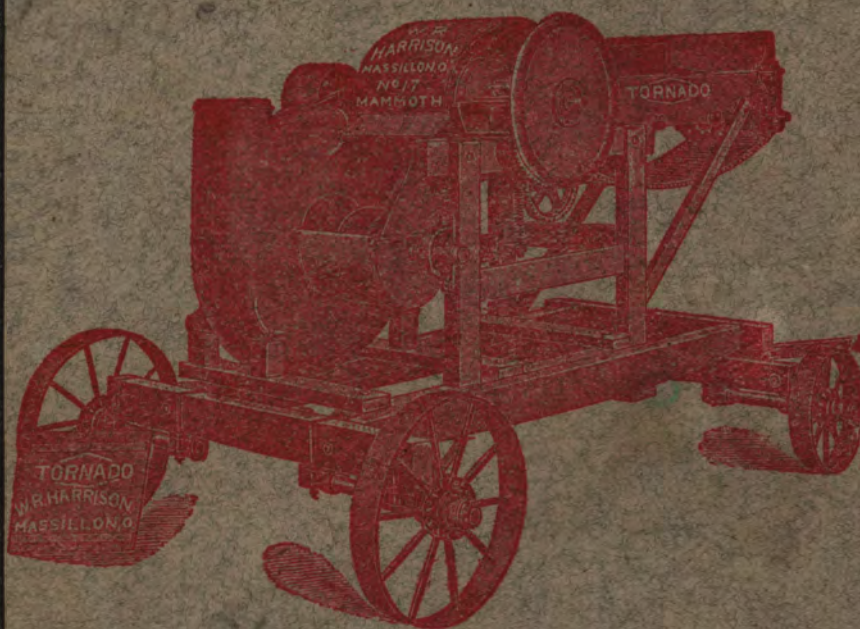


W. R. HARRISON & CO.

AGRICULTURAL WORKS

MASSILLON, OHIO



—MANUFACTURERS—

TORNADO

Feed and Ensilage Cutters and Silos

W. R. HARRISON & CO.

Feed and Ensilage Cutters, Carriers, Blowers, and Silos

I N presenting this—our new catalogue, to our old friends, as well as prospective customers—we desire especially to call your attention to the fact that we are now located in our new up-to-date factory building. It is equipped throughout with the most modern machinery obtainable for our particular purposes.

The very highest skill and care are taken in the designing and manufacture of our goods, and we offer them to the trade only upon their merits, which has created such a growing demand for TORNADO goods, and which has necessitated the enlargement of our plant when rebuilding, thus enabling us to meet the ever increasing demand.

We take pride in announcing to our customers that we are now in a position to offer them one of the most complete lines for the preparing and keeping of ensilage and forage materials at uniformly low prices, and desire to extend our thanks to our numerous friends for their liberal patronage of the past; also assure them, as well as all future customers, that we shall put forth our best efforts to give them prompt service and cheerfully answer all correspondence to the best of our ability.

W. R. Harrison & Co.

Ca 1900



CORN FODDER

Its Value, and How to Handle and Feed it to the Best Advantage and Greatest Profit to the Farmer

CORN Fodder has taken such a prominent place among rough feeds that the greatest effort has been put forth to discover and bring into general use the best modes of handling and the most economical methods of feeding it. Until within a few years past but little attention was paid to this matter, but the hay crop has become so uncertain that almost every farmer has learned that corn fodder is one of the best rough feeds for horses, cattle and sheep. It has been accurately determined by experimenters that the food value of an acre of corn fodder, properly taken care of and utilized, is as great as that of an acre of hay. Therefore, a thing to be wondered at is the careless manner in which many farmers handle and feed it. The proper utilization of the corn fodder means a saving of hay, which in turn is equivalent to many dollars in the farmer's pocket.

To secure the best results from corn fodder we suggest the following plan: Cut off and shock it as soon as you find it passing the roasting ear period, and before the frost has driven the sap from the stalks. Husk the corn as soon as possible, placing the fodder under cover. Next, have it run through a Tornado Feed Cutter, as needed. To give the best results in this direction, secure a large wooden trough having a closely fitted lid. Place the cut fodder into it as it may be needed for use, putting a small quantity of chopped feed or meal on it; then enough water to dampen the whole mixture, and then thoroughly stir with fork or shovel. In cold or freezing weather boiling hot water should be used, if possible, the lid put down, and the mixture allowed to steam and soak for about thirty minutes or more.

The value of the corn fodder is not in the blades nor in the husks, but in the stalks, as has been proven by so many of our farmers as well as by our different state experimental stations. Therefore, why not follow the above plan? If you do, you will realize that corn fodder is of more value as a feed, especially for producing a large flow of good, rich milk, than the best clover hay ever produced.

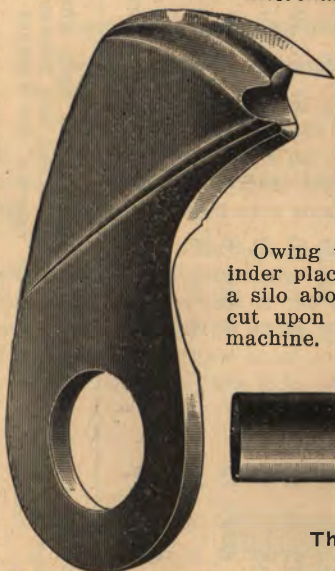
Tornado Cutting Devices

Three Different Styles of Cutting Cylinders, all of which are interchangeable, in the same Machine

The cutting arrangement of the Tornado, as shown in the accompanying illustration, is made up of a series of little knives following each other spirally on the shaft, which, when in motion, gives a spiral movement.

This cutting cylinder is most especially adapted to cutting dry fodder and green ensilage as the peculiar motion cuts, splits, and reduces the corn stalks to a soft pulpy condition, leaving no hard or sharp edges to hurt the mouth of the animal and cause sore gums.

Owing to the fine condition in which this cylinder places the material, there can be stored in a silo about 15 per cent. more silage than when cut upon an old style straight or twisted knife machine.



Single Knife or Section, as used on Cylinder.



The Tornado Cutting and Splitting Cylinder No. 1.

Our cutting cylinders are well equipped with patent safety flange on the fly wheel, which, when any foreign substance enters the machine, prevents serious damage by releasing the momentum of the wheel and stopping the cylinder instantly.

This style cylinder is adapted to any and all kinds of material, but in order to meet the demands of persons doing "job work," we have added the following styles of cutting devices, which are interchangeable with this cylinder.



Our Twisted Knife Cylinder No. 2.

Owing to numerous requests being made of us, from time to time, for a cylinder to cut certain materials very fine—finer than by our regular cutting device described above—we added this cylinder, which is especially adapted to cutting hay, straw, sheaf oats, alfalfa, etc., for which purpose we recommend it to all owners of TORNADO machines.



Our "Lightning" Shredding Cylinder No. 3.

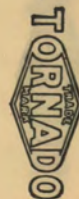
This is our latest product in cylinder construction, being manufactured under "patent pending" rights, and is conceded to be the most perfect exclusive shredding device upon the market.

It is adapted to the cutting of dry corn fodder, placing it in long slim shredded strips, and, as stated above, interchangeable with our other cylinders.

Our Sizes and How to Select Them

SIZE NO.	Power Required for Operating Cutters only See note below*	Estimated Time to Cut 1 Ton		Head of Stock Adapted to
		Dry Fodder	Ensilage	
		Minutes	Minutes	
6	Hand Power			1 to 4
8	" "			5 to 7
10 "C"	1 to 2 Horse Power	45		10 to 15
12 "D"	2 to 3 " "	40	20 to 25	15 to 20
15 "E"	4 to 5 " "	25 to 30	15 to 20	25 to 35
11 "K"	3 to 4 " "	35 to 40	20 to 25	15 to 20
13 "L"	4 " "	30 to 35	15 to 20	20 to 30
.....				
15 M Mammoth	5 " "	20 to 25	12 to 20	35 to 40
16 M "	4 to 5 " "	12 to 15	8 to 10	40 to 50
17 M "	6 " "	10 to 12	7 to 9	50 to 60
20 M "	8 " "	8 to 10	6 to 8	75 to 80
210 Mogul	8 " "	8 to 10	5 to 6	80 to 90
240 "	9 " "	6 to 8	4 to 5	90 to 95
270 "	10 " "	5 to 7	No Limit	100 or more

*Additional power is required when Chain Carrier or Blower is attached, the amount depending upon whether dry or green material is to be handled, style of the Carrier and the distance to be elevated. When this information is given us, we can advise as to power required and capacity. For power required to operate our Cutters with BLOWERS attached, see pages 8, 10, and 11.



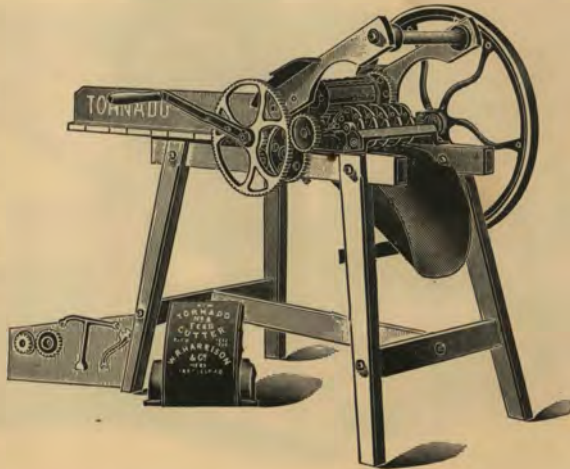
New and Improved No. 6 and No. 8 Tornado

Length of Cuts— $\frac{3}{8}$, $\frac{5}{8}$, and $\frac{7}{8}$ inches.

The $1\frac{1}{4}$ -inch cut is intended only for Hay and Straw. Use only the shorter cuts for Corn Fodder.

The Nos. 6 and 8 Tornado Cutters represent the two smallest sizes of Cutters in the Tornado line. We do not intend them for anything but hand cutting, although, at small additional expense, a power pulley can be attached to No. 8 and the machine operated by a small gas engine, windmill or light horse power.

For the small farmer, or those living in the city and having one or two horses and cows, these cutters are "just the thing." With one of these cutters the user can save its entire cost in one winter easily, as every particle of fodder cut on it is edible and there is no waste, as is the case with straight or curved knife cutters. It cuts hay and straw equal to any cutter on earth, while for fodder, nothing yet produced can approach it in efficiency.



For Hand Power.

DIMENSIONS, ETC.

Size	Length of Cutting Cylinder	Head of Stock Adapted to	Weight
No. 6	7-inch	3 to 4	185 lbs.
No. 8	9-inch	5 to 7	215 lbs.



Improved Nos. 10C and 12D

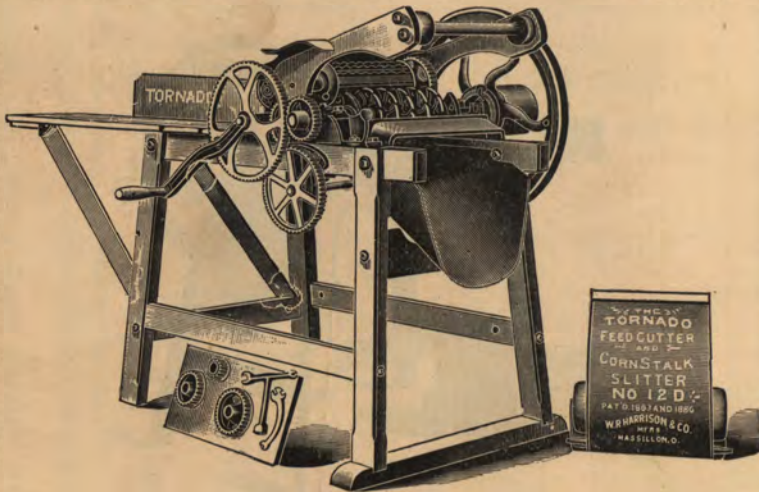
Combined Hand and Power.

Length of Cuts— $\frac{1}{2}$, $\frac{3}{4}$, 1, and $1\frac{1}{4}$ inches.

Speed of Cylinder—900 to 1000 revolutions per minute.

The Nos. 10C and 12D Tornadoes are built for combined hand and power use and are exceedingly well adapted to ordinary farm and dairy work. They are substantially constructed and easy running. When operated by hand they run just as easily as an exclusive hand machine, when cutting the same amount of feed, and except for the most limited requirements, we always recommend them in preference to the smaller machines, for the reason that an increase in stock, at same feeding cost, always follows the use of a Tornado, consequently a small hand machine in course of but a short time proves too small.

As regularly built, the Nos. 10C and 12D are arranged with Fly Wheel and Pulley on left hand side only, or side opposite crank handle. When SO ORDERED we can, at an additional price, furnish these cutters so that pulley and fly wheel can be attached to either side. This style we term "DOUBLE HEADERS." Any of our carriers can be attached to the Nos. 10C or 12D. Can also furnish them with stop-feed arrangement at additional cost.



Hand and Power Cutters.

DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length of Cutting Cylinder	CAPACITY—Estimated when Operated by Power		Power Required NOT Including Carrier	Weight
		Dry Fodder	Ensilage		
10 "C"	11-inch	1 Ton 45 Min.		1 to 2-Horse	350 lbs.
12 "D"	13-inch	1 Ton 40 Min.	1 Ton 20 to 25 Min.	2 to 3-Horse Furnished with Blower for Dry Fodder Work	

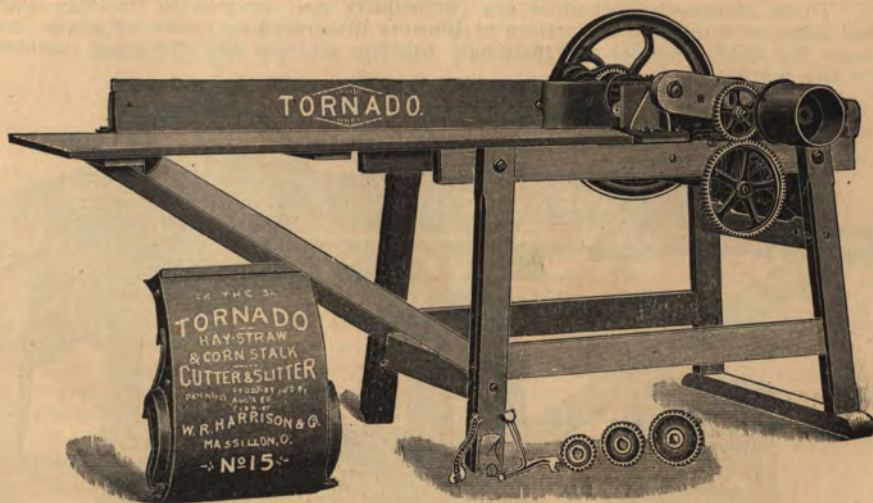
No. 15E Tornado

THIS machine is a strong, substantially constructed, medium-sized power cutter, with a capacity sufficiently large to meet the requirements of the majority of farmers or dairy men. With its spacious and handy feed table, heavy gearing and interchangeable fly wheel and pulley, allowing it to be driven from either side, it makes one of the most popular sizes of the Tornado Line. Either of our two styles of Chain Carriers, also Traveling Feed Table, can be attached to the No. 15E. (See No. 15 Mammoth Tornado, page 9.)

Length of Cuts— $\frac{1}{2}$, $\frac{3}{4}$, 1 and $1\frac{1}{4}$ inches.

Speed of Cylinder—900 to 1,000 revolutions per minute.

Not furnished with stop-feed.



For Power Only.

DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length of Cutting Cylinder	CAPACITY—Estimated		Power Required NOT Including Carrier	Weight
		Dry Fodder	Ensilage		
No. 15E	16-inch	1 Ton in 25 to 30 Min.	1 Ton in 15 to 20 Min.	3 to 4-Horse Not furnished with Blower	550 lbs.



Our Mammoth Tornado

Their Special Features and Advantages.

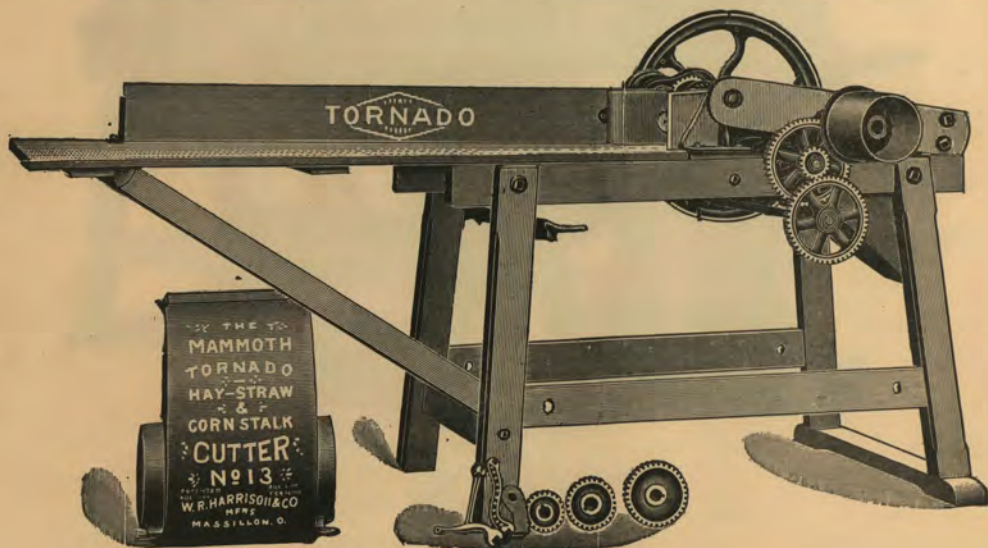
Our "Mammoth" Tornado line is made to meet the demand for a strong, heavy, and durable machine for heavy and continuous cutting, and for Ensilage work. This line comprises the Nos. 11M, 13M, 15M, 16M, 17M, 19M, and 20M, as shown on the following pages.

The frame work is of the best seasoned oak and very heavy. The Cutting cylinders are also increased in diameter and strength. The gearing is heavy and wide faced and of an improved arrangement.

The Mammoth Tornado Cutters are also provided with a Clutch Gear or Stop Feed, by which the feed rollers can be instantly stopped from either side by means of a lever directly in front, and within easy reach of the operator. This obviates the necessity of passing around or the danger of reaching over the machine, as is the case in other Cutters provided with upright shifting levers, etc.

The pulleys and fly wheels of the "Mammoth" Tornado line are interchangeable, thus allowing the machine to be driven from either side. The fly wheels are provided with our Perfection Safety arrangement found in all Tornado Cutters and described on page 3.

These Mammoth Tornadoes are particularly well adapted to Ensilage work, and fitted with our Chain Carriers or Blowers illustrated on following pages, they make the most practical and up-to-date Ensilage Cutting and Elevating machines on the market.



DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length of Cutting Cylinder	CAPACITY—Estimated		Power Required		Weights	
		Dry Fodder	Ensilage	Cutter only	With Blower	Cutter only	Cutter and Blower
No. 11M	13-inch	1 Ton in 35 to 40 Min.	1 Ton in 20 to 25 Min.	2 to 3-Horse	5 to 6-Horse	500 lbs.	800 lbs.
No. 13M	15-inch	1 Ton in 30 to 35 Min.	1 Ton in 15 to 20 Min.	3 to 4-Horse	6 to 8-Horse	560 lbs.	975 lbs.
No. 15M	16-inch	1 Ton in 20 to 25 Min.	1 Ton in 12 to 20 Min.	4-Horse	*	575 lbs.	*

*Not furnished with blower.



Nos. 11M, 13M, and 15M Mammoth Tornado Cutters

THE cut on opposite page represents the first three sizes of our "Mammoth" Tornado line, viz.: Numbers 11M, 13M, and 15M. Hand attachment is furnished only with the Nos. 11M and 13M when so ordered and at additional cost. The No. 15M "MAMMOTH" Tornado is an exclusive power machine. No hand attachment is furnished for it. In appearance it resembles very much the regular No. 15E Tornado shown on page 7, except that it is heavier in every way, supplied with the Stop Feed arrangement, as are also the Nos. 11M and 13M sizes, and in other ways conforms to the balance of the "MAMMOTH" line. The 11M, 13M, and 15M Mammoth Tornadoes can be fitted with either of our Carriers, also Traveling Feed Table, and Nos. 11M and 13M are furnished with Blower.

Length of Cut— $\frac{1}{2}$, $\frac{3}{4}$, 1, and $1\frac{1}{4}$ inches.

Speed of Cutting Cylinder—900 to 1,000 revolutions per minute.

Reasons Why the Tornado is Superior to All Others

It is Simple in construction. Few parts and all of easy access, make ease of operation and durable.

Has Large Capacity and Ample Strength. Will cut more feed in less time and with less power than any other cutter.

Has Positive Self-Acting Feed Rolls which insure regular and even feeding at all times. When the stalks are once caught between the feed rolls they cannot be pulled out or back, but continue to pass on through without other assistance.

Has improved Knife Blades and Cutting Device, working independently and cutting continuously, avoiding all jar and strain on the machine.

Has Adjustable Cutter Bar and Stripper Bar. The Shear Plates can be removed and reversed, and the entire Cutter Bar adjusted in an instant. The Stripper Bar acting on the Lower Feed Roller prevents clogging and choking.

Has Reversible Shear Plates which are so made that by adjustment the knives will always cut squarely against them.

Has improved Safety Fly Wheels and Pulleys which prevent accidents. Hard substances entering the cutters and cylinder, stop the cylinder, allowing the fly wheel to run free until the power is shut off.

The "Tornado" Cutter is the only machine of its kind which will cut hay, straw and corn fodder all equally well, and the only kind which prepares corn fodder so that the full value is obtained for feeding.

It is the only cutter that cuts and splits the corn stalk and leaves it in a nice, soft, pulpy condition, without any sharp edges to make sore mouths.

It is the only cutter that is absolutely safe to run at a high speed.

It is the only cutter in which the knives can be sharpened without removing any part of the cutting apparatus, and is therefore the quickest and easiest sharpened of all cutters. It is sharpened by simply filing the inside edge of each knife, all of which can be done in one-half the time required to unbolt, grind, and replace the old-style straight or curved knives.

We furnish our "TORNADO" Cutters with either or all of the following different kinds of Cutting Heads, viz.: Our regular "TORNADO" combined Cutting and Splitting, our late improved Shredding, and our long twisted Knife Head.



Nos. 16M and 19M Mammoth Tornadoes

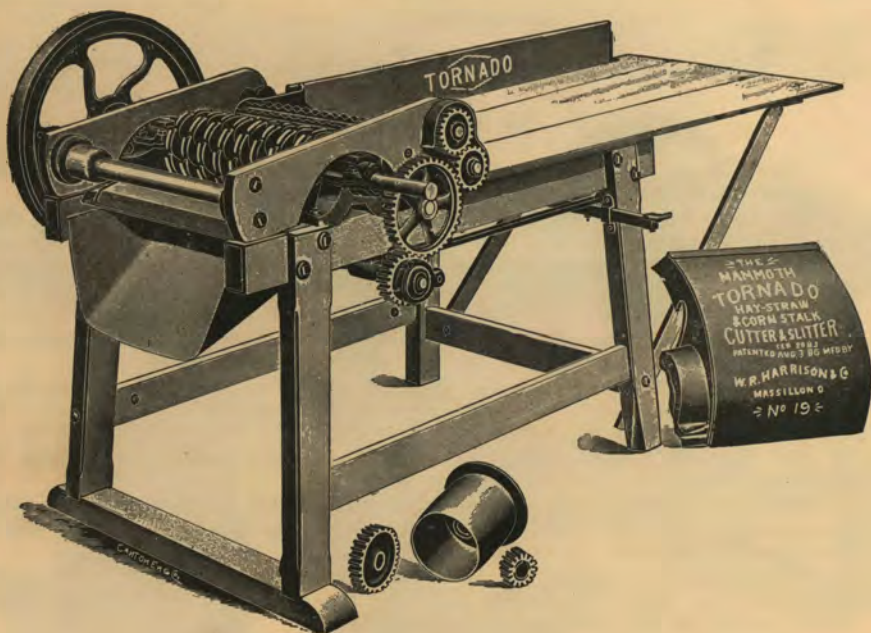
POWER ONLY

THESE machines as shown by the following table are of large capacity, substantially constructed, and well adapted to extensive farm or dairy use.

Like the balance of the "MAMMOTH" line, they are provided with large and spacious feed tables, interchangeable fly-wheels and pulleys, and the stop-feed arrangement. They can be fitted with Traveling Feed Tables and any of our chain Carriers. No. 16M is furnished with Blower.

Length of Cut— $\frac{1}{2}$, $\frac{3}{4}$, 1, and $1\frac{1}{4}$ inches...

Speed of Cutting Cylinder—1,000 to 1,200 revolutions per minute...



DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinder	Capacity—Estimated		Power Required		Weights	
		Dry Fodder	Ensilage	Without Blower	With Blower	Cutter Only	Cutter and Blower
No. 16M	16-inch	1 ton in 12 to 15 min.	1 ton in 8 to 10 min.	4 to 5 H. P.	8 to 10 H. P.	750 lbs.	1250 lbs.

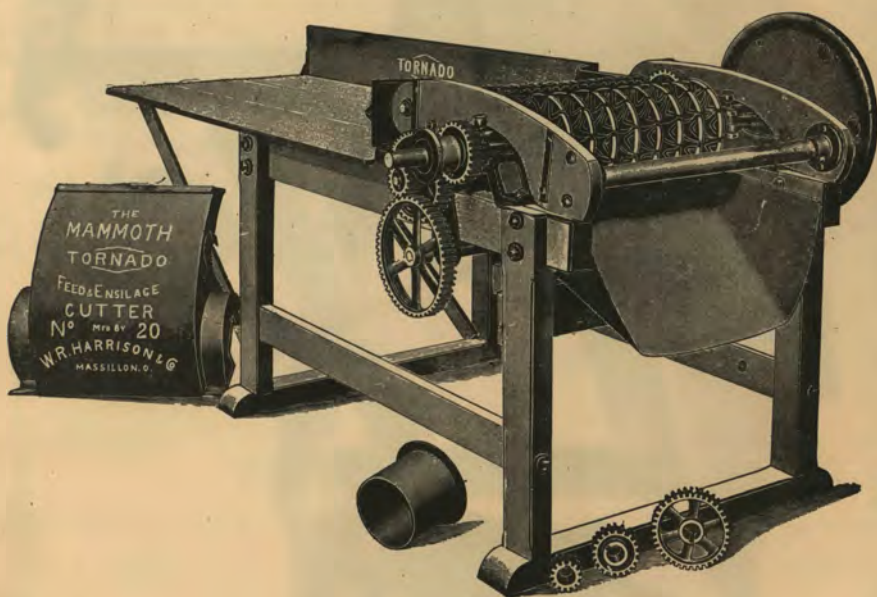
Nos. 17M and 20M Mammoth Tornadoes

POWER ONLY

THE Nos. 17M and 20M "Mammoth" Tornadoes shown by this cut are the latest addition to our "Mammoth" Tornado line. They are built somewhat after the style and pattern of the Nos. 16M and 19M, but are much heavier and stronger. The gearing is extra heavy and wide faced, and the cutting cylinders, besides being one inch longer than the Nos. 16M and 19M cylinders, are also 10 inches in diameter, two inches greater in this respect than the Nos. 16M and 19M cylinders. These machines are fitted with large feed tables, interchangeable fly-wheels and pulleys and the **stop-feed arrangements**. Traveling Feed Tables can also be attached, and when fitted with our Chain Carriers or Blowers, these machines make the finest Feed or Ensilage Cutting and Elevating outfits yet put upon the market.

Length of Cut— $\frac{1}{2}$, $\frac{3}{4}$, 1, and $1\frac{1}{4}$ inches.

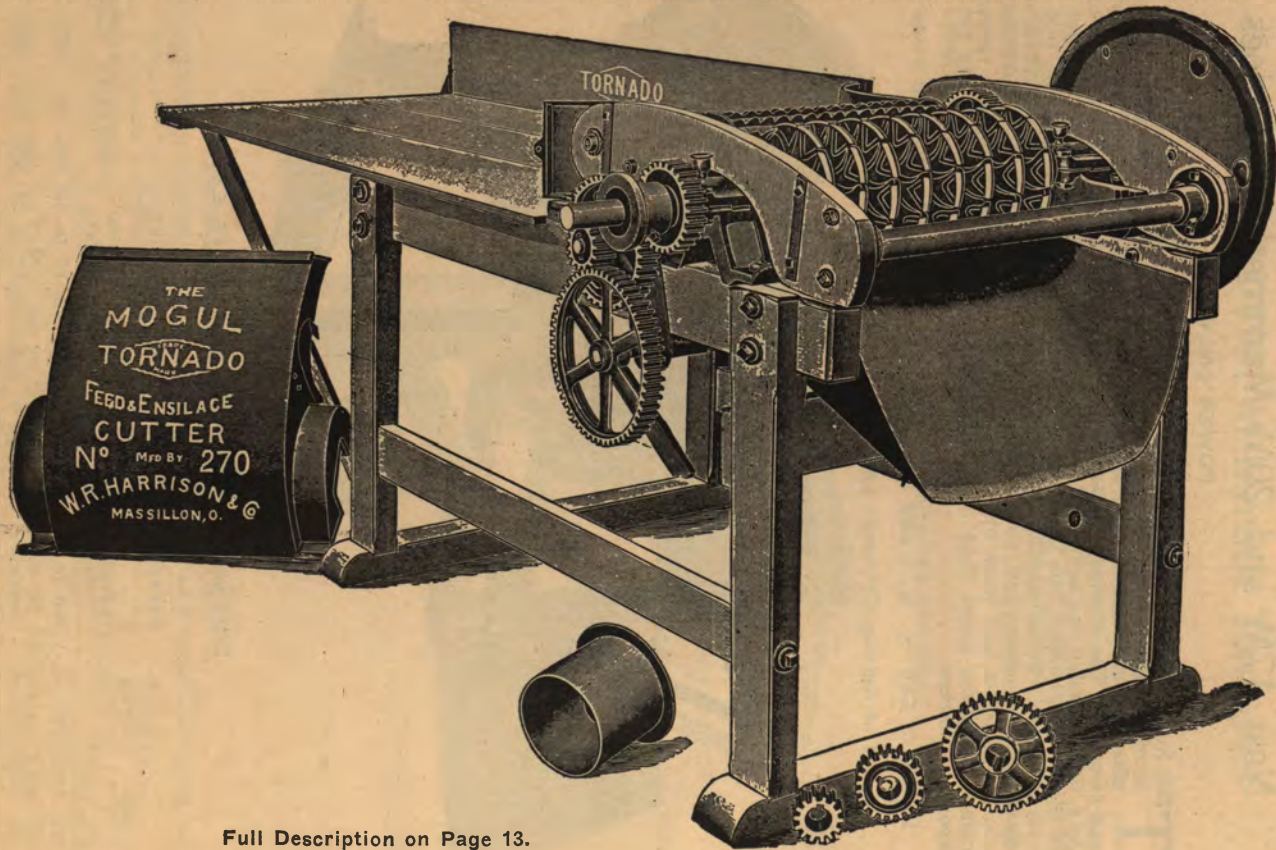
Speed of Cutting Cylinder—1,000 to 1,200 revolutions per minute.



DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinder	CAPACITY—Estimated		POWER REQUIRED		Weights	
		Dry Fodder	Ensilage	Without Blower	With Blower	Cutter Only	Cutter and Blower
No. 17M	17-inch	1 ton in 10 to 12 min.	1 ton in 7 to 9 min.	6 Horse	10 to 12 H. P.	880 lbs.	1375 lbs.
No. 20M	20-inch	1 ton in 8 to 10 min.	1 ton in 6 to 8 min.	8 Horse	12 to 14 H. P.	950 lbs.	1450 lbs.

Nos. 210M, 240M, and 270M Mogul Tornado Cutter



Full Description on Page 13.



Nos. 210, 240, and 270 Mogul Tornadoes

FOR POWER ONLY

These Sizes furnished with our Straight Away or Direct Carriers only.

THE cut on the preceding page represents our "Mogul" Tornado made in three sizes, viz.: Nos. 210, 240, and 270. A description is partially conveyed by the name. They represent the extreme in feed cutter construction and exceed in size, capacity, and strength, anything that has yet appeared on the feed cutter market. They are, of course, too large in capacity and requisite power for the average farmer, and we have added them to our already large line, to meet the demand of those who must have a machine of sufficient size and strength to take in Dry Corn Fodder or Ensilage Corn as fast as it is possible to feed it. The "Mogul" Tornado is especially adapted to parties wanting a machine that will readily take full bundles, although we have always maintained that it is advisable to remove all twine, etc., from the bundles before putting through the machine, as such are certainly not fit to enter into the daily diet of cattle, to whose welfare in other directions great attention is usually paid.

The "Mogul" Tornado is also intended and built for parties who make a practice of cutting for others, who generally want the corn to be taken care of as fast as a large force of hands can get it to the machine.

Length of Cut— $\frac{1}{2}$, $\frac{3}{4}$, 1, and $1\frac{1}{4}$ inches.

Speed of Cutting Cylinder—1,000 to 1,200 revolutions per minute.

DIMENSIONS, CAPACITIES, ETC.

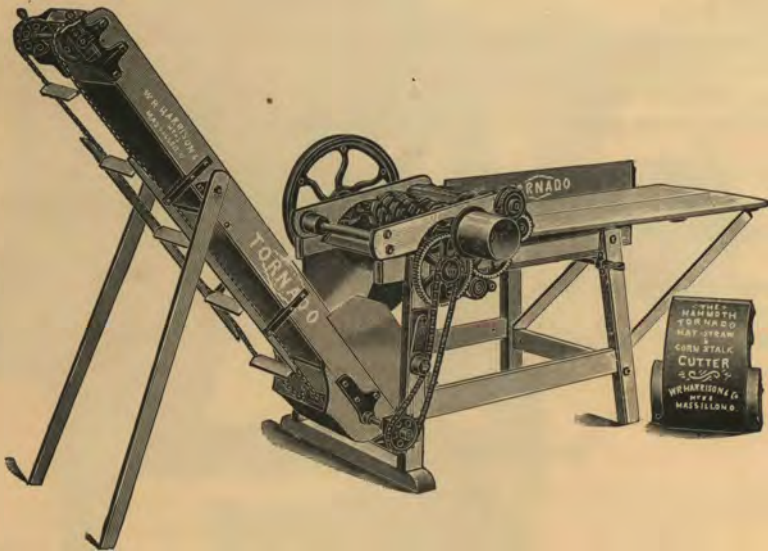
Size	Length Cutting Cylinder	Capacity—Estimated		Power Required Not Including Carrier	Weight
		Dry Fodder	Ensilage		
No. 210	21-inch	1 Ton in 8 to 10 min.	1 Ton in 5 to 6 min.	8-Horse Power	1400 lbs.
No. 240	24-inch	1 Ton in 6 to 8 min.	1 Ton in 4 to 5 min.	9-Horse Power	1500 lbs.
No. 270	27-inch	1 Ton in 5 to 7 min.	1 Ton in 3 to 4 min.	10-Horse Power	1600 lbs.

Every Tornado machine is thoroughly inspected before shipment and every precaution taken to safeguard the purchaser against defects and delays.



This Cut Shows the Tornado With Our Direct or One-Way Carrier

Can be Attached to any of our Power
Cutters, from 10C to 270M, inclusive.



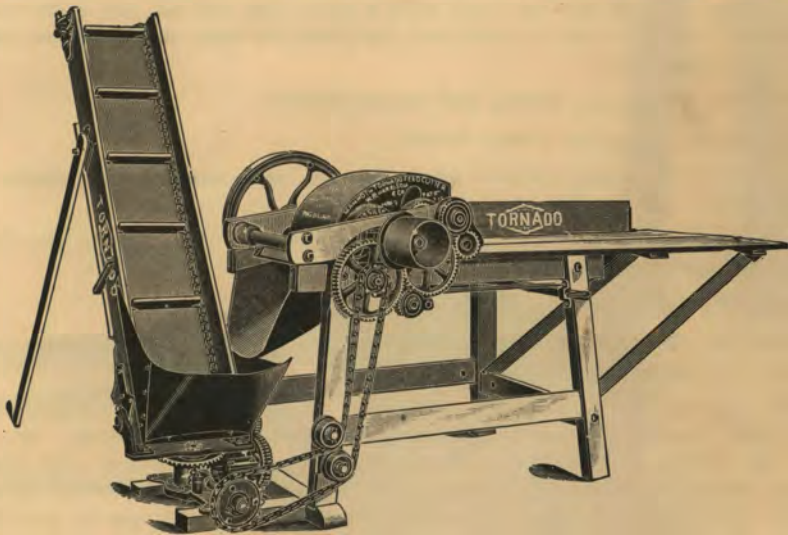
THE simplest and easiest running chain carrier made. Gearing and friction reduced to a minimum. An excellent general purpose carrier. Delivers straight away only, but there are very few places in which it cannot be used. Furnished for any TORNADO Cutter from No. 10C up.

No other firm can offer such inducements in way of styles, sizes, or prices. Close observation of the description in this catalogue, and special prices which we are now offering, will convince any man of the truth of these claims.

This Cut Shows the Tornado With New Swivel Carrier Set to Deliver to the Right

IMPPROVED FOR 1913.

Can be attached to any sizes
from 10C to 270M, inclusive.



TO produce a Swivel Carrier that would give satisfaction has been an unsolved problem from the time such carriers were first attempted until we solved it recently, when we produced the Swivel Base, as shown in this illustration. Previously, almost every carrier of the Swivel type gave trouble, owing to the bevel gear construction. We, however, have applied to our Swivel Bases a gear construction that is entirely new in its mechanical principle, and, after several years of severe tests, we find it perfect in every particular. Since first using this construction, we have not had a single complaint, nor do we know how we can improve it, and assure our friends that the Tornado Swivel Carriers have reached the climax of perfection. Get our prices on one of these outfits.



Tornado Blowers

(SEE CUT OPPOSITE PAGE)

MANUFACTURERS of Feed Cutters have for years given careful thought to the question of "Blowers" for elevating cut feed and ensilage, and that they are the successful means of conveying ensilage from the cutter to the silo is evidenced by the fact that practically all manufacturers of cutters also offer a blower. "TORNADO" Blowers, however, are not "a" Blower, but "the" Blower. By actual tests they have been proven superior in quality and more economical to operate than any other.

The cost of operation of machinery is largely in the item of power, and "TORNADOES" are the lightest running of any, and, therefore, by saving power they save money. Almost any one could build a cutter that will cut, and a Blower that will blow, if enough power is furnished, but there are other considerations besides cutting and blowing.

FIRST.—You want a Strong and Durable Blower.

SECOND.—You want a Safe Blower.

THIRD.—You want a Blower whose separate parts are easy of access and convenient.

FOURTH.—You want an ensilage outfit which puts the silage in your silo in the best shape and condition.

FIFTH.—You want an outfit of large capacity.

SIXTH.—You want an outfit that will last you at least until it has done enough work to have more than earned its cost.

We say the "Tornado" is the only cutter and blower which combines these requisites. Compare its construction with other makes and then decide. We claim that the cutting device and the blowing device should be separate and distinct, driven separately so that the strain of the one is in no way reflected upon the other. It is the Blower whose knives, splitters, fan flights, etc., are all attached to one wheel and shaft, which becomes dangerous.

With the "Tornado," however, should anything go wrong with the one it does not necessarily damage the other and cause serious and even dangerous accidents and smashups.

Besides, with the "Tornado" type of Cutter and Blower every nut, bolt, casting, etc., is easily accessible, can be removed and put back at will, and saves enormous cost and trouble in handling.

With our Cutters you can put 20 per cent, more tons of silage into a silo than with any other make of cutter, owing to the fine condition into which the knives put the corn stalks.

We will gladly give detailed information upon request.

Belt or Drive Side of Cutter and Blower With Traveling Table Mounted on Truck

Showing Flexible Distributor Pipe.

Furnished in Six Sizes, viz.:

Nos. 11B, 12B, 13B, 16B, 17B, and 20B.



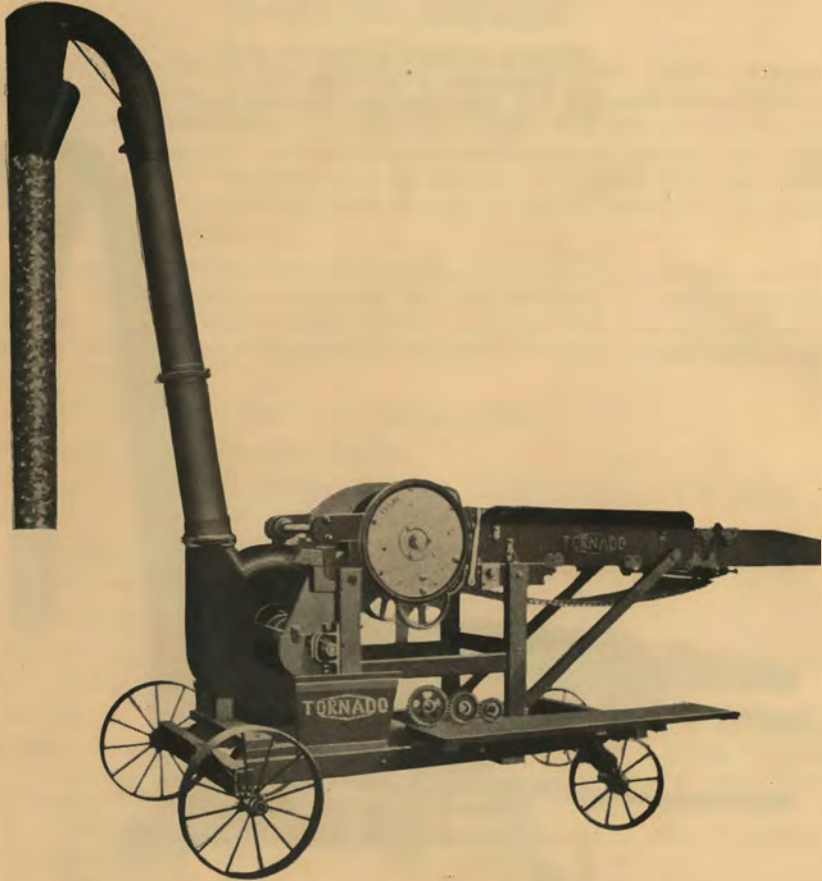
Approximate Weight, 2,000 Pounds.

THE above is an exact reproduction of our 1913 Low Down "Tornado" Cutter and Blower Outfit complete, with Traveling Feed Table and Mounted on Truck. If the purchaser so desires, we can furnish the Tornado with flat, stationary feed table and without being mounted. The cheapness of these additional facilities, however, warrants the average purchaser in having a complete outfit, especially when convenience is taken into consideration.

As to capacity and required power to operate these Blower outfits, see tables on pages 8, 10, and 11.



Platform or Feeding Side of Blower Outfit Showing The Tornado Ensilage Conveyor and Distributor



THIS IS THE LATEST ADDITION to our already complete equipment for the preparing and keeping of ensilage. It is the result of careful study and scientific work to perfect a distributor that will meet with the approval of the most exacting person, who is not satisfied with anything but the very ACME of PERFECTION.

It is made of extra heavy galvanized steel reducer pipes in three-foot sections, being joined together by means of heavy chains with snap hooks, which makes it very easily operated and easy to handle. The ends of each section are re-inforced or strengthened, which enables this distributor to withstand the heavy strain and wear of silo filling.

This Conveyor and Distributor can be attached to any one of our several different sizes of silo filling outfits. It is a marvel of efficiency and simplicity, and a saver of time, labor, and money. It also eases the work for the man on the inside of the silo, and will give you a better quality of ensilage.

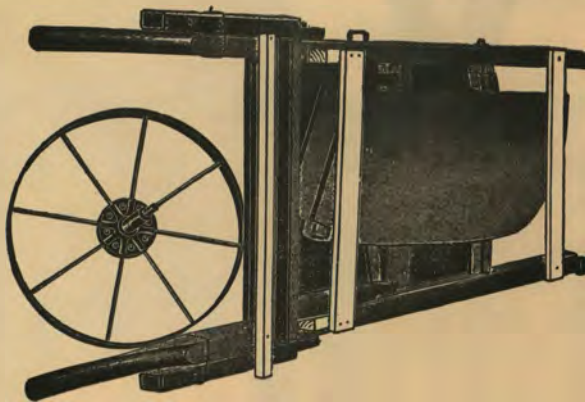
Tornado Hand-Made Wheelbarrows

(Set Up Ready for Use.)



MADE IN FOUR SIZES.

Our Barrows are Strong, Neat and Durable. Constructed of perfectly seasoned white oak or ash, thoroughly painted with genuine white lead and pure linseed oil. Iron wheel with iron axle. Legs well braced with half oval iron. Frame firmly held together with two half-inch iron bolts extending across from handle to handle. Every farmer, gardener, or other person wanting a good strong barrow should have a "Tornado." Write us for prices. Shipped knocked down.



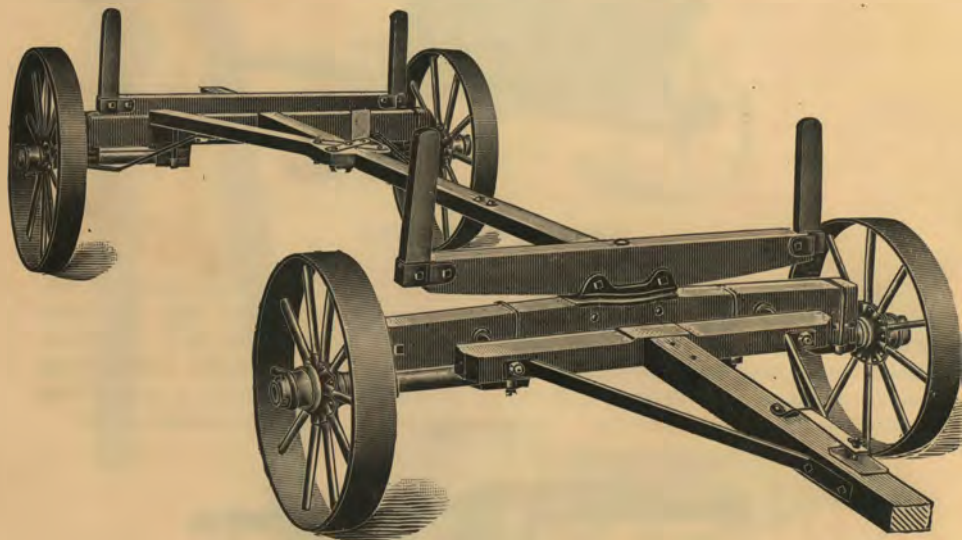
K. D. Packed Ready
for Shipment.

As shown in "cut," we are prepared to ship our wheelbarrows "**Knocked Down Fat and Packed,**" thus securing the very lowest rates of freight possible, besides saving three-fourths of the storage room required when set up or packed the old way. Hereafter shipments of our Barrows will be made as above shown and described, unless ordered set up.



Tornado Farm Truck

Herewith we illustrate our splendid line of Low Down Farm Trucks or Wagon Gears. The "Tornado" Gear is a splendid outfit for ordinary farm purposes, such as the hauling of manure, of ensilage to the cutter, in fact for all such purposes. It is just the thing for a light and serviceable wagon and can be offered to the purchaser at a very moderate cost. Especially adapted for mounting our Tornado Cutters



Dimensions and Capacity in Tons of Tornado Silos

The following is only a partial list of the many different sizes of silos we manufacture. Do not fail to write for our latest 1913 Silo Catalog.



Outside Diameter in Feet	Height in Feet	Approximate Capacity in Tons	Outside Diameter in Feet	Height in Feet	Approximate Capacity in Tons
10	20	28	16	24	90
10	24	35	16	26	100
10	26	40	16	28	110
10	30	48	16	30	118
12	20	40	16	32	130
12	24	50	16	34	140
12	26	56	16	36	150
12	28	62	16	38	160
12	30	70	18	28	140
12	32	78	18	30	152
14	26	76	18	32	164
14	28	85	18	34	176
14	30	95	18	36	188
14	32	107			

Ration per Day—For full grown animal, 40 lbs.

To Ascertain Capacity of Sizes not given above, multiply the diameter by the height, this by one-fourth the diameter, and divide by 16, which will give you the capacity in tons.

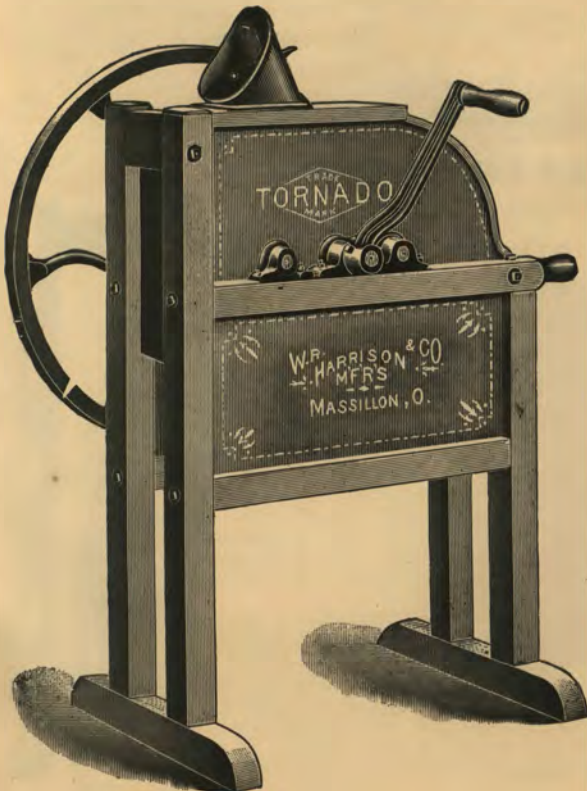
Tornado Lever Cutter

We illustrate herewith our Tornado Lever Cutter. A strong, durable hand cutter. Cuts very easily, has large capacity; gauge plate to regulate length of cut; also a new device by which the knife is held up close to the shear plate, thus always insuring a full, clean and easy cut. The lever can be readily removed and the knife ground without detaching it from lever.



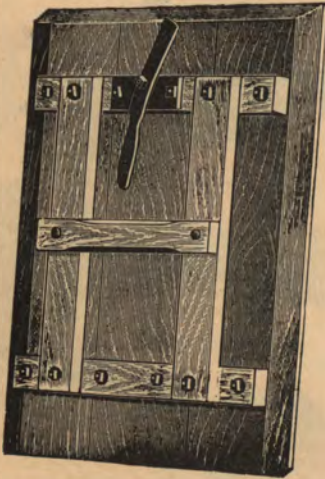
The Famous Tornado Corn Sheller

This cut represents our New Corn Sheller, a new addition to our Famous Line of TORNADO Farm Machinery. This sheller is unquestionably the best ever put on the market in this pattern. Material is all selected, gears of heavy and wide teeth, finish of the very best, general struction and workmanship the finest that can be turned out.





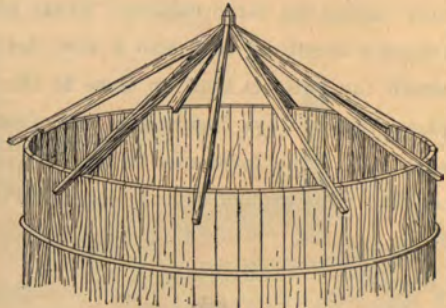
Salient Features in the Construction of Tornado Silos



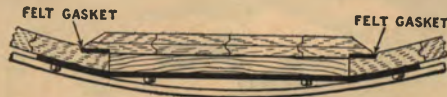
Sectional View of Door.



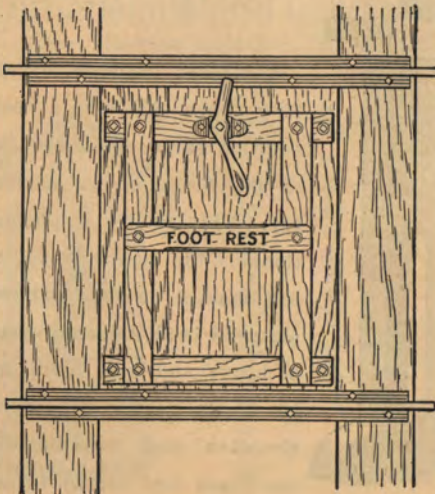
Malleable Connecting Lug.



Sectional View of Top.



SECTION & PLAN OF DOOR



FRONT ELEVATION OF DOOR.



Door Partly Closed.

Ensilage and Silos

AS to the value of Ensilage as a feed there is no longer any doubt. Instead of being employed only as a winter feed, there are many now who find it very profitable to feed it during the mid-summer months. When properly put up and kept in a good silo, it is undoubtedly a very profitable food. Every one familiar with the subject knows that the proper keeping of Ensilage depends upon keeping the air out and the gas in. The carbonic acid gas is a result of fermentation and must be retained in the silo, so that this process of fermentation is not carried too far. The air must not come in contact with the silage, otherwise a process similar to putrefaction sets in, the ensilage takes on a musty, green, moldy form, and a large part, if not all of it, is rendered unfit for food. To assist in avoiding conditions which will bring about the above results, we claim the ensilage should be put in as fine (not coarse) condition as practicable, so that it will pack as closely and tightly as possible. It is not necessary to be told by a scientist that the tighter and closer the ensilage can be packed and settled, the greater will be the exclusion of air. Here is where the Tornado Ensilage Cutter comes to the rescue. By virtue of its peculiar cutting device shown on page 3, it is enabled to put the Ensilage Corn in a much finer condition than that prepared upon any other cutter or shredder. We thus eliminate one of the greatest dangers, by putting the ensilage in such shape that by its own consistency the air is excluded. By then providing a good silo, to prevent the air from gaining admission from the bottom, and to retain the generated gas inside, you have met all the conditions necessary to have a supply of good succulent ensilage that will retain intact all its valuable food properties.

The forms of silos are many, but it is only fair to say that the Stave or Tubular Silo seems to have the preference. It not only costs less to construct generally, but also has the advantage of doing away with all corners, through which there is always more or less liability of ingress of air. The round silo also facilitates the settling of the ensilage. So much has been published by the leading farm and dairy journals on the subject of silo building that we deem it unnecessary to go further into details. We give on page 21 a table which will be of assistance in determining the size of silo necessary.

Ensilage---Its Advantages and Uses

THE great danger to American agriculture is the loss of fertility. Too much cropping, too little manure. Thus our soil becomes bare, our crops meagre, and in the intense "struggle for existence" we go to the wall. What we most need---what we must have---is more fertilizers. The cheapest, and by far the best fertilizer, for the great majority of our farmers, is barnyard manure. He who secures the most of this will win the race. To secure this barnyard manure we must keep stock---cattle, sheep, hogs, and horses, and the more the better. From our experience we are free to say that with a large silage properly secured we can increase our stock one-half. Many say the stock can be doubled. If the silage can be made a safe and healthy ration the year through, as we think more than probable, thus superseding the wasteful system of pasturing, then surely the last estimate made above is entirely within limits. We thus score one---a tremendous one---for silage. Double the stock; double the manure; double the fertility double the production.

Silage is much more digestible than dry food and thus the beef animal fed on it looks more sleek and lays on fat faster; the milch cow gives more and better milk; all animals, cattle, horses, sheep, and hogs; thrive upon it, and are more thrifty and healthy, because it ministers to their every need. Dairymen of the highest intelligence who know their business from A to Z. all unite in the assertion that it adds decidedly to both the quantity and quality of the milk. Silage serves the need of the animal, and so pushes growth, lays on fat, fosters health, and increases milk and butter as no dry food can do.

Write us for our Special Silo Catalogue giving particulars.



Hints on Silos and Silo Building

Compiled from "Ohio Farmer," "Rural New Yorker," "Hoard's Dairyman," and "Cornell Bulletin."

BEFORE giving plans for the silo building in detail it will be well to understand that however built, whatever the material to be put into it, the building and filling must conform to some general laws from which there can be no departure. Differently constructed silos are but different ways of reaching the same end. True it is that silo building has been an evolution, but it has been in the construction and not a change of a fundamental law. At the start silo building made slow progress, because it was supposed that the structure must be of stone with massive walls, but when it was found that a thickness of inch board was as good protection as stone or mortar, if not better, the wooden silo came in with a rapid stride. Still they all involve the one general idea, protection of the contents from air.

As the contents of a silo must undergo what is called the heating-up process, or of fermentation, three things must be counted upon as essential in silo building. First, it must be of material that will prevent air from gaining access to the silage; the walls must be practically perpendicular, so as to permit the silage settling without friction or "lugging," and, once fermented and cooled off, there must not be a fresh admission of air to bring in new swarms of fermentive germs, to start a new fermentation, which in this case means decaying silage and great loss. The process of fermentation is akin to the process of digestion, and after the first "curing" has been gone through it is important that the air be excluded to prevent mold and putrefaction.

The plan for building a silo must include a smooth, perpendicular wall in order that the silage may settle evenly and without creating air space below.

The stave silo, hooped stoutly, seems to have the preference, and is being built more largely than any other style or plan. It is a great economizer of lumber, is as strong as the divided hoops will make it, has no corners or frame, is as good a protector of its contents as any, and is easily made, and if needed elsewhere, is readily taken down and rebuilt provided the staves are numbered before removing.

The durability of silos has been reported variously, some having withstood exposure and wear for twelve or more years, while others have rotted in three years. The Tornado Silos are built so that as soon as the silage is removed they may be ventilated, allowing them to dry out, thereby preserving the material and lengthening the life of the silo.

The size of the silo is important. Up to within a couple of years the idea was to build just large enough to afford six months' feeding, but now there is an enlargement of the plan, as it is found by exhaustive trials that silage in the summer is the most effectual soiling crop yet tried, and surest. The man who has silage in the summer to feed with pasturage is independent of the feed seller, and nothing will hold the cows up so from shrinkage.

So there is a larger planning, more silage capacity, either in larger silos or in more smaller ones, now that the tub silo is much in evidence. The old allowance of $4\frac{1}{2}$ tons per cow, allowing for wastage, is now made larger, and 6 tons per cow is supposed to be about right, so as to give her a ton and a half in mid-summer. The capacity of the silo is quickly ascertained by estimating that a cow will need a cubic foot of silage a day. This for 180 days would be a little over 4 tons, and 45 pounds to the foot would make it necessary to provide about 200 cubic feet for each cow; so multiply the number of cows by 200 cubic feet, and build the silos to hold correspondingly. We append a table on page 21 giving the dimensions and capacity in tons of our Tornado Round Silos.



**The
TORNADO**