

Cir 53 revised

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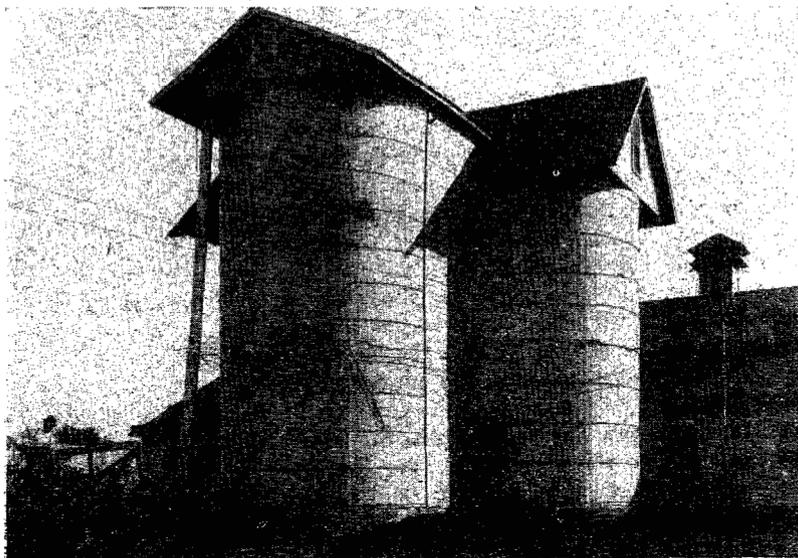


Fig. 1.—Filling a silo with sorghum. The cut material is forced up through the pipe by a blower.

**FILLING SILOS**

J. B. FITCH

The rapidity with which silos have been adopted on Kansas farms in the last few years has made it necessary for many farmers to fill their silos and care for the silage without previous experience. Through the advice of other silo users they have had more or less success in securing good silage. As their knowledge of making silage increases with years of silo experience the quality of silage will generally be improved, as will also the efficiency of the filling operation.

It is the object of this circular to answer some of the most common questions which arise at silo-filling time. Such methods will be treated as have been found by experimental evidence and by practical use to be most successful in producing good silage.

### TIME TO CUT THE SILAGE CROP

It is desirable to cut the crop for the silo at a time when it contains the maximum food nutrients in a condition that will make good silage. Years ago corn was cut for the silo in a very green condition, before the ear and stalks had matured, and a very sour silage, high in moisture, was obtained. Of late years the tendency has been to allow the corn crop to stand until more mature. The proper time to cut corn for the silo is about a week or ten days before it is ready to put up in the shock; the ear should be well dented and the lower leaves on the stalk dry, but the stalk itself still full of sap. Corn in this condition contains the maximum food nutrients and at the same time sufficient moisture to cause it to pack well in the silo. It is advisable to let the corn approach maturity before cutting it, even if water will have to be added at filling time, as is often the case when a few days of hot winds dry the leaves and stalks very rapidly. In the case of short, immature corn the practice is to let the corn stand in the field just as long as it will continue to grow. This corn is generally very dry, and water must be added when the crop is put into the silo. Corn should not be allowed to get so dry that the leaves shatter badly.

**As in the case of corn, the sorghums were formerly cut in a green condition and a very acid silage resulted, due to a greater amount of sugar in the sorghums. The sorghums should be cut for the silo when the heads are mature and when the seeds are so hard that they can not be crushed between the thumb and finger. Late-planted sorghums often reach the frost date before maturing. Light frosts do not materially affect the sorghums, which should be allowed to stand until frosted rather than put in the silo in an immature condition. (Fig. 2.)**

### METHOD OF CUTTING THE SILAGE CROP

The most convenient method of cutting silage crops is by means of a corn binder. When large silage cutters are used, with a short haul from the field, the binders should be started a day before filling is to begin. With smaller outfits a half day's start with the binder is sufficient to keep the silage cutter busy.

In some cases underslung racks are made especially for hauling silage corn. Such wagons lessen the burden of loading in the field, but in throwing to the silage cutter the ordinary rack is more convenient. For the difference in labor a person is not justified in making a special rack to be used only during silage-filling time.

### SIZE OF SILAGE CUTTER

The desirable size of silage cutter depends upon the number of silos one has to fill and upon the men and teams available. A large cutter run to its fullest capacity reduces to the minimum the cost per ton of silage. Cutters varying in size from 16 to 20 inches will keep five or six teams busy hauling from a short distance. Additional teams will be needed for hauling from a greater distance. For smaller cutters the number of teams depends upon the size of the cutter and the power furnished. When four to six teams are used, two or three men will be needed in the field to assist the drivers in loading. With large cutters and a large force of help, 80 to 100 tons of silage can be put up



Fig. 2.—Cutting Early Amber cane for the silo

in a day. Where labor is scarce, smaller outfits are used over a longer period of time. This gives the silage more time to settle during the filling process, and it can also be packed better than where large outfits are used. With the larger cutters time is saved in feeding the machine because the bundles need not be cut, while with the smaller machines cutting the bundles is necessary to prevent the cutter from choking. One man is needed at the cutter to feed and operate it properly. With a large cutter one man in addition to the teamster is needed on the load to pitch to the cutter. In the case of a small machine each teamster can throw off his own load.

### POWER REQUIRED FOR CUTTER

Sufficient power should be furnished to run the cutter to its capacity. The power required is generally specified in horse-

power for gas and steam engines, and should be followed carefully. The power necessary depends upon the size of the cutter used and the method of elevating the cut material into the silo. The common method is that of blowing the cut material up a pipe and into the silo by means of a powerful fan.

In some cases a continuous chain carrier is used to elevate the cut material into the silo. The use of the carrier lessens the power required to about half of that necessary when the blower is used. This means that on such an outfit for filling silos money can be saved because a lower-power engine can be used. The open carriers have been objected to on account of the lighter materials, such as leaves and husks, blowing out. This difficulty can be overcome by use of covered carriers. The carriers are probably more cumbersome to transport than the blower. Where power is available, the blower is to be preferred. (Figs. 1 and 3.)

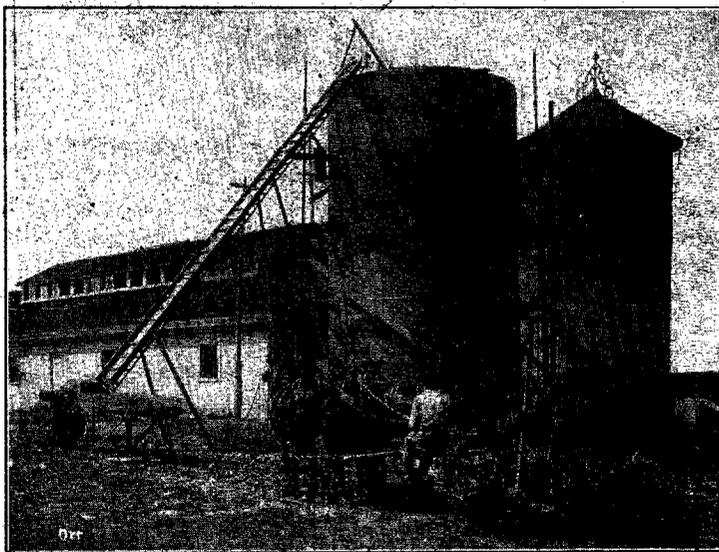


Fig. 3.—Some silo-filling equipment. Notice the silage cutter with open carrier

#### CUTTING SILAGE

For the most efficient packing, the knives on the cutter should be sharp and should be set to cut the material into pieces one-half to three-fourths of an inch in length. When the cut material goes into the silo some provision is necessary so that the heavy and lighter particles will be evenly mixed throughout the silage. If allowed to fall into the silo, naturally the heavy particles settle in one pile and the leaves and other light particles blow to the outside. The common method is to use a distributor, which consists of a series of galvan-

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ized iron pipes three to four feet long which fit into each other and can be taken off as the silo is filled. This distributor connects with the blower pipe at the top of the silo and carries the cut material in a compact mass to the bottom of the silo. The distributor eliminates much of the objectionable work on the inside of the silo and saves the work of one man. A good distributor can be made by sewing together sacks with the bottoms removed, through which the silage can pass from the top of the silo. In the absence of some sort of distributor, a chute should be made by which the cut material, before falling, will be delivered to the center of the silo. A man with a fork can distribute the material evenly over the surface of the silage.

### ADDING WATER

To make silage it is necessary that the air be excluded. To exclude air the cut material must be of sufficient weight to pack well. When the crop is dry it comes into the silo in a very fluffy condition, and, as it can not be packed tight enough to exclude all the air, air pockets are formed which cause mouldy spots in the silage. When the material is too dry, water should be added to it as it goes into the silo. When corn is cut at the proper time it is near the danger line of moisture. It takes experience to tell whether or not water must be added, but perhaps the best guide is to notice how the material comes into the silo. It should be moist enough to pack firmly under one's foot when tramped, and water should be added to the dry, fluffy material until this condition is reached. While silage that is too wet is not desirable, it is hard to injure silage from adding water to it. Excessive dryness, on the other hand, causes spoiled silage. In case of doubt, therefore, water should be added. The common practice and most desirable method of adding water to silage material is to run a stream of water into the blower. In this way each particle comes in contact with the water and the moisture is evenly distributed throughout the silo. Where it is impossible to add water to the blower, the water can be added in the silo. It should be well distributed in the silo, because a great amount of water added in one place is apt to run down through the silage and leave dry places at the surface. It is impossible to state the amount of water to add to silage. The material itself is the determining factor. Silage near the top of the silo should receive more water than that lower down. This will make greater weight for the silage near the top of the silo, where it does not have much weight on it.

### PACKING SILAGE

Perhaps the most important operation in filling a silo is getting the silage properly packed. More silage is spoiled by improper packing than by any other cause controlled by the farmer. When the silage is not tramped sufficiently to exclude the air, spoiled silage

results. It is known, too, that the more the silage is tramped in the filling process the less it settles afterwards. When the silage settles in the silo it tends **to** draw away from the wall, thus leaving **an air** space which results in spoiled silage. The amount of tramping necessary depends **upon** the rate of filling. When a **small outfit is** used over several days, the slow filling gives more time for the silage to be tramped, and the silage settles from day to day. **With** a large outfit, however, the silage should be well tramped, as it goes in more rapidly, and if not well tramped will **settle** several feet after **silo is** filled. The capacity of the silo, unless re-filled, will thus be reduced and a large amount of spoiled silage may **also** result. With a small cutter, two men in the silo are perhaps sufficient, one to **carry** the distributor and the other to do the tramping. With larger outfits, two or three men in addition to the man carrying the distributor are needed. **If** convenient, the men may be changed from the silo to the field and the monotony of the work be relieved. In case of any short delay in filling, the entire force can be used **in** tramping the silage.

An important factor in packing silage is the manner of distributing it in the silo. The most **common method** is to build the silage about two feet high around the walls and tramp this well; then fill up the center and tramp it equally; and then again build up around the walls. By this means the silage will settle without pulling away from the wall. At the top the silage can be rounded **off** by being made higher in the center, and within a few days will settle till nearly level. Tramping is more important in the upper half and top of the silo, **be-**cause this silage will have less weight on it to force it down.

### GAS IN SILOS

It is well to remember that during the process of fermentation that goes on in the silo a gas is given **off** for the first few days after filling. **This gas** may prove dangerous to those who breathe it. It is heavier than air and covers the surface **of the** silage to a depth of a foot or more after the silage **has** stood over night, or when the blower is not running and where **no** drafts **of** air enter the silo. This gas is most frequently found in pit silos. Silo doors should not be put **up** until needed, and in pit silos and silos inclosed in barns it is a desirable precaution to run the blower or cutter a few minutes before the men enter the silo, in order that a circulation may **be** started **and** the gas mixed with air. In case of doubt as to the presence of **gas**, a lighted lantern may be lowered to the surface of the silage. **If** the light goes out the gas is present and a circulation should be created in the silo before a person enters. Within a week after the silo is filled this **gas** will generally have disappeared and no trouble will be experienced in the feeding of the silage.

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### REFILLING THE SILO

Silage will gradually settle in the silo for a few days after it is filled. The amount of settling depends upon the rapidity of filling the silo and the amount of tramping. It is desirable, where the silage settles much, to arrange for refilling in order to increase the capacity of the silo. This refilling may be done two or three days after the first filling. The top few inches of spoiled silage may be thrown off, the additional silage added, and the top sealed. Many farmers who do not have a roof on their silo are increasing the capacity by placing wire fencing on posts at the top of the silo and then filling this additional height. When the silage settles it will generally make the silo about full and the wire may be taken down. Good results have also been reported from the use of folding iron silo roofs, which can be opened to give additional height to the silo and closed down when the silage settles.

### SEALING THE SILO

It will be noticed, following a day's filling, that the surface of the silage has become very hot. This heat is mostly in the surface foot in contact with the air. If filling is continued the action will be stopped, but if a day or so intervenes before filling is started again this surface will probably be spoiled and should be thrown off. When this surface is allowed to stand for some time it will spoil to a depth of from six to eight inches. Underneath this rotted layer the silage will be good. This covering acts as a natural seal for the silage. The depth to which silage will spoil on top depends upon the amount of tramping it has received and upon the moisture in the silage. When the silo is full, as much as 20 barrels of water should be added and the silage then thoroughly tramped. For a day or so following this it is a good plan to tramp the silage each day, especially around the wall of the silo. After this the silage will not settle much, and it is best not to break through the seal by walking on it. When this method is employed, six to eight inches of spoiled silage will probably be lost. In many cases, however the silage spoils to a greater depth because of rapid settling and poor tramping.

Many plans are used for reducing this spoiled silage to a minimum. As the spoiled material will probably not represent a loss of more than one or two tons of silage, a farmer can not afford to spend much time and money to reduce it. The loss may be lessened by husking out the last few loads of corn or heading the last loads of sorghum that go into the silo. Straw may be run through the cutter and spread over the surface of the silage, and when thoroughly wet and well tramped will make a good seal. After the top of the silage has been

thoroughly wet down and well tramped, a layer of oats on this will sprout rapidly because of the heat underneath, and will form a layer over the surface of the silage. A thin layer of salt sprinkled over the top of the silage after it is wet down and well tramped will cut down the amount of spoiled silage. Another method used is to cover the top of the silage with tar paper.

#### **WHEN TO FEED SILAGE**

Silage may be fed as soon as the silo is filled, but for the first few days will be nothing more than cut corn. In a short time, however, the change to silage will have been completed and a uniform feed will be found throughout the silo. If one begins to use the material from the silo immediately after it is filled, no seal is necessary, and silage is saved. After opening a silo it is necessary to feed about two inches from the surface daily to keep the silage from spoiling.

Any spoiled silage which occurs in the silo should be discarded. Cattle will sometimes eat spoiled material, but bad results often occur from this source. In feeding horses one must be extremely cautious in this regard, as horses are much more susceptible to disorder from spoiled silage than are cattle.

#### **MIXING CROPS IN THE SILO**

Many farmers who are raising both corn and sorghum mix these crops in the silo. In some cases loads of the different crops are run through the machine alternately, or it is arranged that a load of each feed shall be at the cutter at the same time. This mixing does not increase the value of either feed, and generally means more work, in that material must be hauled from two fields at the same time. As a matter of fact, the sorghums are generally not mature enough to go into the silo until some time after the corn crop has been cut.

#### **USE OF STOVER FOR SILAGE**

Many farmers are following the practice of refilling their silos in early winter with corn stover or with some kind of sorghum stover. When properly handled such stover silage makes a very good feed. It is more palatable than stover and nothing is wasted. The greatest difficulty in putting stover into a silo is to get sufficient moisture on it to make it pack well. It will take from 75 to 100 pounds of water for each 100 pounds of stover for proper packing. This means that a large amount of water must be available at filling time. Sufficient water cannot be added through the blower, and it is necessary to add additional water to the cut stover as it goes into the silo. Sorghum stover generally will take less water than corn stover, but the amount of water needed depends upon the condition of the stover.