



PORTABLE GRAIN ELEVATORS FOR FARM USE

SATISFACTORY grain elevators can often be made with parts salvaged from discarded farm machinery. Four kinds are illustrated here. Since the construction of homemade grain elevators will largely depend on the materials which may be available, the sketches are intended mainly as suggestions and as a guide. Dimensions and other information are also indicated but these may be varied to suit the parts and materials available.

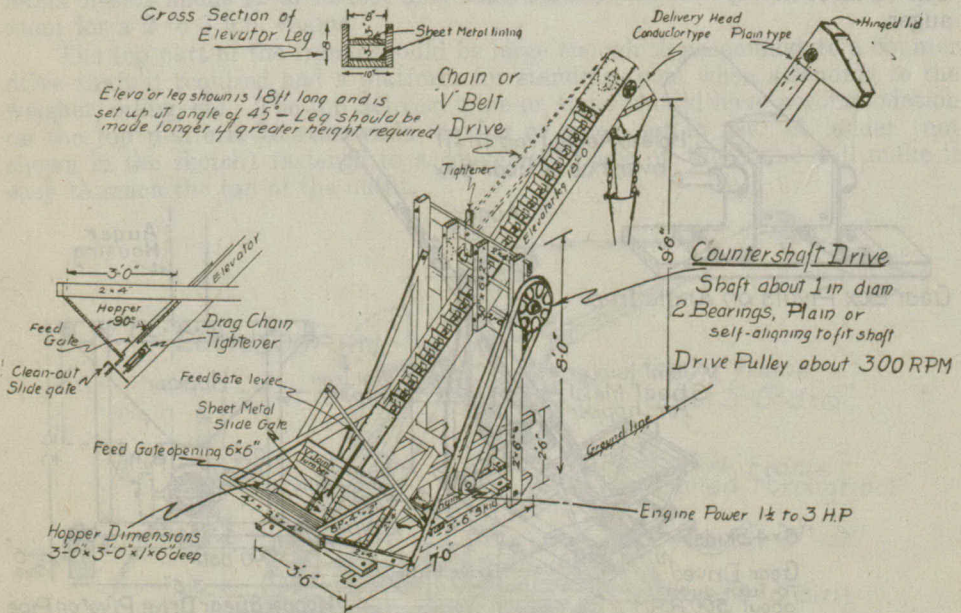


Fig. 1.—Portable grain elevator, drag or flight type. On skids; head driven; hopper supported on frame.

Drag or Flight Type

The drag or flight type of elevator is found on many of the old threshing machines. It is best driven from the top, although it can be driven from the bottom if the flight chains are kept taut. An 18 to 20 foot elevator, using 1½ to 2 horsepower will elevate 10 to 20 bushels of grain per minute depending on the kind of grain and the angle at which the elevator is set.

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The grain elevator shown in Figure 1 is set on skids. It could be mounted on low wheels. However, setting the elevator on skids permits the hopper to be lower and thus makes for easier shovelling into the hopper. There will be less vibration from the engine when skids are used. This principle applies to other types of grain elevators described in this pamphlet. The hopper is supported on the framework rather than on the elevator leg. The hopper can then be substantially constructed with either wood or sheet metal or both and will not place undue strain on the elevator leg or housing. The framework also supplies a strong support for the countershaft drive as well as for the elevator leg. Here again the elevator leg is free of strain from the countershaft drive. A feed gate is required to regulate the flow of grain from the hopper into the elevator leg. A simple accessible slide gate at the bottom of the elevator is required for cleaning out the leg.

Auger Type

The auger type of elevator lends itself to simple construction. It is especially suitable for seed growers since it can be made to clean itself out quite thoroughly. Also the auger can be made to remove much of the awns of barley and oats by simply retarding the flow of seed from the hopper into the auger housing. The auger will convey grain best at an angle of about 45 degrees or less. More power and higher speed is required to convey grain at steeper angles. A four-inch auger turning at 300 r.p.m. will deliver up to 175 bushels or more per hour. A six-inch auger turning at 300 r.p.m. will elevate up to 400 bushels per hour. One to three horsepower is required, depending on the diameter and length of the auger.

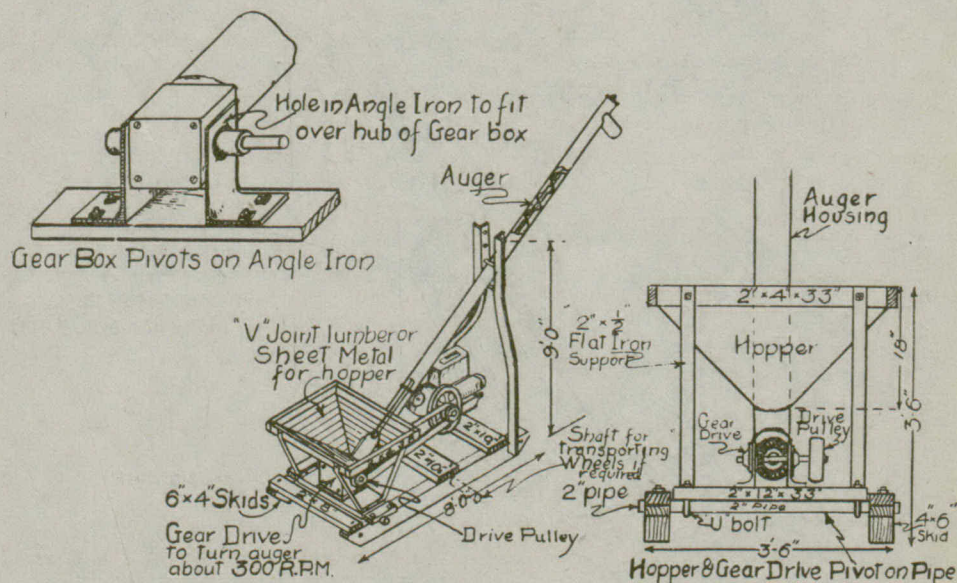


FIG. 2.—Auger type with variable height.

The auger elevator can be gear driven at the bottom or the top. It is of considerable advantage to drive it at the bottom since then it can be constructed so as to permit the auger to be raised or lowered to any angle. If a bevel gear enclosed in a suitable housing is used, it may be pivoted between two pieces of angle iron as shown in the sketch. The hubs of the housing (not the drive shaft) should then be supported in holes made in the angle iron as shown. Such gear drives with suitable housings may be found in old swathers and combines. When a suitable housed gear drive cannot be found, an ordinary open bevel gear drive, (with a suitable thrust bearing on the auger shaft next to the large

gear), can be mounted on a piece of 2 by 12 inch plank which is pivoted on a piece of 2-inch pipe or 1-inch shafting between the skids as shown in the sketch. The hopper then should be supported on the tilting plank so that the auger and the hopper can be raised or lowered together to any suitable angle. A feed gate to control the flow of grain from the hopper to the auger housing is required, also a slide opening should be made as low as possible in the bottom of the auger housing for use in cleaning.

Complete Elevator With Weigher

The complete elevator and weigher assembly as found on threshing machines or separators is ideal where it is desirable to obtain a record of the quantity of grain handled. This is often desirable when grain is being threshed, stored, marketed or used on the farm.

The complete elevating unit as shown in Figure 3 includes the bottom auger which conveys the grain to the bottom of the elevator leg and also the top delivery auger and housing, or a plain delivery pipe as found on elevators from older types of threshers. The weigher is also included. A wood or metal frame is constructed to take the place of the body of the old machine from which the elevator parts were removed. The complete elevator is then mounted on the frame in the same position as it was originally on the old machine. A hopper is built around the bottom conveyor auger. The entire assembly may be set on trucks as shown in the sketch or on skids. The length of the bottom sills may depend on the length of truck or trailer available and the height of the elevator. Skids or sills about 12 to 14 feet long should make the outfit stable and provide room for a 2 to 3 h.p. engine.

The top part of the frame should be large enough to accommodate a counter drive shaft if required and a platform for standing room when attending to the weigher, oiling, etc. The top delivery pipe or auger should have accommodation on the top platform to rest while moving or when not in use. A ladder (not shown in the sketch) fastened to a convenient place on the frame will make it easy to reach the top of the outfit.

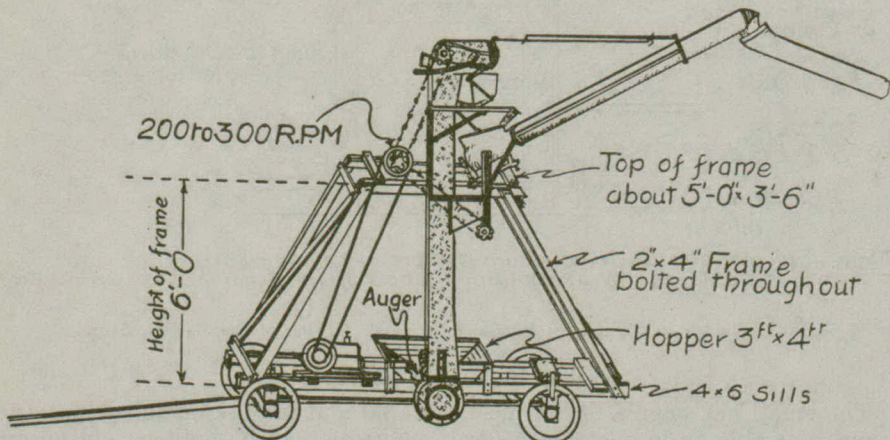


FIG. 3.—Complete elevator from an old threshing machine assembled on a frame which replaces separator body. Bottom grain auger, weigher and top auger conveyor included.

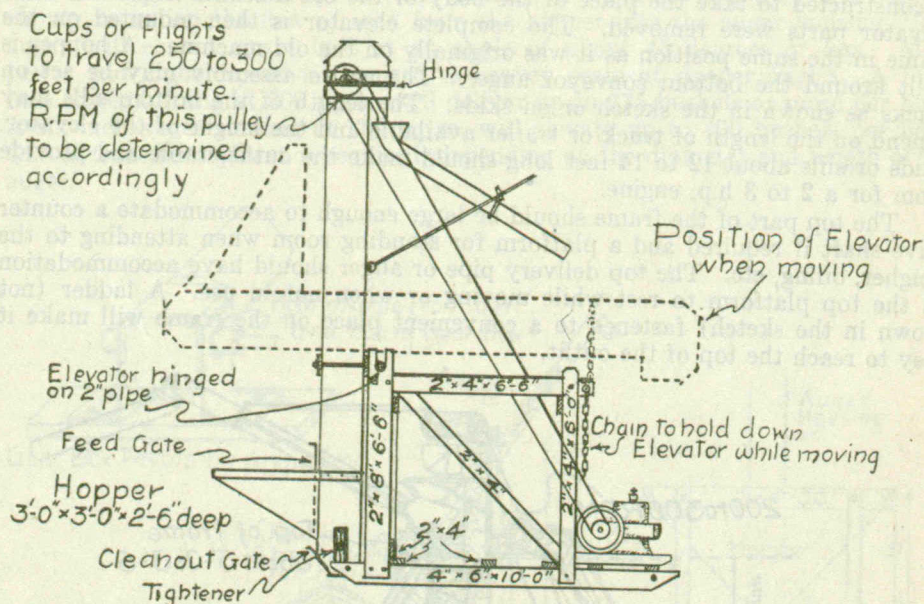
Cup or Flight Type Hinged on Frame

Cup or bucket type elevators are usually more suitable for permanent locations, especially in connection with seed cleaning plants where the capacity is not likely to exceed 200 bushels per hour when grain is being cleaned or processed. However, they can serve in many useful ways as portable elevators. The cups may be mounted on either belts or chains. When a belt is used, the elevator should be kept perfectly upright so that the cup belt will run true on the pulleys.

This is not quite so necessary when the cups are fastened to a chain. The bucket type of elevator should be driven from the top to prevent undue slipping of the belt. Also the larger the pulley in the head of the elevator, the less need will there be for running the cup belt unduly tight. The cups or buckets discharge the grain better when run over a large head pulley. A definite speed must be maintained to ensure the cups being emptied as they turn in travelling over the top pulley or chain sprocket. A bucket elevator having 6 by 4 inch cups travelling at 200 feet per minute will deliver about 5 bushels per minute. A 20-foot cup type elevator would require about 1 to $1\frac{1}{2}$ horsepower.

Figure 4 shows an arrangement for either a cup or a flight type elevator hinged on to a frame. The frame may be made of either wood or angle iron. The frame is $3\frac{1}{2}$ feet wide but should be made a little wider if the elevator exceeds 16 feet in height.

The elevator leg is clamped to a piece of 2-inch pipe with two long bolts and wood cleats. Holes should be drilled in the 2-inch pipe to which the bolts are fastened. The hopper is fastened to the bottom of the elevator leg. The entire elevator leg with the hopper may then be tilted on the frame horizontally when moving.



Note:- Elevator can be driven from bottom of elevator leg but best results are obtained when driven from top as shown in sketch

FIG. 4.—Cup or flight type hinged on frame. Width of frame 3 ft. 6 in.

Power for Grain Elevators

The small gas engine is the most suitable and most economical power for use with portable grain elevators. Grain elevators can be built on old automobile chassis. The automobile engine can then be used for power. The power can be taken from the propeller shaft to drive the elevator.

Tractor power take-offs can be used if a countershaft drive is used, to replace the small gas engine which is usually employed to drive the elevator. However, automobile engines and tractors would consume more fuel in elevating a given amount of grain and therefore would not be as economical as a small gas engine.

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