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W. R. HARRISON & CO.

Agricultural Works

MANUFACTURERS OF

THE TORNADO

Feed and Ensilage
Cutters and Carriers,
Horse Powers, Etc.

MASSILLON, OHIO

W. R. HARRISON & CO.

AGRICULTURAL WORKS.

MANUFACTURERS OF

TORNADO FEED AND ENSILAGE

CUTTERS AND CARRIERS

FOR HAND, HORSE AND STEAM POWER.

SWEEP HORSE-POWERS, BAND JACKS, LAND ROLLERS, AND PORTABLE SELF-HEATING FAMILY STEAM WASHERS.

MASSILLON, OHIO.

CORN FODDER—Its Value.

And How to Handle and Feed it to the Best Advantage and Greatest Profit to the Farmer.

CORN FODDER is taking such a prominent place among rough feeds that the greatest effort should be put forth in trying 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 since the hay crop has become so uncertain almost every farmer has learned that it 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 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 it off and shock it as soon as you find it passing the roasting ear period, and before the frost has driven the sap down into the roots. Husk the corn as soon as possible, and place the fodder under cover if at all possible. 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 stalk, as has been proven by so many of our farmers and 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 timothy hay ever produced.

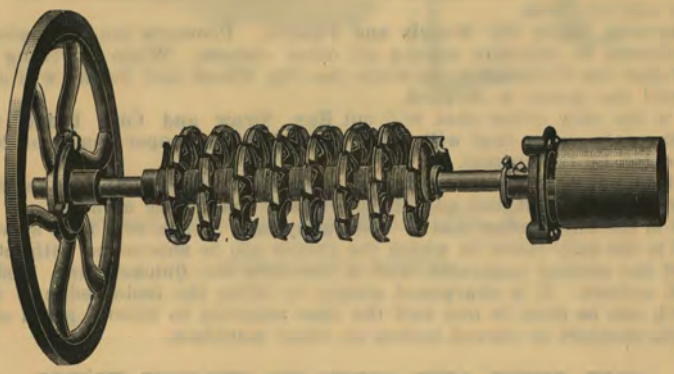
THE TORNADO—Its Construction and Merits.

THE cutting arrangement of the Tornado, as shown in the 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 peculiar motion cuts, splits and reduces the corn stalk to a soft, pulpy condition, leaving no hard or sharp edges to hurt the mouth of the animal and cause sore gums. This motion is also continuous and steady, there being no jerk or jar whatever, the advantage of which is very apparent.

The Tornado will also cut Hay and Straw, no extra attachments being necessary, and is far superior to all other cutters and shredders in many ways. It was the first machine constructed with the full object in view of giving the farmer a cutter which would put the corn fodder into the best shape possible for feeding. Until the Tornado was first built, many years ago, the only method known was the old-style way of cutting the corn stalk square off either with straight, curved or twisted knife machines. The wonderful success attained by our machine led to numerous attempts at imitation, and as a consequence a number of shredders (so-called), crushers, etc., have found their way upon the market; but none of them have ever succeeded in producing the results or achieving the success attained by the Tornado. The shredders referred to are all made up of a series of toothed disks resembling buzz-saws somewhat, arranged on a revolving shaft, and the result

obtained by them is merely a stringing out of the corn stalk into long ribbon-like bits, which are not as easily masticated by the animal or as easily handled by the operator, nor will it pack as tightly as fodder which has been prepared upon a Tornado. Neither will these shredders cut Hay or Straw without extra attachments being added, which means additional trouble, time and expense. Moreover, the harsh action of these shredders on green corn stalks, and often on dry fodder, causes the juicy nutriment of the corn stalk to be squeezed out and lost.

In the case of slitting and crushing attachments, often sold with other cutters at additional cost to purchaser and at a good profit to the maker, it is well known that these attachments require a vast amount of additional power and then fail to put the fodder in anything like the perfect condition resulting from the use of the Tornado. Our machines have been thoroughly tried and tested for many years, and have shown their superiority over all others, either in the preparation of Ensilage, Dry Fodder or Hay and Straw. Do not be deceived into buying an inferior make or an expensive as well as an inferior imitation.



TORNADO CYLINDER OR CUTTING DEVICE.

SINGLE KNIFE OR SECTION, AS USED ON ABOVE CYLINDER.

SUPERIOR POINTS OF THE "TORNADO" IN A NUTSHELL.

1. **Its Simplicity of Construction.** It is a well-known fact that the simpler a machine is constructed the easier it is to handle. A cuttter full of intricate parts is a dear investment at any price.

2. **Its Strength and Capacity.** It will cut more feed in less time and with less power, and do better work, than any other cutter on the market.

3. **Its Positive Self-Acting Feed Rollers.** They insure regular and even feeding at all times. When the feed is once caught between the Feed Rollers it can not be pulled back or out, but continues to pass on through, without any pushing by the operator.

4. **Its Improved Knife Blades and Novel Cutting Device.** The Knives work independently of each other, and cut continuously, avoiding all jar and strain to the machine.

5. **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.

6. **Reversible Shear Plates.** These can always be kept so that the knives will cut square against them.

7. **Improved Safety Fly Wheels and Pulleys.** Prevents the expensive and dangerous accidents so common among all other cutters. When anything hard gets into the Cutter the Cylinder stops while the Fly Wheel and Pulley will continue to revolve until the power is stopped.

8. It is the only cutter that will cut **Hay, Straw and Corn Fodder, all** equally well, and the only cutter that will put corn fodder in a proper condition for feeding, and to be eaten by the animal.

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

10. It is the only cutter that is **Absolutely Safe** to run at a high speed.

11. 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 simply by 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 on other machines.

OUR SIZES AND HOW TO SELECT THEM.

Size No.	Power Required for Cutters Only.	Capacity. Estimated Time to Cut One Ton.		Head of Stock Adapted To.
		Dry Fodder.	Ensilage.	
6	Hand Power			3 to 4
8	Hand Power			5 to 7
10 "C"	1 to 2 Horse Sweep 1 Horse Tread	30 to 60 Minutes	20 to 30 Minutes	10 to 15
12 "D"	2 to 3 Horse Sweep 1 to 2 Horse Tread	20 to 30 Minutes	15 to 20 Mihutes	15 to 20
15	3 to 4 Horse Sweep 2 to 3 Horse Tread	12 to 15Minutes	10 to 12 Minutes	30 to 40
11 Mammoth	3 to 4 Horse Sweep 2 Horse Tread	15 to 20 Minutes	14 to 16 Minutes	25 to 30
13 Mammoth	4 Horse Sweep 2 Horse Tread	14 to 16 Minutes	12 to 14 Minutes	30 to 40
15 Mammoth	4 Horse Sweep 2 to 3 Horse Tread	12 to 15 Minutes	10 to 12 Minutes	35 to 50
16 Mammoth	6 Horse	10 to 12 Minutes	8 to 10 Minutes	50 to 75
17 Mammoth	7 Horse	10 to 12 Minutes	7 to 9 Minutes	50 to 75
19 Mammoth	8 Horse	8 to 10 Minutes	6 to 8 Minutes	75 to 100
20 Mammoth	8 Horse	8 to 10 Minutes	5 to 7 Minutes	75 to 100
210 Mogul	9 Horse	7 to 9 Minutes	4 to 6 Minutes	100 and over
240 Mogul	10 Horse	6 to 8 Minutes	3½ to 5 Minutes	100 and over
270 Mogul	12 Horse	5 to 7 Minutes	3 to 4 Minutes	100 and over

Additional power is required when Chain Carrier or Blower is attached, the amount depending upon whether Dry or Green material is to be handled, the style of Carrier, and the distance to be elevated. When this information is given us, we can advise as to power required.

New and Improved No. 6 and No. 8 Tornado.

FOR HAND POWER.

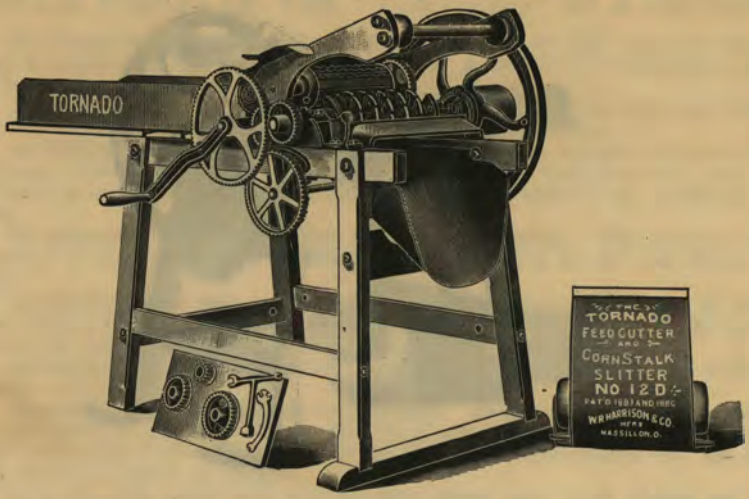
THE Nos. 6 and 8 Tornado Cutters are the smallest machines of the Tornado line and intended only for hand power. The No. 8 is sometimes fitted with a Power Attachment at small additional cost, when so ordered, but we do not recommend its use by power, and invariably advise the purchase of larger machines when anything more than hand power is to be applied. When the No. 8 is driven by power not more than one horse power should be applied nor a wider belt used than 2 in. or 2½ in.

DIMENSIONS, ETC.

Size	Length of Cutting Cylinder.	Head of Stock Adapted To.	Weight
No. 6	7 Inch	3 to 4	220 Lbs.
No. 8	9 Inch	5 to 7	250 Lbs.

Length of cut: ⅜, ⅝, ⅞ and 1¼ inches.

The 1¼ inch cut is intended only for Hay and Straw. Use only the shorter cuts for Corn Fodder



Improved No. 10 C and 12 D Combined Hand and Power Cutters.

Flat Feed Tables, as shown on following page, are furnished with above cutters instead of feed troughs unless otherwise ordered.

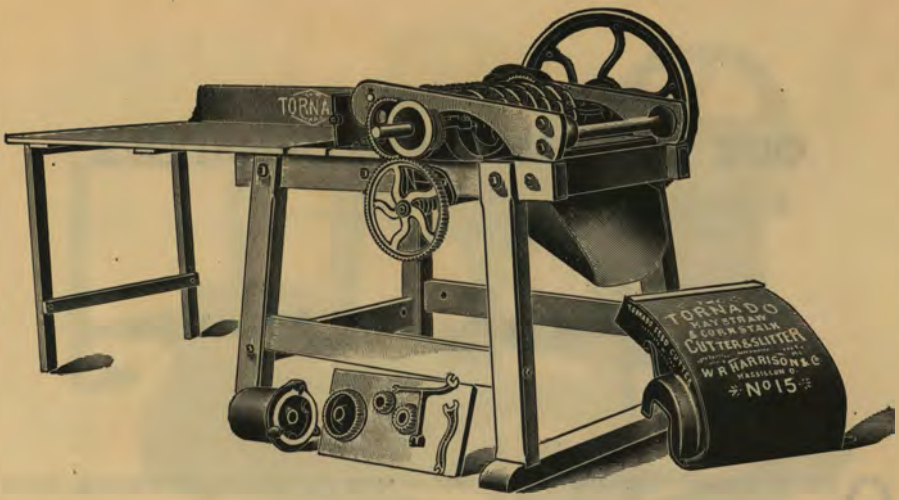
THE Nos. 10 "C" and 12 "D" Tornadoes are built for combined Hand and power use and are exceedingly well adapted to ordinary farm or dairy work. They are substantially constructed and easy running. When operated by hand they run just as easily as an exclusive hand machine, when cutting the same amount 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. 10 "C" and 12 "D" are arranged with Fly Wheel and Pulley on left hand side only, or side opposite crank handle. When SO ORDERED we can, at the same price, furnish these cutters so that pulley and fly wheel can be attached to either side, but when so arranged the hand attachment must be entirely dispensed with. This style we term DOUBLE HEADERS. Any of our carriers can be attached to the No. 10 or 12.

DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinder.	Capacity (Estimated) When Operated by Power.		Power Required Not Including Carrier or Blower.	Weight.
		Dry Fodder.	Ensilage.		
10 "C"	11 Inch.	1 Ton 30 to 60 Min.	1 Ton 20 to 30 Min.	1 to 2 Horse Sweep or 1 Horse Tread	350 Lbs.
12 "D"	13 Inch.	1 Ton 20 to 30 Min.	1 Ton 15 to 20 Min.	2 to 3 Horse Sweep 1 to 2 Horse Tread	375 Lbs.

Length of cuts ½, ¾ and 1 inch.
Speed of cylinder—900 to 1,000 revolutions per minute.



No. 15 TORNADO--For Power Only.

IMPROVED FOR 1902.

THIS machine is a strong, substantially constructed medium sized power cutter, with a capacity sufficiently large to meet the requirements of the majority of large 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. Any of our three styles of Chain Carriers and Traveling Feed Tables can be attached to the No. 15. (See No. 15 Mammoth Tornado, Page 9.).

DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinder.	Capacity (Estimated)		Power Required Not Including Carrier or Blower.	Weight.
		Dry Fodder.	Ensilage.		
No. 15	16 Inch	1 Ton in 12 to 15 Min.	1 Ton in 10 to 12 Min.	3 to 4 Horse Sweep or 2 Horse Tread	550 Lbs.

Length of cuts—½, ¾ and 1 inch.

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

OUR "MAMMOTH" TORNADOES.

Their Special Features and Advantages.

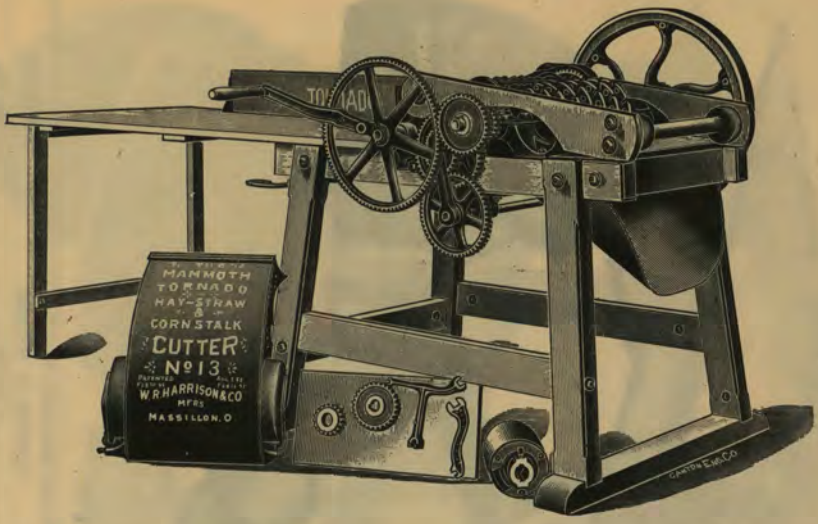
OUR "Mammoth" Tornado line is made to meet the demand for a strong, heavy and durable machine for heavy and continuous cutting, and for Ensilage work. This line comprises the Nos. 11, 13, 15, 16, 17, 19 and 20, as shown on following pages.

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 pulleys and fly wheels are also provided with our Perfection Safety Arrangement found in all Tornado Cutters and described on page 4.

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 Storing Machines on the Market.



Nos. 11, 13 and 15 MAMMOTH TORNADO CUTTERS.

THE above cut represents the first three sizes of our "Mammoth" Tornado line viz: 11, 13, and 15, except that the hand attachment shown is furnished only with the Nos. 11 and 13, and then only when specially ordered and at additional cost. These machines are much too heavy and their capacities too great to be operated to any extent by hand. The hand attachment for the Nos. 11 and 13 is seldom called for, and only practical where circumstances compel the operation of the Cutter temporarily by hand. The No. 15 'MAMMOTH" Tornado is an exclusive power machine. No hand attachments are furnished for it. In appearance it resembles very much the regular No. 15 Tornado shown on page 7, except that it is heavier in every way, supplied with the Stop Feed arrangement, and in other ways conforms to the balance of the "MAMMOTH" line. The 11, 13 and 15 Mammoth Tornadoes can be fitted with any of our Carriers or Blowers, also Traveling Feed Tables.

DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinder.	Capacity (Estimated)		Power Required Not Including Carriers or Blowers.	Weight.
		Dry Fodder.	Ensilage.		
No. 11	13 Inch	1 Ton in 15 to 20 Min.	1 Ton in 14 to 16 Min.	2 to 3 Horse Sweep 1 to 2 Horse Tread	550 Lbs.
No. 13	15 Inch	1 Ton in 14 to 16 Min.	1 Ton in 12 to 14 Min.	3 to 4 Horse Sweep 2 Horse Tread	600 Lbs.
No. 15	16 Inch	1 Ton in 12 to 15 Min.	1 Ton in 10 to 12 Min.	4 Horse Sweep 2 to 3 Horse Tread	650 Lbs.

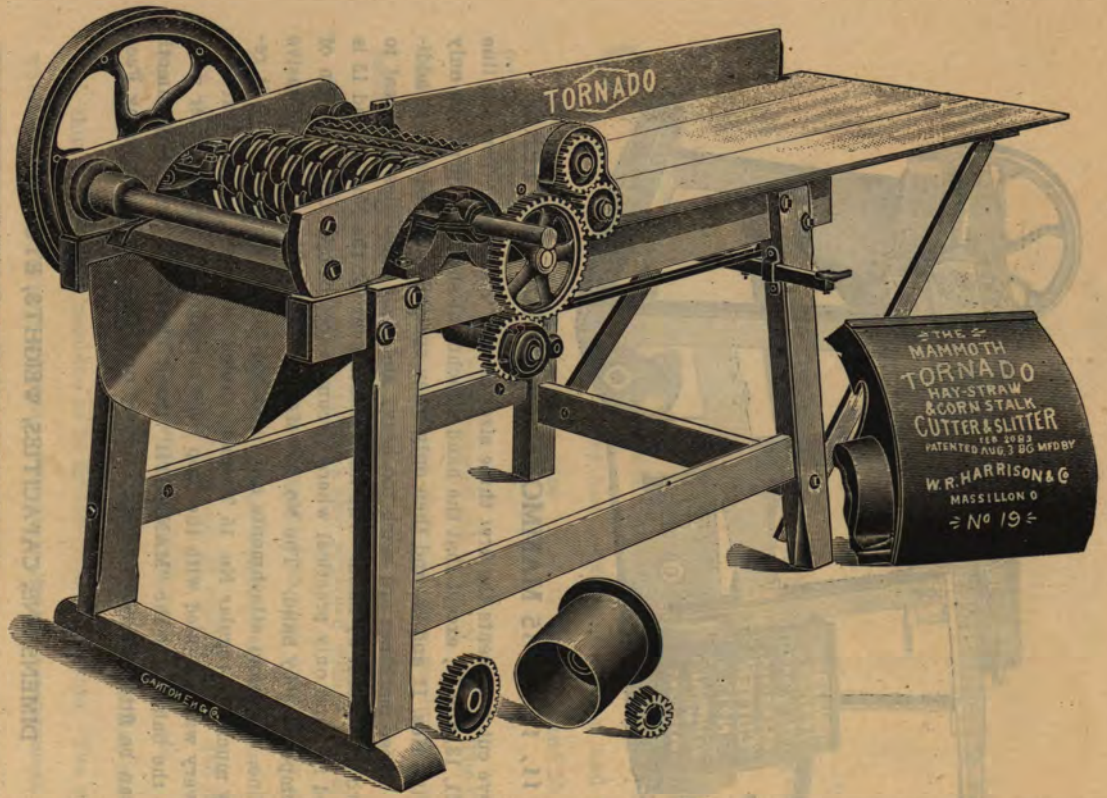
Lengths of cut—½, ¾ and 1 inch.

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

Nos. 16 and 19 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 or Blowers.



DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinder	Capacity (Estimated)		Power Required Not Including Carrier or Blower	Weight
		Dry Fodder	Ensilage		
No. 16	16 Inch	1 Ton in 10 to 12 Min.	1 Ton in 8 to 10 Min.	6 Horse	800 lbs.
No. 19	19 Inch	1 Ton in 8 to 10 Min.	1 Ton in 6 to 8 Min.	8 Horse	875 lbs.

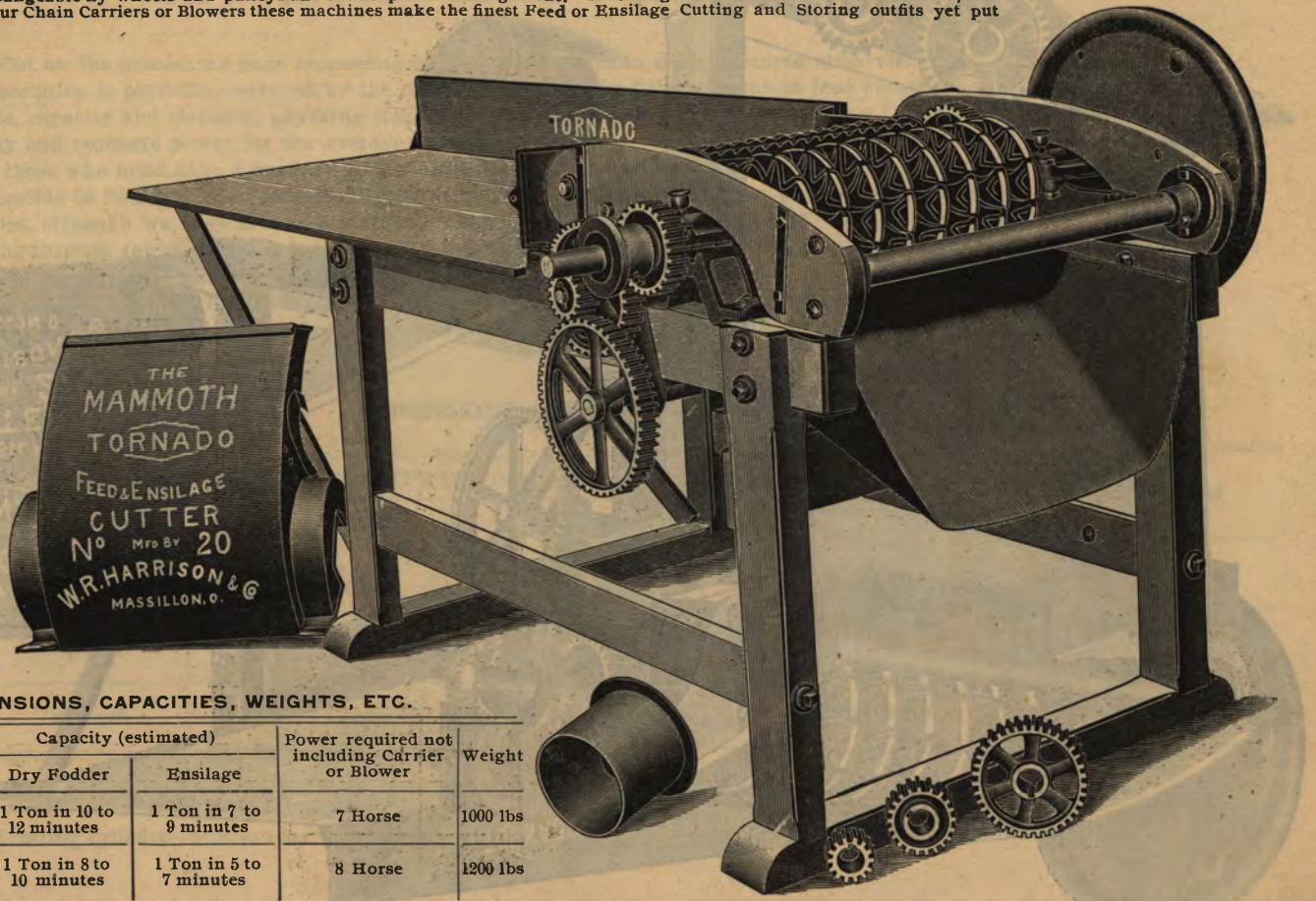
Lengths of cut—½, ¾ and 1 inch. Speed of cutting cylinder—1000 to 1200 revolutions per minute.

Nos. 17 and 20 MAMMOTH TORNADOES—Power Only.

The Nos. 17 and 20 "Mammoth" Tornadoes shown above are the latest addition to our "Mammoth" Tornado line. They are built somewhat after the style and pattern of the Nos. 16 and 19, 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. 16 and 19 cylinders, are also ten inches in diameter, two inches greater in this respect than the Nos. 16 and 19 cylinders. These machines are fitted with large feed tables, interchangeable fly wheels and pulleys and the Stop Feed arrangement. 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 Storing outfits yet put upon the market.

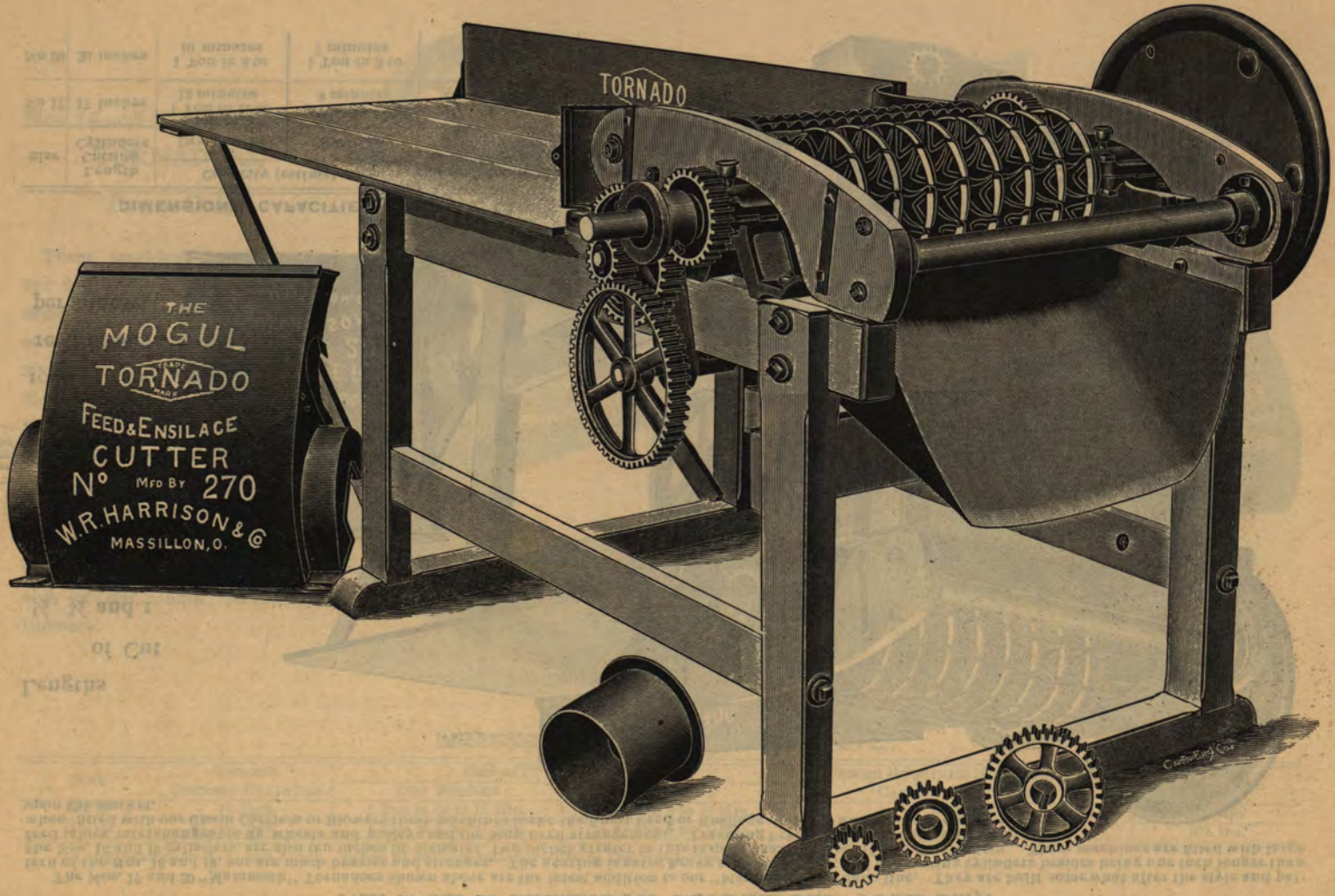
Lengths of Cut ½, ¾ and 1 inch

Speed of Cutting Cylinder 1000 to 1200 revolutions per minute.



DIMENSIONS, CAPACITIES, WEIGHTS, ETC.

Size	Length Cutting Cylinders	Capacity (estimated)		Power required not including Carrier or Blower	Weight
		Dry Fodder	Ensilage		
No 17	17 inches	1 Ton in 10 to 12 minutes	1 Ton in 7 to 9 minutes	7 Horse	1000 lbs
No 20	20 inches	1 Ton in 8 to 10 minutes	1 Ton in 5 to 7 minutes	8 Horse	1200 lbs


TORNADO
THE
MOGUL
TORNADO
FEED & ENSILAGE
CUTTER
No 270 MFD BY
W.R. HARRISON & CO
MASSILLON, O.

Nos. 210, 240 and 270 "MOGUL" TORNADOES—Power Only.

THE Cut on the preceeding 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 demands 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.

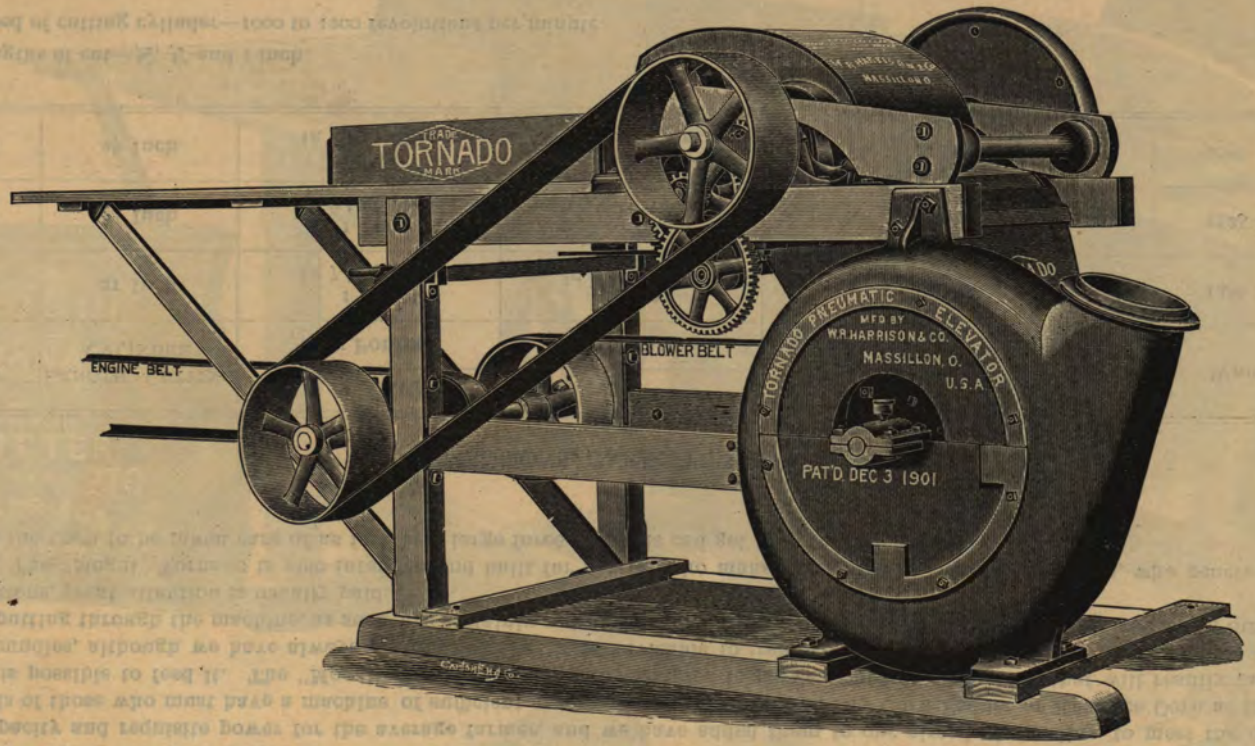
The "Mogul" Tornado is also intended and built for parties who make a practice of cutting for others, who generally want the Corn to be taken care of as fast as a large force of hands can get it to the machine.

DIMENSIONS, CAPACITIES, ETC.

Size	Length Cutting Cylinder	Capacity (Estimated)		Power Required Not Including Carrier or Blower	Weight
		Dry Fodder	Ensilage		
No. 210	21 Inch	1 Ton in 7 to 9 Min.	1 Ton in 4 to 6 Min.	9 Horse	1450 Lbs.
No. 240	24 Inch	1 Ton in 6 to 8 Min.	1 Ton in 3½ to 5 Min.	10 Horse	1525 Lbs.
No. 270	27 Inch	1 Ton in 5 to 7 Min.	1 Ton in 3 to 4 Min.	12 Horse	1650 Lbs.

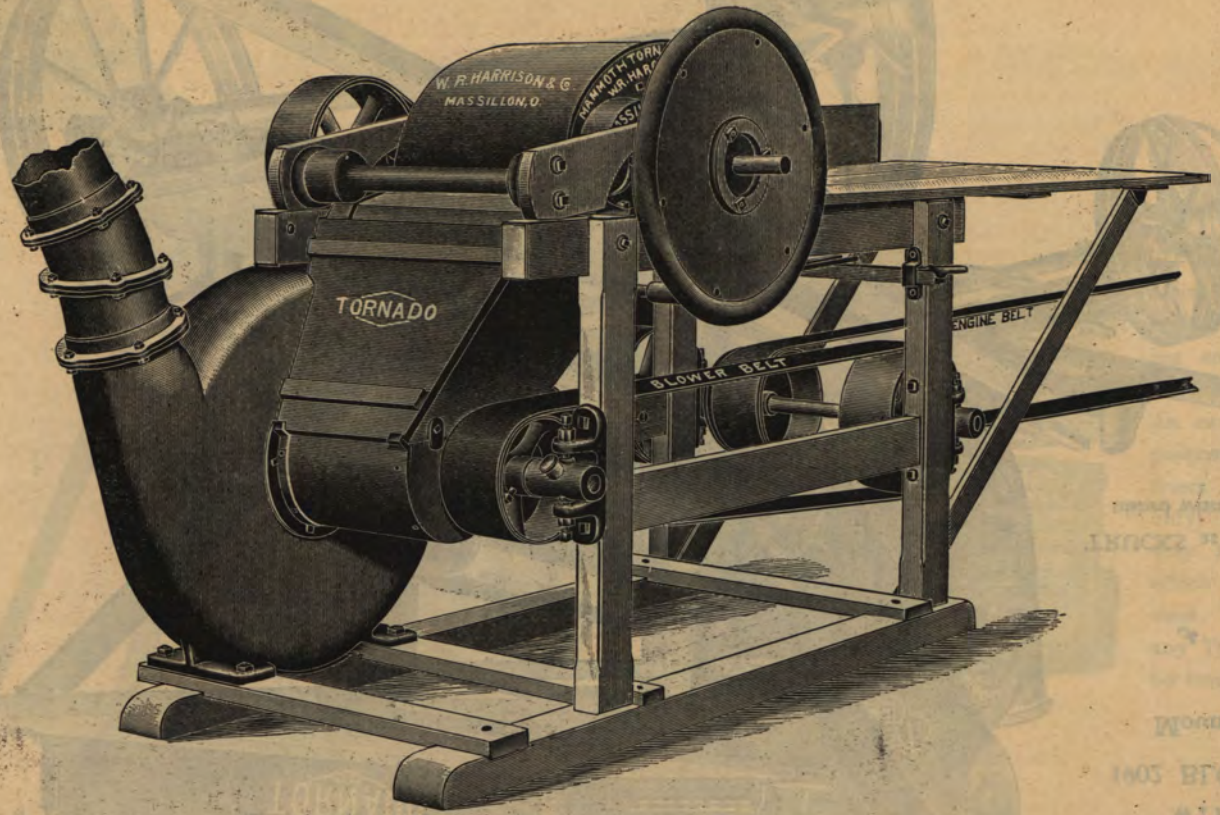
Lengths of cut—½, ¾ and 1 inch.

Speed of cutting cyliuder—1000 to 1200 revolutions per minute.

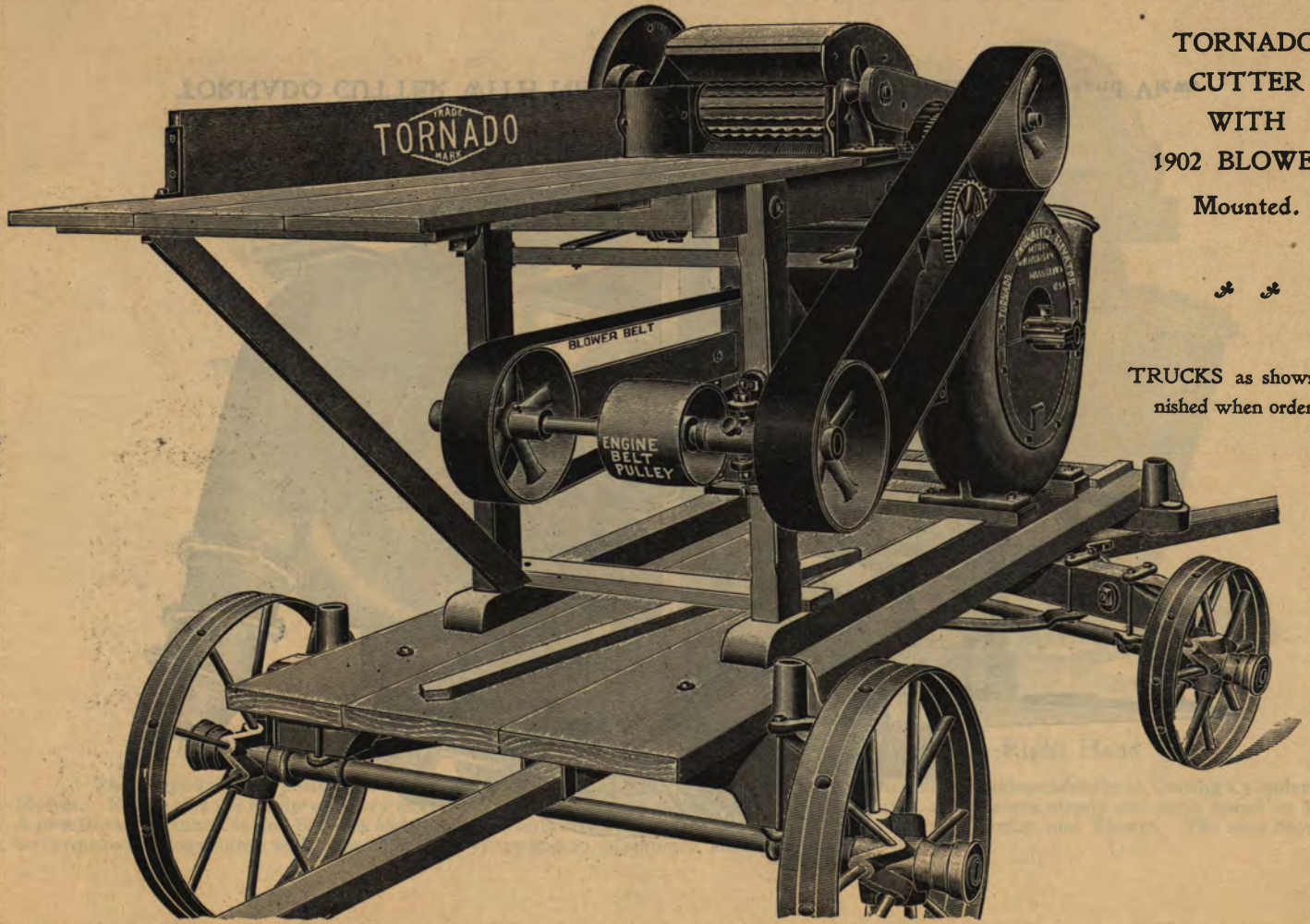


TORNADO CUTTER WITH NEW 1902 BLOWER ATTACHED—Right Hand View.

The simplest, most positive and practical feed and ensilage blower built. Power transmitted independently to Cutting Cylinder and to Blower. Eliminates the strain of heavy engine belt from Cylinder, as well as from entire outfit, and insures steady and even speed on Blower. A new device attached to our Blowers absolutely prevents clogging or congestion between Cutting Cylinder and Blower. The 1902 Blower can be furnished in connection with Nos. 11, 13, 15, 17, 19 and 20, Mammoth Tornadoes.



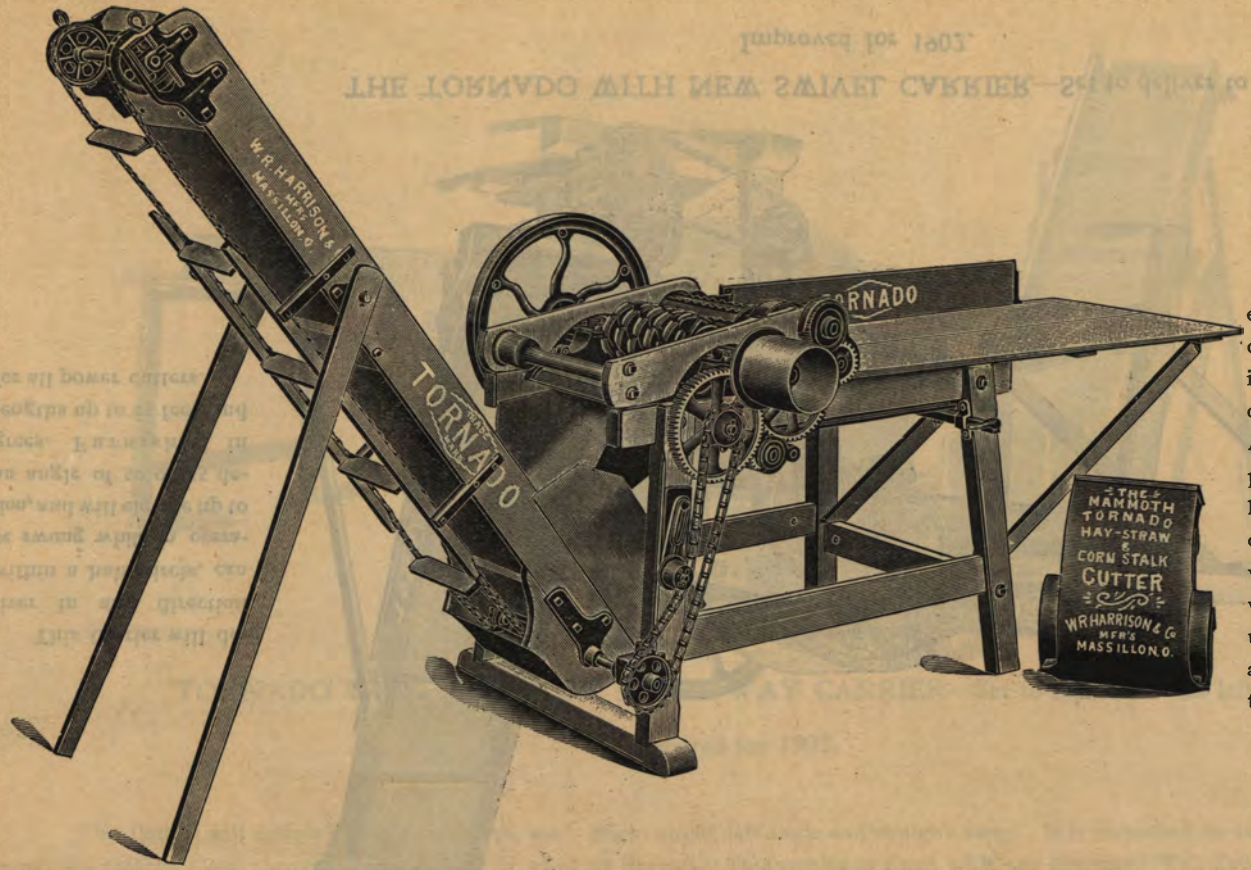
TORNADO CUTTER WITH NEW 1902 BLOWER ATTACHED—Left Hand View.



TORNADO CUTTER WITH 1902 BLOWER.

Mounted.

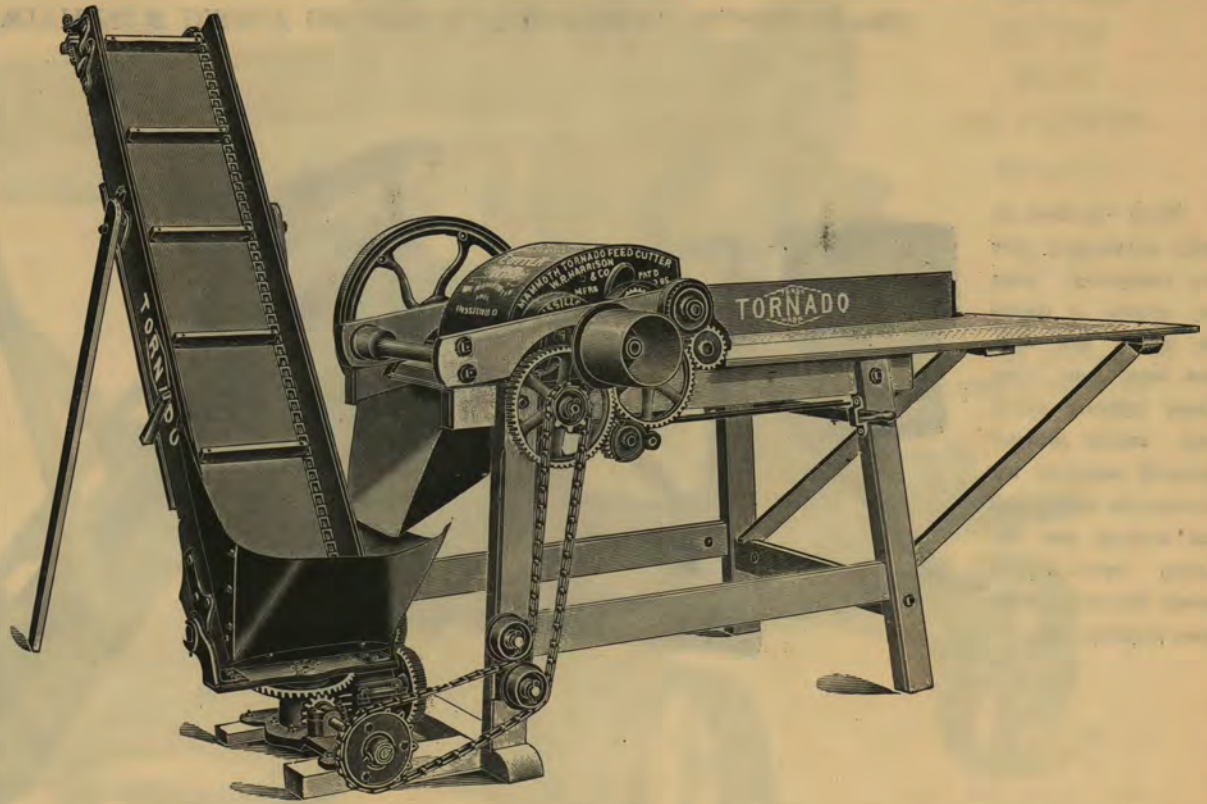
TRUCKS as shown furnished when ordered.



TORNADO WITH NEW DIRECT OR ONE-WAY CARRIER. Improved for 1902.

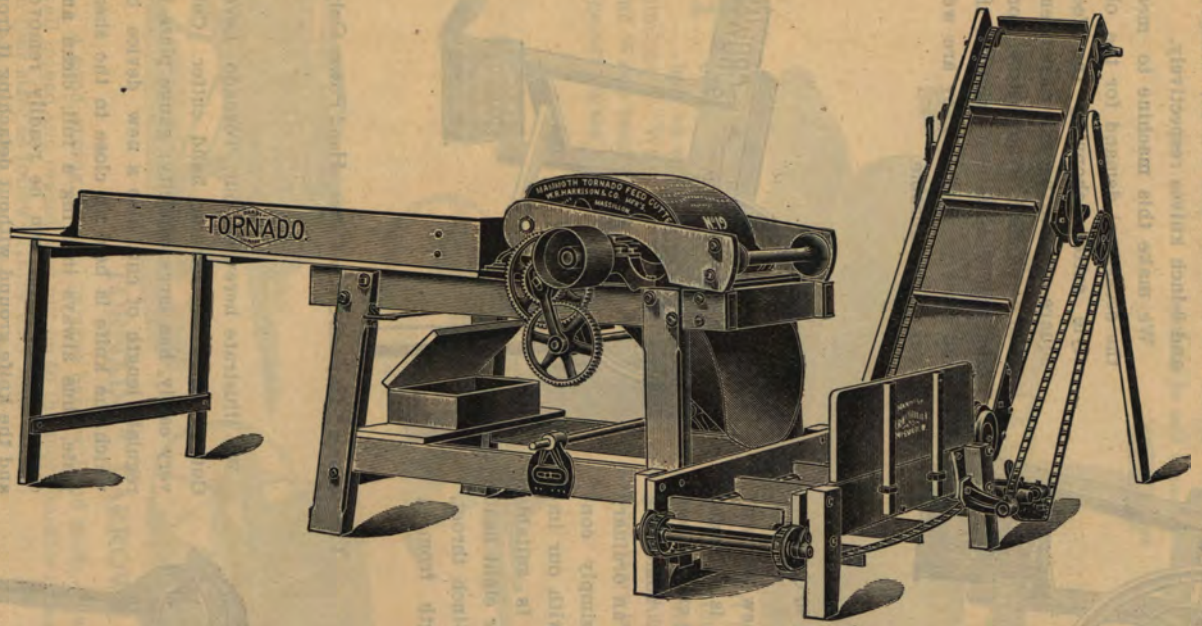
The simplest and easiest running chain carrier made. Gearing and friction reduced to a minimum. An excellent general purpose carrier. Delivers straight away only, but there are very few places in which it cannot be used. Furnished for any TORNADO Cutter from No. 10 up.

This Carrier will deliver in any direction within a half circle, can be swung while in operation, and will elevate up to an angle of 50 or 55 degrees. Furnished in lengths up to 25 feet, and for all power cutters.



THE TORNADO WITH NEW SWIVEL CARRIER—Set to deliver to the right.

Improved for 1902.



TORNADO WITH ANGLE OR THREE-WAY CARRIER—Set to deliver to the left.

Improved for 1902.

This Carrier will deliver in three directions, viz: Right angle, left angle and straight away. It is furnished in any length, and for all power size cutters. Will elevate up to an angle of 50 or 55 degrees. This carrier is fitted with our combined Web Driving and Tightening Device, by which the web chain is driven, adjusted and regulated at the lower part or Carrier within reach of the ground.

No. 70 and No. 90 Columbia.

We herewith show cut of our Columbia Cutter, which is made in two sizes, No. 70 and No. 90, with 7½ and 9-inch knives respectively.

We make this machine to meet the occasional demand for the old style cutter, chopping the feed square off, and we can recommend it to do as good, if not better, work than other machines acting on the old style principle. They are well put up and durable.

This represents our new "Crown" Cutter. This machine is intended only for Hay and Straw cutting and for parties wanting something larger and better than an ordinary Lever cutter. It is simply constructed and is fitted with our improved Ratchet Feed. Is suitable for cutting for seven or eight head of stock, has a full 10-inch throat, and will cut any length from ¼ inch to 2 inches.

The "Crown" Hay and Straw Cutter—Hand Power Only.

Tornado Lever Cutter.

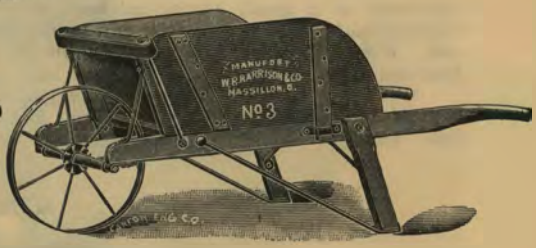
We illustrate herewith our Tornado Lever Cutter. A strong, durable hand cutter. Cuts very easily, has large capacity; gauge plate to regulate length of cut; also a new device by which the knife is held up close to the shear plate, thus always insuring a full, clean and easy cut. The lever can be readily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

THE TORNADO ALL-STEEL LAND ROLLER.

MADE IN 6, 7 AND 8-FOOT LENGTHS, WITH THREE DRUMS, 24 INCHES IN DIAMETER.

Weight of Rollers 600, 700 and and 750 lbs. respectively. Weight can be increased by operator to suit circumstances.

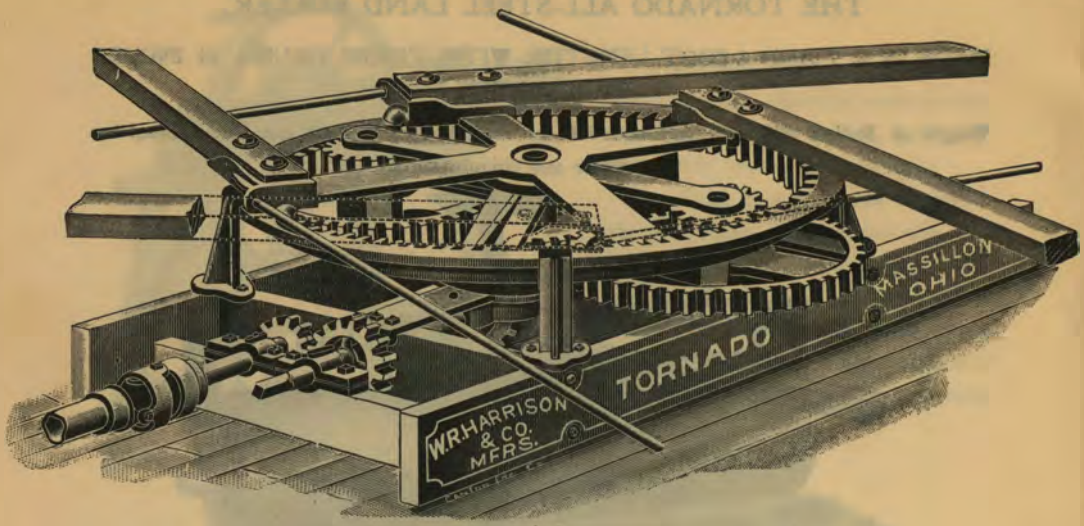
THE above cut shows our New "TORNADO" LAND ROLLER. It is worthy of the "Tornado" trademark. For strength, durability, and good results it has no equal. In construction it is superior to all others. Neck weight eliminated. Wear and tear reduced to a minimum. It has a combination Babbit and Waste bearing at each end. In turning corners there is no pounding of tongue against horses' shoulders.



"TORNADO" BARROWS.

A good, strong, general purpose barrow, hand made, of well seasoned hard wood, well ironed and braced, and put up in the most durable manner in every way. Made in four sizes as follows (three only illustrated):

No. 1—Inside measurement, 19x23x11.
No. 2—Inside measurement, 21x26x12.
No. 3—Inside measurement, 23x26x13.
No. 4—Inside measurement, 25x30x15.



TORNADO SWEEP HORSEPOWERS.

For 2, 4 and 6 Horses.

WE have long felt the need of a power to operate light farm machinery, such as corn shellers, wood saws, feed grinders, etc., and especially our Tornado Feed Cutters and other machinery requiring high speed. Here we have it. It is double geared, heavily and strongly constructed, with babbitted shaft bearings, friction almost eliminated—in fact, it is the "Excelsior" in the line of Sweep Horsepowers.

The No. 1 size is intended for one or two horses and furnished with one or two sweeps, as ordered. This size power will run our Nos. 10, 12 and 11 sizes of Tornado Cutters to good advantage.

The No. 4 size is made with two or four sweeps (as ordered) for four or six horses. This size power is designed to operate our Nos. 13, 15, 16 and 19 sizes of Tornado Cutters.

Practical tests conducted under our personal supervision have demonstrated to us the efficiency, durability and practical value of these powers. We do not hesitate to fully warrant them.

The feature of the Tornado Power is that it can be fitted with a high-speed attachment at a small additional cost, thus obviating the use of a Band Jack or Countershaft, where the power can be transmitted at right angles with the tumbling rod. Where it is necessary to transmit the power in a straight line with the tumbling rod a bevel-geared jack must be used.

We are also prepared to supply the trade with Tornado Straight and Bevel Geared Jacks, illustrated on following page, which will be found on trial to be "in line" with the balance of the "Tornado" family of Feed Savers.

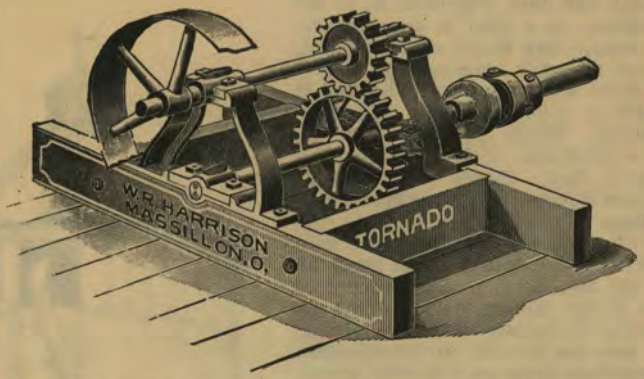
SIZES.

Size	Furnished With	Tumbling Rod Revolves to one Revolution of Master Wheel	Weight	Price With
No. 1, For 1 or 2 Horses	Sweeps, Lead Poles, Stay Rods, Tumbling Rod and Knuckles, Ground Block, 16, 20 or 24-in Iron Pulley, etc.	46 times on Slow Speed 84 times on High Speed	750 Lbs.	1 Sweep..... 2 Sweep.....
No. 4, For 4 or 6 Horses	Sweeps, Tumbling Rod and Knuckles, Stay Rod, Ground Block, 16, 20 or 24-in Pulley, etc	46 times on Slow Speed 84 times on High Speed	1150 Lbs.	2 Sweep..... 4 Sweep.....

Length of tumbling rod furnished with each Power is 14 feet; additional lengths furnished at additional cost.

THE TORNADO GEARED JACKS.

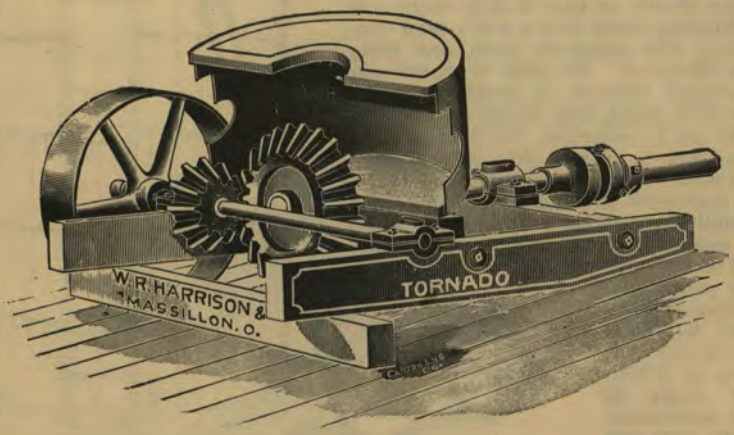
Oak Frame, Heavy Gear, Babbitted Bearings, Strength, Durability, Efficiency.



STRAIGHT GEARED JACK.

For transmitting power by belt at right angles with the tumbling rod.

Geared 40 to 22 (nearly 2 to 1).



BEVEL GEARED JACK.

For transmitting power in a direct line with tumbling rod.

Geared 44 to 22 (exactly 2 to 1).

ENSILAGE AND SILOS.

At this day and date, argument as to the value of Ensilage as a feed is unnecessary. There is no longer any doubt on that point, in fact instead of being employed only as a winter feed there are many now, who find it very profitable to feed it during the midsummer months. When properly put up, and kept in a good silo, it is undoubtedly a very profitable feed. 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 musky, green, mouldy form, and large parts, 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 practical, 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 the air. Here is where the Tornado comes to the rescue. By virtue of its peculiar cutting device shown on page 3, it is enabled to put the Ensilage Corn into 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 having a supply of good succulent Ensilage, that will retain intact all of its valuable food properties.

The forms of Silos are many, but it is only fair to say that the Stave or Circular 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 to Silo building, that we deem it unnecessary to go further into details. We give on opposite page a table which will be of assistance in determining the size of silo necessary:

SIZE		ESTIMATED CAPACITY		
DIAMETER	HEIGHT	TONS	CORN, ACRES	COWS WINTERED 180 DAYS
10 Ft.	20 Ft.	30 to 40	2 to 3	5 to 8
12 Ft.	20 Ft.	40 to 50	3 to 4	10 to 14
14 Ft.	20 Ft.	60 to 80	4 to 6	14 to 20
16 Ft.	20 Ft.	70 to 90	5 to 7	18 to 24
10 Ft.	24 Ft.	35 to 50	3 to 4	11 to 14
12 Ft.	24 Ft.	50 to 75	4 to 6	14 to 20
14 Ft.	24 Ft.	80 to 110	5 to 7	24 to 30
16 Ft.	24 Ft.	90 to 120	6 to 9	28 to 34
12 Ft.	30 Ft.	75 to 100	5 to 8	24 to 30
14 Ft.	30 Ft.	110 to 140	6 to 9	32 to 38
16 Ft.	30 Ft.	130 to 160	10 to 14	37 to 45