilities, yet there are more than 127,000 farms in the state.

Many examples could be given of the amount of work done, in many cases, by the housewife in carrying water from wells located various distances from the kitchen door. It is sufficient to say that many families pump more than 75 tons of water per year and carry it to the house from wells located from 50 to 100 feet away.

It is the purpose of this circular to present a number of water supply and sewage disposal systems which have been used in Nebraska and surrounding states and which will add greatly to the comfort and convenience of the farm home.

THE CHOICE OF WATER SUPPLY SYSTEM

No doubt the members of every rural household desire the best of home conveniences but often finances do not permit of a very great cash outlay. It is then necessary to seek the best without spending much money.

1. The water supply systems shown in Figures 1, 3, and 6 are well adapted to the following:
   a. The renter who cannot afford to spend much money improving a place belonging to some one else.
   b. The landlord who does not care to put expensive improvements on a farm which he is renting to others.
   c. The young farmer just starting in business for himself on his own place.

2. The farm owner in moderate circumstances would probably choose the water supply system shown in Figure 3 and later add to it as shown in Figure 4. He might also well choose the system shown in Figure 6.

3. The owner who wishes to add more expensive and more permanent improvements to his place might well consider either of the systems shown in Figures 7 and 8 or any one of the splendid commercial types which are for sale.

OTHER FACTORS TO BE CONSIDERED

1. If it is desired to install a system which will serve both the house and the barn, then one of the more expensive types as shown in Figures 7 and 8 must be used.

2. When the water in the well is always within 15 or 20 feet of the surface of the ground, the simple systems shown in Figures 1, 3, or 4 may be used just as shown with the pipe from the kitchen pump leading directly into the well. In localities where wells are deep, the water may be pumped by the windmill into a cisterm as shown in Figure 2. It is then pumped from the cistern to the kitchen sink.

3. If there is higher ground near the buildings where an underground tank of tile, concrete, or brick may be located, a splendid water supply system may be had by employing the arrangement shown in Figure 8. In a level country, the reserve water supply for serving both house and barn may be had by using an elevated tank, as shown in Figure 7.

4. Figure 4 shows an arrangement whereby water is pumped from a shallow well or cistern to an attic tank. This may be used under most any circumstances except in very cold weather. The system shown in Figure 5 may be used only where the ground at the windmill and the house are at about the same level.

WATER REQUIREMENTS

The following table will serve to show about the amount of water required for household use under various conditions:

Purpose and conditions	Consumption per person per 24 hours
Domestic purposes, pump at kitchen sink (System No. 1, Figure 1)	8 gallons
Domestic purposes, faucet at kitchen sink	15 gallons
Domestic purposes, running hot and cold water in kitchen, bath, and laundry	25 gallons

A horse, mule, or cow requires about 12 gallons of water per 24 hours. A sheep or hog will consume, on an average, about 2 gallons in a like period. Some allowance must be made for leakage, waste, cooling milk, sprinkling lawns, and like purposes. A storage tank of from 125 to 150 barrels ($32\frac{1}{2}$ gallons per barrel) capacity will prove large enough for average farm needs.

DESCRIPTION OF VARIOUS SYSTEMS

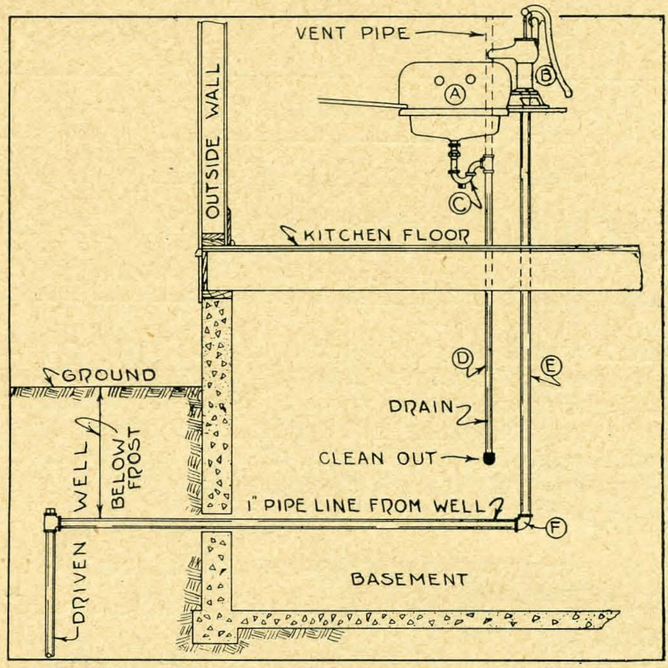
System No. 1, Figure 1. (Pitcher Spout Pump at Kitchen Sink)

A very simple and inexpensive way of bringing water to the kitchen sink is by means of the pitcher spout pump. Figure 1 shows the pump proper marked " B " and the portion just below the spout is the cylinder containing the valves and the plunger.

This pump may be mounted at the right or left side of the sink depending upon the position of the drain board and it may be supported on a shelf nailed to the wall or bolted to a special bracket which clamps to the side of the sink.

A pump of this character will not draw water from a depth greater than 20 feet, therefore, if water is to be drawn directly from the well, the water level in the well must never be more than 20 feet below the top of the sink.

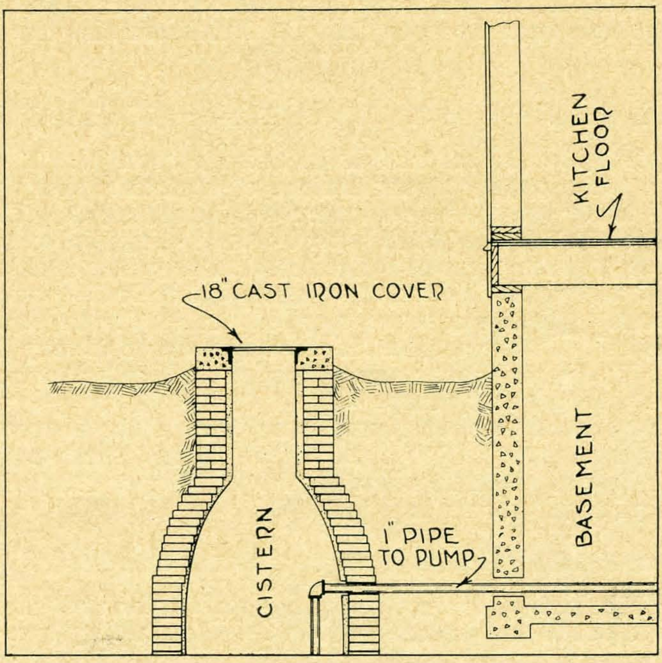
On a cold night when it is desirable to drain the pipes to prevent freezing, it is simply necessary to raise the pump



THE KITCHEN PITCHER PUMP – SYSTEM No 1

- Ⓐ SINK AND DRAIN BOARD
- Ⓑ PITCHER PUMP
- Ⓒ TRAP FOR SINK
- Ⓓ DRAIN FROM SINK
- Ⓔ GALVANIZED 1" PIPE
- Ⓕ 1" ELBOW

fig. 1.



AN OUTSIDE CISTERN

WHERE WATER IN WELL IS MORE THAN 20′ BELOW SURFACE IT IS NECESSARY TO USE A CISTERN IN WHICH WATER FROM THE WELL MAY BE STORED AND DRAWN AT THE KITCHEN SINK.

fig. 2.

handle to its full distance of travel. This action trips the valves allowing the water to drain back into the well.

In localities where wells are deep a cistern may be built, as shown in Figure 2, and water pumped to it from the windmill. The cistern may be located from 100 to 200 feet from the house, if desired, however, the low water level in the cistern must not be more than 20 feet below the top of the sink.

System No. 2, Figure 3. (Force Pump at Kitchen Sink)

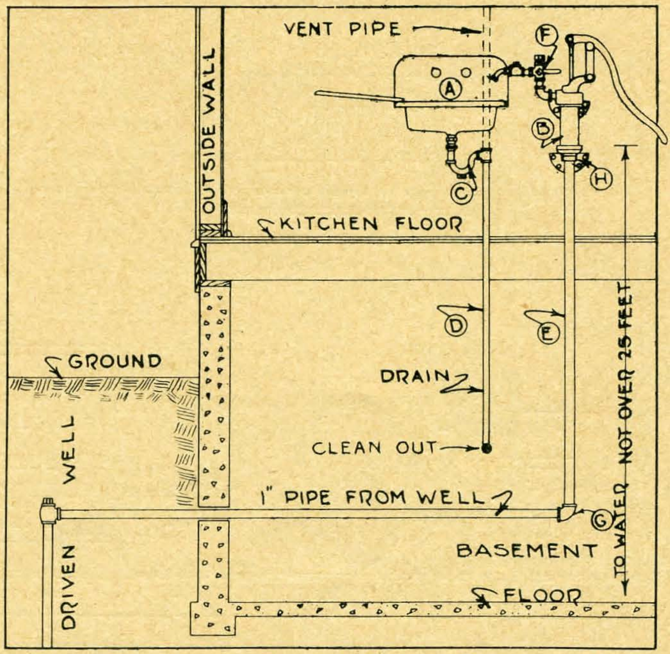
System No. 2 does not differ from system No. 1, except that a force pump is used instead of a pitcher spout pump. In all other ways the arrangement is the same. The advantage of the force pump is that later a range boiler may be used and, when properly connected to a water back in the range, will permit both hot and cold water to be pumped at the sink. The force pump may be one of the bracket type which bolts to the wall with wood screws or it may be one of the kind which fastens to a wooden shelf after the manner of the pitcher spout pump.

The spout of the force pump is made up of the fittings listed in Figure 3. At " F " is shown a ¾-inch, three-way cock which is used when this simple system is expanded to include the equipment shown in Figure 4.

System No. 2A, Figure 4. (Force Pump and Range Boiler)

In Figure 4 is shown the arrangement which results when a range boiler and water back are attached to the force pump shown at " B," Figure 3. At " F," Figure 3, is shown a three-way cock. Figure 4 shows the pipe connections to the range boiler " M."

By simply turning the handle of this three-way cock it is possible to send the water from the pump directly to the sink or to cut it off from the sink and send it to the range boiler through the pipe marked " K." When the boiler is full and a fire is started in the range, a circulation takes place from the water back in the stove to the boiler. The hot water, being lighter, rises to the top of the range boiler. When hot water is desired at the sink, it is simply necessary to pump more cold water into the boiler which in turn forces hot water through pipe " O " to the sink. When the boiler at " M " is full of warm water it is possible to syphon it at the sink by turning the handle of the three-way cock into the proper position and opening the air cock at " O."

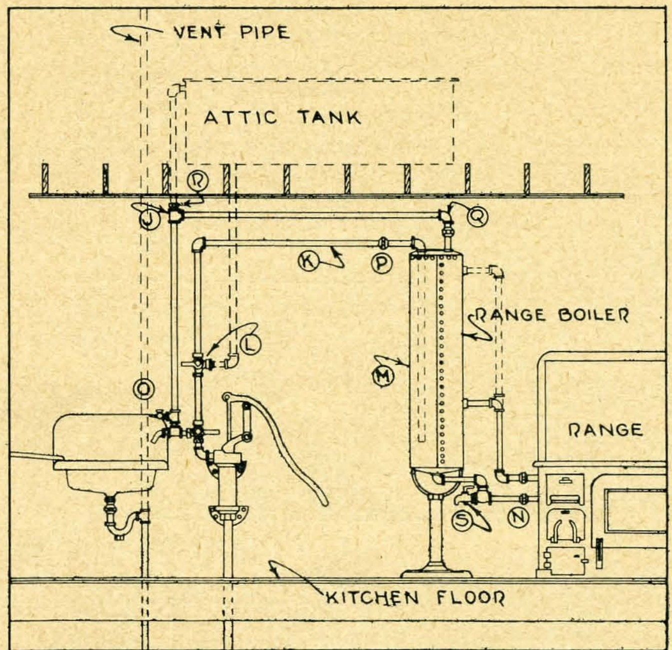


THE KITCHEN FORCE PUMP SYSTEM No 2

BILL OF MATERIALS

- (A) SINK AND DRAIN BOARD
- (B) BRACKET FORCE PUMP
- (C) TRAP FOR SINK
- (D) DRAIN FROM SINK
- (E) 20' GALVANIZED 1" PIPE
- (F) ¾" THREE WAY COCK
- (G) ONE 1" ELBOW
- (H) ONE 1¼" BUSHING
- (I) MISCELLANEOUS
  - 2-¾" CLOSE NIPPLES
  - 1-¾" ELBOW - 1-¾"x3" NIPPLE
  - 1-¾" T - 1 ¾" HYDRANT NOZZLE
  - 2-¾" PIPE PLUGS

fig 3.



THE KITCHEN FORCE PUMP AND RANGE BOILER No.2A

ADDITIONAL MATERIALS NEEDED

J 3-¾" T CONNECTIONS	P 4-¾" UNIONS
K 25' ¾" PIPE (SEE BELOW)	Q 7-¾" ELBOWS
L 1-¾" 3 WAY COCK	R 2-¾" PLUGS
M 1- RANGE BOILER	S 1-SEDIMENT COCK ¾"
N 1- WATER BACK	5-¾" NIPPLES
O 1- AIR COCK	

AMOUNT OF PIPE DEPENDS ON POSITION OF STOVE

fig. 4.

When this system is being installed a second three-way cock may be added as shown at "L." Then, at some later time it will be possible to use an attic tank by making pipe connections at "L" and "R." This attic tank may be filled by pumping directly into it and when full, the overflow will come back to the sink through the pipe marked "J." Hot water may then be drawn by opening the cock at "L," so that water flows from the bottom of the attic tank, through the three-way cock at "L," through the pipe at "K" into the range boiler, and back through the pipe "Q" to the sink. Cold water may be drawn directly at the sink by turning the handle of the three-way cock at "L" into the proper position.

REGARDING THE HOT WATER SYSTEM

The 30-gallon range boiler will be large enough for the average family. The water back should be of the proper size for the boiler. It will be noticed that no valves of any kind are put in the pipe marked "Q," Figure 4. This pipe is left open so that there is always a chance for the steam from the boiler to escape, otherwise an explosion might result.

The water in the hot water back or the boiler may not freeze in cold weather but the pipes connecting the two sometimes do and an explosion is often the result when a fire is built in the range. Always make sure that none of the pipes are frozen before starting a heavy fire.

The new type range boilers are connected to the water back as shown by the dotted lines in Figure 4. The heavy lines show the old method of tapping low down on the side. The new method permits hot water to be drawn very much sooner after a fire is started. At "S" is a sediment cock which should be opened from time to time to drain out the accumulation of sediment which would, in time, clog up the pipes.

It should be noted that the cold water pipe marked "K" enters at the top of the range boiler and continues down inside it to within about six inches of the bottom. Ordinarily this pipe is tapped with a small hole just after it enters the boiler. This hole is omitted in this case as it would hinder syphoning hot water as explained previously.

System No. 3, Figure 5. (Attic Tank and Force Pump)

The water supply problem of the household may often be solved by the use of a tank placed in the attic or even in some unused room on the second floor. Figure 5 shows how the connections may be made when using a horizontal double-

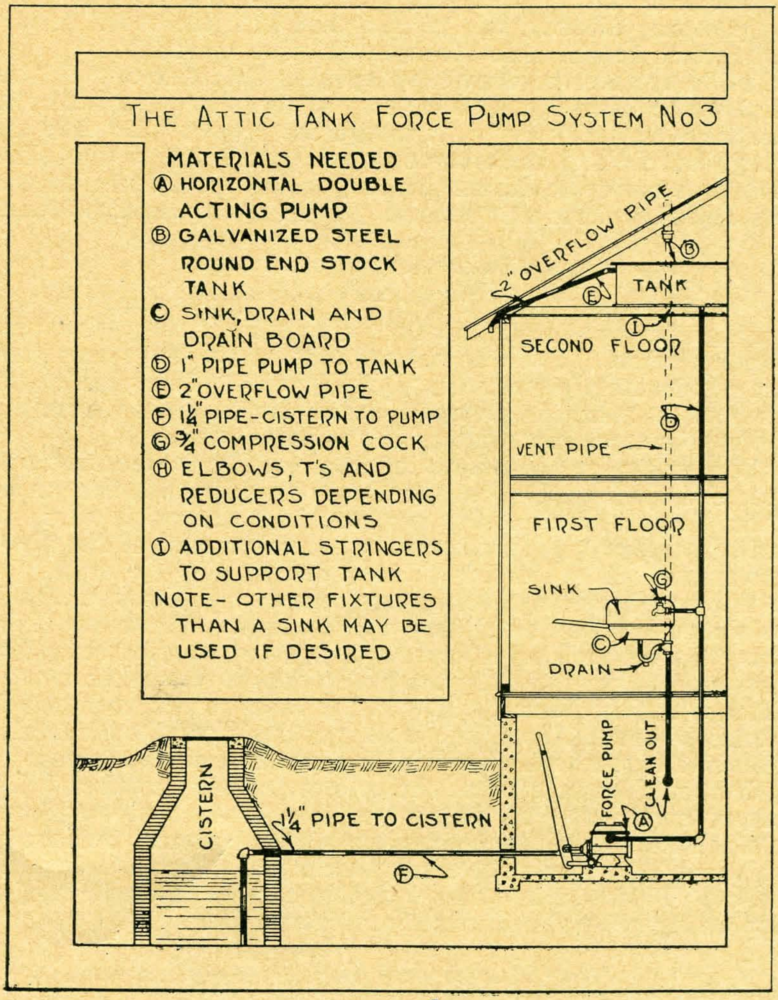

THE ATTIC TANK FORCE PUMP SYSTEM No3
MATERIALS NEEDED
Ⓐ HORIZONTAL DOUBLE ACTING PUMP
Ⓑ GALVANIZED STEEL ROUND END STOCK TANK
Ⓒ SINK, DRAIN AND DRAIN BOARD
Ⓓ 1" PIPE PUMP TO TANK
Ⓔ 2" OVERFLOW PIPE
Ⓕ 1¼" PIPE-CISTERN TO PUMP
Ⓖ ¾" COMPRESSION COCK
Ⓗ ELBOWS, T'S AND REDUCERS DEPENDING ON CONDITIONS
Ⓘ ADDITIONAL STRINGERS TO SUPPORT TANK
NOTE- OTHER FIXTURES THAN A SINK MAY BE USED IF DESIRED
2" OVERFLOW PIPE
TANK
SECOND FLOOR
VENT PIPE
FIRST FLOOR
SINK
DRAIN
FORCE PUMP
CLEAN OUT
CISTERN
1¼" PIPE TO CISTERN

Fig. 5.

acting pump in the basement to force water from a cistern to the attic tank.

An ordinary galvanized iron horse tank is used for storage. These tanks may be obtained in various sizes and shapes but the oblong type with rounded ends is to be preferred, since it may be set directly over a partition which relieves the joists of the load. If not placed over a partition additional joists must be used under it to take the weight from the ceiling joists. A tank 6 feet long, 2 feet wide, and 2 feet deep will hold about 150 gallons which should ordinarily be a two-days' supply. Very little trouble is experienced from freezing, if water is pumped at least twice a day in cold weather. The warmer water from a well or cistern keeps the temperature in the tank above the point where solid freezing takes place except in the coldest weather.

The overflow pipe should be 2 inches in diameter and may be carried out under the eaves or returned to the basement beside the supply pipe. Regular tank connections may be purchased for attaching the 1-inch supply and 2-inch overflow pipes to the attic tank. When complete bathroom fixtures as well as kitchen sink are used with this system, a 250-gallon attic tank should be purchased if a two-days' supply is desired.

Various modifications of this system may be made to fill the attic tank. For instance, water might be pumped from a shallow well instead of a cistern as shown. Or, instead of using the pump in the basement it might be desirable to force water directly from a force pump at the windmill through a 1-inch pipe laid underground to the basement and then to the attic tank.

System No. 4, Figure 6. (Deep Tank at the Well)

A satisfactory method of obtaining cool drinking water at the kitchen sink is shown in Figure 6. It has the advantage of requiring no force pumps.

At "A" is shown a deep concrete tank. From the bottom of this tank, a 1-inch pipe is laid, 4 feet underground, to the basement and then turned upward to a pitcher spout pump, just as is used in System No. 1. All the water pumped by the windmill, for all purposes, passes through the tank at "A" keeping it filled with cool water. Any pumping done at the house draws cool water from the bottom of tank "A."

The relative elevation of the ground at the windmill and house should be about the same when this system is used,

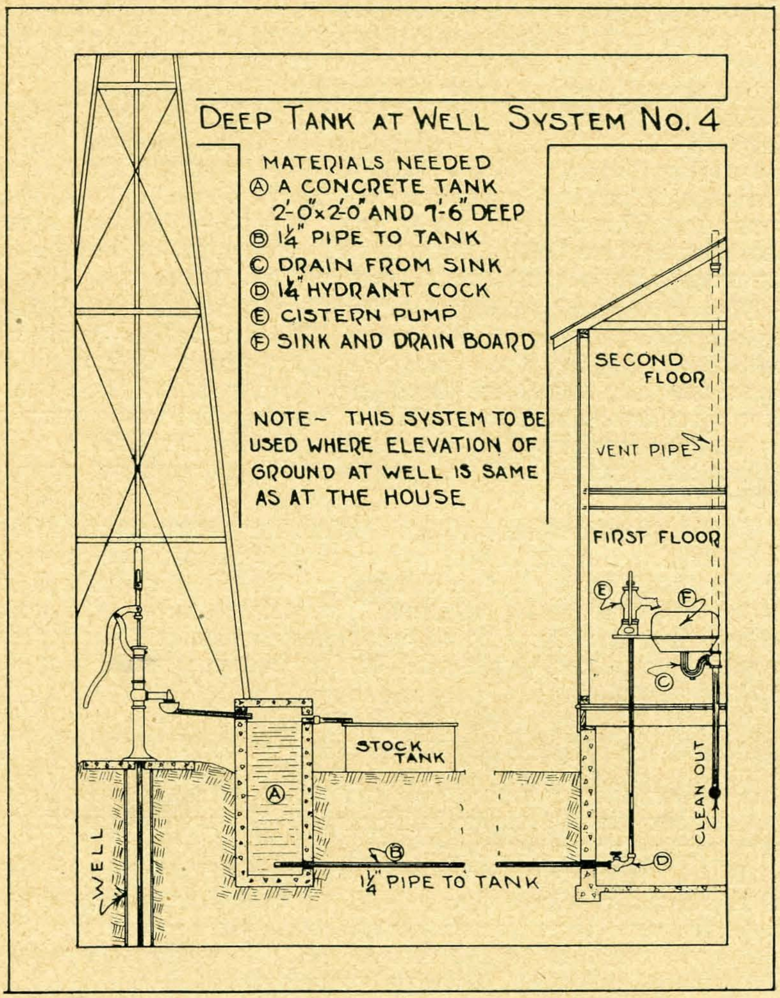
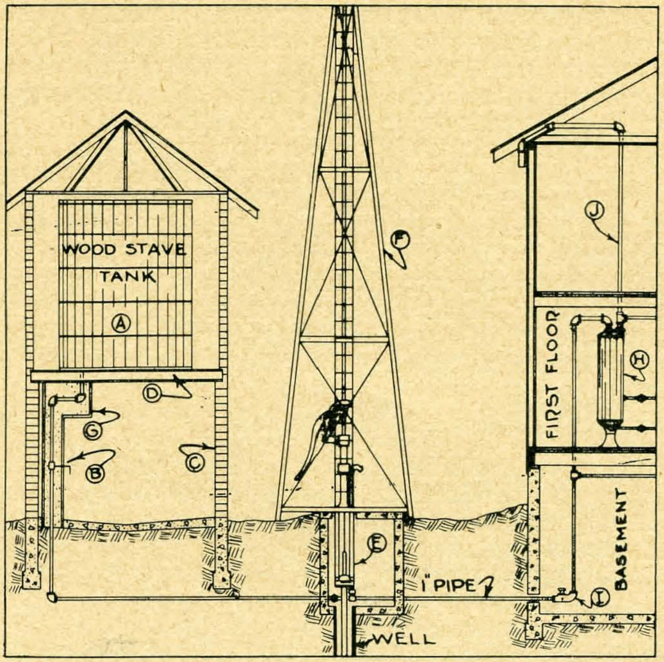

DEEP TANK AT WELL SYSTEM No. 4
MATERIALS NEEDED
Ⓐ A CONCRETE TANK 2'-0"x2'-0" AND 7'-6" DEEP
Ⓑ 1¼" PIPE TO TANK
Ⓒ DRAIN FROM SINK
Ⓓ 1¼" HYDRANT COCK
Ⓔ CISTERN PUMP
Ⓕ SINK AND DRAIN BOARD
NOTE – THIS SYSTEM TO BE USED WHERE ELEVATION OF GROUND AT WELL IS SAME AS AT THE HOUSE
SECOND FLOOR
VENT PIPE
FIRST FLOOR
STOCK TANK
CLEAN OUT
WELL
1¼" PIPE TO TANK

Fig. 6.



ELEVATED TANK ON TOWER SYSTEM No 5

Ⓐ ROUND CYPRESS WOOD TANK 8'x10'
Ⓑ SHUT OFF VALVE
Ⓒ TILE TOWER 12' DIAMETER
Ⓓ I-BEAM SUPPORT FOR TANK
Ⓔ FORCE PUMP
Ⓕ WINDMILL TOWER
Ⓖ FROST PROTECTION
Ⓗ RANGE BOILER
Ⓘ HYDRANT COCK
Ⓙ EXPANSION PIPE

BARN YARDS MAY ALSO BE SERVED FROM TANK

fig. 7.

although good results have been obtained where tank "A" was 15 feet below the level of the sink at the house and 100 feet away.

In the basement at " D " is a 1-inch hydrant cock which, when turned, cuts off the water to the pump and drains the pipe between it and the pump to prevent freezing. This cock need not be used when the ground elevation at tank "A" is 5 feet lower than that at the house as the pipe leading up to the kitchen may be drained by simply raising the pump handle as explained in connection with System No. 1.

Freezing at tank "A" is prevented by packing it around with manure and covering the top with old blankets or 12 inches of sawdust. The tank at "A" is made 2 feet square and 7 feet 6 inches deep. The walls are 5 inches thick and are reinforced with woven wire hog fencing. The cover must be tight fitting and may be made of concrete or two thicknesses of 2-inch plank. It is sometimes possible to find an old iron tank which may be bought second-handed and used at " A," instead of building one of concrete.

System No. 5, Figure 7. (Elevated Tank and Tower)*

The elevated tank has been used for years as a means of water storage for the farm. It has the following advantages:

1. It provides running water for the barn yards as well as for the residence.
2. It may be placed near the well, hence water need not be piped long distances.
3. It may be used in a level country.
4. Leaks in the tank are easily detected and repaired.

The following disadvantages must be considered:

1. It is more expensive than an underground tank, both in first cost and upkeep.
2. Some trouble may be experienced from freezing.
3. Water is warm in summer for household use.
4. It is somewhat unsightly.

The main features of the system shown in Figure 7 are:

1. A round tank 8 feet in diameter and 10 feet deep made up of cypress or redwood staves held in place by means of adjustable iron hoops. The capacity is about 115 barrels or a week's supply for the average farm.

* NOTE: Persons interested in installing this system should procure the following blueprints from the Extension Service of the Agricultural College, Lincoln, Nebraska:
No. 10.873-11 Elevated wood tank in tile tower.............................. 15 cents
No. 10.873- 8 Pump and hydrant connections.............................. 10 cents
These prints give complete details of construction.

2. A tower 12 feet in diameter made of tile or brick to support the tank and protect it from the sun in summer and from freezing in winter. The tower wall should be 12 inches thick up to the " I " beam supports, shown at " D," and 5 inches thick from there up. It should be covered with a conical roof. The space in the tower beneath the tank may be used for storage of oil barrels, etc.
3. The 1-inch pipe connections from well to tank and to all places where water is to be delivered. This pipe must be well protected where it passes up through the tower to the tank or freezing will result. This may be accomplished by placing it in a box 12 inches square packed with dry sawdust or mineral wool. A shut-off valve at " B " provides a way to save the supply if a leak is detected anywhere in the system or it may be closed for making repairs.
4. At the well, a three-way force pump. The underground connections are made in a pump pit of concrete at " E." This pit is made 4 feet square and 5½ feet deep and should be tightly covered with a concrete slab.
5. At the house the supply pipe entering the basement where a hydrant cock is placed at " I." When this is shut, all the pipes in the house drain to prevent freezing. When cock " I " is shut, the range boiler pressure is relieved through pipe " J " which goes to the attic and then out under the eaves.

   Unless the tile tower is made higher than shown, the bathroom must be on the lower floor of the house. A height of 8 feet to the bottom of the stave tank is usual for fixtures on the lower floor. This height should be increased to 14 feet when the bathroom is on the second floor.

System No. 6, Figure 8. (The Underground Masonry Reservoir) *

One of the most satisfactory gravity systems obtainable consists of an underground reservoir, placed on high ground, with proper pipe connections to a force pump and to points where water is to be delivered.

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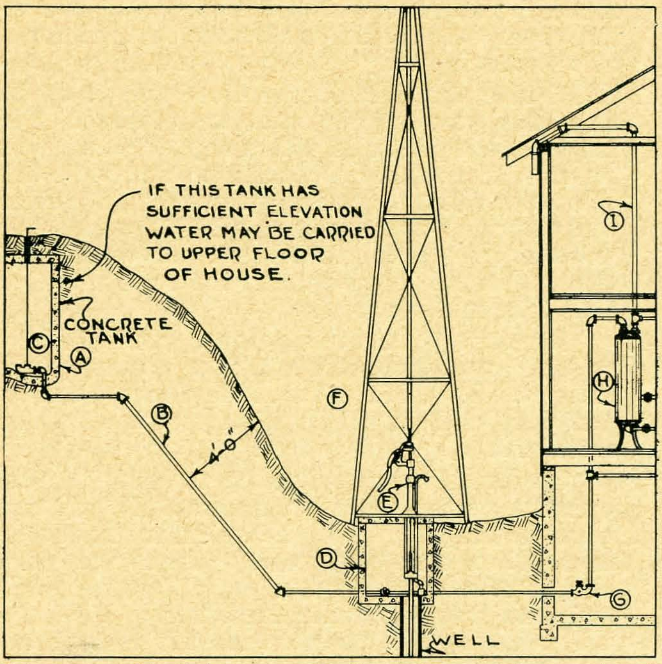
* NOTE: Those interested in installing this system should obtain the following detail blueprints from the Extension Service, Agricultural College, Lincoln, Nebraska:
No. 10.873-16 Plans for underground concrete reservoir........................ 10 cents
No. 10.873- 8 Plans for concrete pump pit and hydrant connections 10 cents



MASONRY TANK PLACED ON HIGH GROUND SYSTEM No. 6

Ⓐ A SQUARE OR RECTANGULAR CONCRETE TANK
Ⓑ 1" PIPE FROM WELL TO TANK.
Ⓒ SHUT OFF AT TANK
Ⓓ WELL PIT
Ⓔ FORCE PUMP
Ⓕ WINDMILL
Ⓖ HYDRANT COCK
Ⓗ RANGE BOILER
Ⓘ EXPANSION PIPE

Fig. 8.

It has the following advantages:

1. The work of building the reservoir may be done by the owner.
2. The water is fairly cool in warm weather.
3. No trouble is experienced from freezing.
4. The cost of upkeep is low.

The disadvantages are:

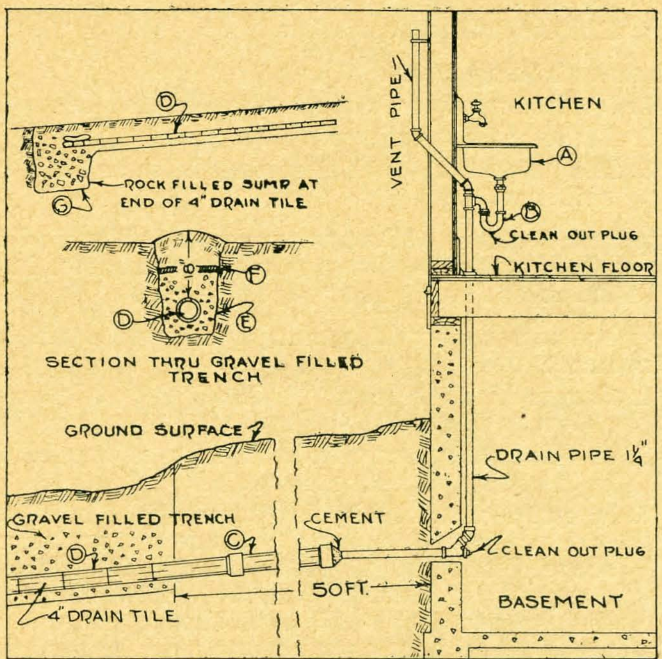
1. Limited number of farms where it may be used.
2. Leaks are not easily detected.
3. Long pipe lines often necessary between reservoir and buildings.

The main features of the system shown in Figure 8 are the same as described under the previous system shown in Figure 7 with the exception of the storage reservoir.

Any one of a variety of masonry reservoirs might be used, for instance:

1. A cylindrical reservoir "bricked up" and plastered as shown in Figure 2.
2. In some soils, cement plaster may be applied directly to the dirt with fair results.
3. A rectangular or circular reservoir of solid concrete construction. A concrete reservoir, rectangular in shape, 7 feet deep, 7 feet wide, and 10 feet long has a capacity of about 115 barrels or a week's supply for the average farm. This particular shape may be easily made since simple forms may be used in pouring the concrete. The walls are made 6 inches thick and the reinforced concrete cover is 5 inches thick. The concrete mixture used is 1 part cement and 4 parts sand. The reinforcing in the concrete cover consists of ¼-inch bars, 6 inches apart crosswise, and ¼-inch bars, 12 inches apart lengthwise.

The same 1-inch pipe line may be used for drawing water from the reservoir as is used for pumping into it. Systems are in successful operation where the reservoir is located on raised ground 800 feet from the well and buildings. Shut-off cocks are provided at "C" and at "G" as described under System No. 5, Figure 7.



SEWAGE DISPOSAL FROM KITCHEN SINK SYSTEM No1

Ⓐ SINK Ⓖ ROCK FILLED SUMP 5' DEEP
Ⓑ TRAP-VENTED BY PIPE TO OUTSIDE
Ⓒ 4" VITRIFIED TILE 50' TO DRAIN TILE
Ⓓ ORDINARY 4" DRAIN TILE 50' FALL ¼" PER FT.
Ⓔ TRENCH 2' DEEP GRAVEL FILLED
Ⓕ LAYER OF TIGHT CLAY
NOTE-USE THIS SYSTEM FOR SINK ONLY

fig. 9.

SEWAGE DISPOSAL SYSTEMS

System No. 1, Figure 9. (Kitchen Sink and Disposal Tile) *

The main features of this simple system are:

1. The kitchen sink which should be firmly set to the wall with the top of the rim or apron about 36 inches from the floor.

2. The trap at " B " provided with a clean-out plug. The trap is necessary since it prevents foul gases from entering the house from the sewer.

3. The 1¼-inch drain pipe continued out through the wall behind the sink or up through the partition and out through the roof for a vent. This vent pipe prevents the water in the trap from being drawn out by the suction of water running down the drain and provides a means of escape for sewer gases. Note the clean-out plug in the basement which permits any clogging of the pipe to be cleaned out.

4. A string of 4-inch vitrified sewer tile with cemented joints to lead the sewage at least 50 feet from the house before it enters the gravel-filled trench where it soaks away into the ground. This vitrified sewer tile should have a fall of from ⅛ to ¼ inch per foot. (" C," Figure 9.)

5. Fifty feet of ordinary 4-inch drain tile laid in a gravel-filled trench with a fall of ¼ inch per foot. (" D," Figure 9.) This trench is dug approximately 2 feet deep and the tile are laid not more than 18 inches below the surface. No trouble will be experienced from freezing. At the end of the ordinary drain tile is a rock-filled sump. In other words just a hole filled with rock and covered over with dirt. In extremely sandy soils it will not be necessary to do more than lay the tile in a trench and cover them up. The gravel and the rock-filled sump will not be necessary.

* NOTE: This system cannot be used with safety except for the disposel of waste from the kitchen sink or the cellar drain. No bathroom fixtures may be connected to it.

System No. 2, Figure 10. (Septic Tank with Tile Disposal System)*

1. Complete plumbing in the house as shown in Figure 10. This includes fixtures for the bathroom, kitchen sink, cellar drain, laundry tubs, etc. At "A," Figure 10, is shown the cast iron soil pipe which extends out under the foundation of the house, a distance of 4 or 5 feet to where it joins the vitrified sewer tile. At "D" is shown the galvanized iron vent pipe, 1½ inches in diameter. Recessed, cast iron fittings are used on this pipe.
2. From 30 to 50 feet of 4-inch vitrified sewer tile with cemented joints shown at "G" laid from the house to the septic tank. This pipe should have a fall of from ⅛ to ¼ inch per foot and should be laid to a uniform grade.
3. A concrete septic tank consisting of two chambers, the first one of which is 3 feet wide, from 5 to 7 feet deep, and 5 feet long. The second one is 3 feet wide, from 3 to 4 feet deep, and 4 feet long. The walls of the tank are 5 inches thick while the covers are made of 10 concrete slabs which may be removed for cleaning the tank.
4. From 300 to 500 feet of ordinary 4-inch drain tile laid to a grade of 6 inches per 100 feet, in a gravel-filled trench about 18 inches deep. After the tile and gravel are placed in the trench a layer of tight clay is tamped over the gravel to keep the fine soil particles from above from washing down into the gravel and filling the spaces.

The raw sewage from the house enters the first chamber of the tank through the pipe "G." After it has been in the tank for a certain period, bacterial action takes place which liquidifies a part of the sewage, turns part of it into gases and reduces some of it to a sludge which settles to the bottom of the tank. This sludge must be cleaned from the tank once in five or six years.

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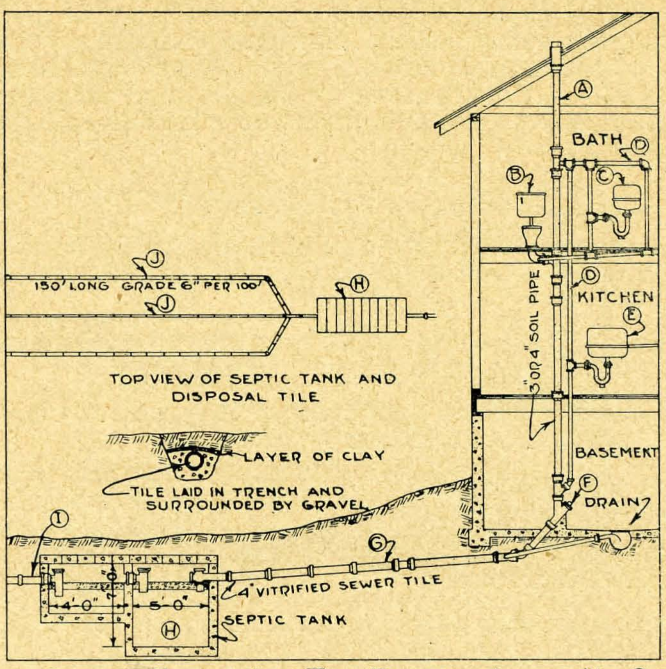
* NOTE: Persons interested in installing complete plumbing fixtures in the house and a septic tank for disposal should procure the following material from the Extension Service, Agricultural College, Lincoln, Nebraska:
No. 10.812-2 Disposal Chamber Septic Tank.. 20 cents
Extension Circular 703.
United States Department of Agriculture, Farmers Bulletin 1227.
United States Department of Agriculture, Farmers Bulletin 1426.

The main features of this system are:



SEPTIC TANK WITH TILE DISPOSAL SYSTEM No 2

Ⓐ 3" OR 4" SOIL PIPE
Ⓑ TOILET
Ⓒ LAVATORY
Ⓓ VENT PIPE
Ⓔ KITCHEN SINK
Ⓕ CLEAN OUT PLUG
Ⓖ 4" VITRIFIED SEWER TILE FALL 1/8" TO 1/4" PER FOOT
Ⓗ SEPTIC TANK - 50' TO 100' FROM HOUSE
Ⓘ TO DISPOSAL TILE
Ⓙ 4" DRAIN TILE LAID IN TRENCH 18" TO 24" DEEP

Fig. 10.

The effluent which leaves the tank is usually a colorless, thin liquid which soaks away into the soil surrounding the drain tile. This colorless liquid is not free from germs, however, therefore the strings of drain tile should not be located near the well or other sources of water supply.

If the tile disposal system shown at " J " can be used, it is always good policy to do so. Sewage should never be emptied into an open draw or into a stream. It not only causes polution, foul odors, and endangers the health of the community but considerable trouble is experienced from freezing at the end of the pipe.

HINTS ON CONSTRUCTION

1. Underground water pipes in Nebraska should be laid 4 feet to 4 feet 6 inches deep. Use only galvanized wrought iron pipe.
2. Carry water pipes to second story through inside partition. Put fixtures on inside walls if possible.
3. Keep sewer and water pipes away from wall or windows in basement where freezing may take place.
4. Use pipe compound on joints when screwing water pipes together.
5. Arrange all water piping with slight slope so that it may be drained if necessary.
6. To cheapen plumbing plan the bath room above or near the kitchen.
7. Remember that the water in the range boiler and water back expands when heated and an explosion is likely to result when pipes are frozen or when piping is not properly installed.
8. Write the Extension Service, Agricultural College, for more definite instructions before installing the complicated water supply and sewage disposal systems.

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