UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE
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Care and Hitches for Work Horses

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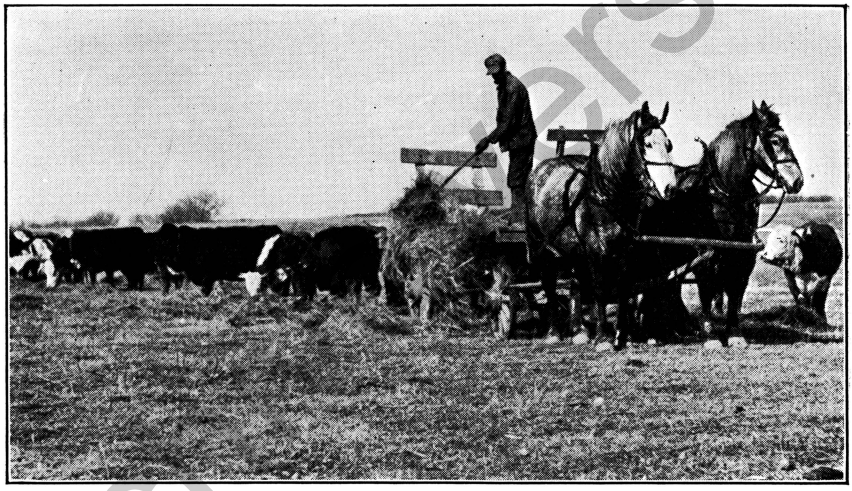

Fig. 1.—A pair of desirable-type mares at work on the farm.

Horses are the main source of dependable power on Missouri farms. Their adaptability to all kinds of farms and farm work makes them almost indispensable. Their use provides power that may originate entirely on the farm, from the standpoint of both maintenance and replacements.

The high prices of grain during the war period and the urge for increased production along with the development of automobiles and other mechanical power caused a shift away from the use of horses. In 1917 and 1918 there were 27,600,000 horses and mules in the United States. On Jan. 1, 1939 there were 15,200,000. The number is decreasing at the rate of approximately one-half million annually.

This change has diverted more than 40,000,000 acres of crop land in the United States from the production of horse feed to the growing of crops that must be utilized in the production of meat and milk to be added to the already burdensome surplus of those commodities.

This released acreage of grain and hay, along with changed economic conditions has greatly reduced feed prices and consequently lowered the cost of keeping horses. The average annual feed cost per horse under corn belt conditions in 1917 was $130. Corn was figured at $2.00 per bushel, oats at 70c per bushel and hay at $18.00 per ton. This figure is in sharp contrast to the $35.00 found necessary to keep a horse on a Missouri farm, with corn at 40c and oats at 25c per bushel. Farm records in Missouri indicate that it will require approximately 30 bushels of corn, 30 bushels of oats and one ton of hay along with adequate pasture and other roughage to keep a work horse for one year.

The cost of farm power makes up a relatively large part of the farm operating expenses. The feed cost for horses should therefore be kept as low as possible, but the amount of feed should not be so reduced as to impair the ability of the horses to do a maximum amount of hard work.

Henry and Morrison found that a 1200-pound horse will produce 10.6 tons of manure per year. This does not include the bedding that is necessarily used to save the liquid manure when horses are stabled. If this manure is properly conserved and put on the land, it will aid materially in maintaining soil fertility.

Wintering Work Horses

In the winter season the teams not being worked regularly can be maintained largely on cheap roughages. Straw stacks, stalk pasture, and blue grass can be used provided water and salt are available at all times. It will be poor economy to allow horses to become unduly thin and weak. If roughages are depended on entirely they should be supplied in abundance. The addition of a little legume hay makes a great difference in the way in which horses will go through the winter.

Horses that have been wintered largely on roughage should receive some grain in late winter in order to condition them for the early spring work. A few ears of corn fed each day will soon improve their condition. Those that are very thin and that tend to shed their winter coats slowly may profitably be fed from one-half to one pound of linseed oil meal daily. This is especially important when no legume hay is included in the ration. Animals that are properly fed and groomed should not require clipping If clipping is practiced it should be done only in favorable weather. It is usually necessary to blanket horses or keep them in warm stalls for a time after clipping.

Fitting Collars

Great care should be used in adjusting collars at the beginning of the season. Much trouble is prevented by avoiding sore necks and shoulders rather than trying to cure them. Horses with well-shaped, sloping shoulders can wear full-faced collars, while those with beefy necks and straight shoulders should probably have "half-sweeney" collars. Pulling contests have shown that many horses are worked with collars that are too short. This may cause them to choke on a heavy pull and may bruise the top of the neck causing troublesome sores. The collar should be from 2 to 2½ inches longer than the depth of the horse's neck. Collars should not be too wide. A space the thickness of the fingers between the side of the neck and collar is sufficient. When the pull comes on the side of the shoulder instead of on the face the nerve that extends to the shoulder muscle may be injured with resultant "sweeney" with lameness and shrinking of the shoulder muscle. Proper adjustment of the hames will do much to regulate the width of the collar. If collars are properly fitted there will be no need for sweat-pads. The face of the collar should be kept clean and smooth. Washing instead of scraping should be used to clean the collar.

Care of the Shoulders

It is very important to avoid sore shoulders. At the beginning of the work season collars should be cleaned each evening, before they are dry. The shoulders should be brushed each morning and the collars correctly fitted. It will help, to wash the shoulders in a salt water solution at the end of the day's work. Bruised shoulders may result from side draft, and this can be avoided through correct hitching of the team.

Feed for Horses at Work

Horses doing heavy work such as plowing and harvesting will nearly maintain normal body weight if they receive from 1 to 1¼ pounds of grain and 1 pound of hay per day for each 100 pounds of live weight. The amount of grain should be reduced as soon as the heavy seasonal labor is completed. Horses doing light to medium work should receive from ¾ to 1 pound of grain and from 1 to 1½ pounds of hay for each 100 pounds of live weight. Individual variation in feed requirement caused by conformation and temperament should be taken care of by the feeder. The condition of the horse will finally govern the amount of feed to be given. Mules usually require more roughage and less grain than horses. Horses at work should never be allowed to gorge on roughage. Legume hay is more valuable than non leguminous roughage in maintaining body weight of mature horses. Horses at heavy work receiving a reasonable amount of clean legume hay endure the hot weather equally as well

as those fed timothy hay. Horses receiving alfalfa as a roughage require 20% less grain than those fed timothy.

The grain ration for mature horses may consist of either ear or shelled corn or corn and oats equal parts by weight. The addition of ½ to 1 pound of linseed oil meal per head daily to the foregoing grain ration especially for immature horses in the spring will be beneficial.

The following sample rations for horses at heavy work show the amounts necessary per 1000 lbs. live weight.

RATION NO. 1	RATION NO. 2	RATION NO. 3.
Corn—12 pounds Legume hay 10 pounds or legume hay 6 pounds and non legume hay 4 pounds.	Corn—6 pounds Oats—6 pounds Roughage as in No. 1.	Oats 12 to 14 pounds Roughage as in No. 1.

On this basis a 1500-pound horse at heavy work should receive 16 to 18 pounds of grain and 15 pounds of hay. Reduction of the amount of grain with some exercise on days that horses are idle will help prevent azoturia (kidney trouble).

The amount of hay given horses at heavy work should be limited. Experiments have shown that horses given all the hay they will eat cannot do as much work as horses getting two-thirds as much hay as they will consume. At least one-half of the day's feed of hay should be given at night.

The immature grass in the early spring will not add much if anything to the horse's ration. During this period horses doing heavy farm work may be turned out for an hour after they come in from work at night and then be put back in the barn. As soon as the grass is developed and the nights are warm horses should be left out at night as well as on all days they are not at work.

Good pasture reduces the cost of keeping work horses. The following table is taken from the record of Russell Green of Bates County. It includes his nine horses for the year beginning March 1, 1931. The reduction in cost after the horses were put on pasture in May is very pronounced.

Month	Horse hours	Feed Cost	Cost in Cents per hour	Month	Horse hours	Feed Cost	Cost in Cents per hour
March	856	$49.75	5.7	Sept.	291	$25.80	8.86
April	845	55.35	6.5	Oct.	328	26.20	8.00
May	833	31.50	3.7	Nov.	450	18.00	4.00
June	1144	26.20	2.3	Dec.	862	18.60	2.15
July	530	18.90	3.7	Jan.	456	18.00	3.94
August	224	15.90	7.1	Feb.	491	17.40	3.54
Total					7183	$331.60	4.61

During the rush season horses may gorge themselves on grass on Sundays or other days they are idle and turned on grass, unless they are given at least one feed of grain. The grain will reduce the amount of grass they will eat and may prevent over heating the following day when they are put to hard work.

Health Precautions*

Horses getting a well balanced ration usually do not need any stock powder or tonic. Money spent for such may be wasted. If the animal is sick a competent veterinarian should be called.

Bot flies, or "nit" flies as they are commonly known, irritate horses from July to frost, laying their eggs on the horse's nose, throat and legs. Some of these eggs are eventually licked off by the horse and taken into the digestive tract. The larvae spend the winter months in the stomach of the horse, then pass out in the manure, develop on the ground, and became mature flies in July, August and September ready to start laying eggs again.

These and other internal parasites of horses can be controlled by the proper use of drugs, but the location of the parasite in the digestive tract makes it necessary to use different drugs for different parasites. Bots, ascarids, and stomach worms are located in the anterior portion of the horse's digestive system. Carbon disulfide given in December and January will largely rid the horse of these three parasites. The strongyles (round worms), both large and small species, and pin worms are located in the posterior portion of the digestive tract and require a non-volatile drug like oil of chenopodium. These drugs, should be given only by a licensed veterinarian.

The Extension Service has been sponsoring a campaign for the eradication of horse bots and other parasites through the local county agents' offices with the cooperation of local veterinarians. The veterinarians can treat the horses for smaller fees by having the work conducted on a community basis. Bot flies will seldom travel more than one-half mile unless to follow a team. If all the horses in a community are treated the fly may be eliminated. This would make the operation of big team hitches much more satisfactory. Horses kept free of parasites take less feed, work better and are thriftier than infested animals.

At the same time that horses are treated for bots an examination should be made of the teeth and "floating" be done when needed. Many horses that are poor in flesh and wear staring coats despite a reasonable supply of food owe their condition to poor teeth alone.

"Colic" may be caused by acute indigestion, or by impaction. These conditions may be caused by improper methods of feeding and watering, giving the animal severe or unusual exercise im-

*Approved by the Department of Veterinary Science, Missouri College of Agriculture.

mediately before or after feeding, the feeding of spoiled or green feeds, new grains, imperfect mastication of feed due to defective teeth, or obstruction of the intestines by worms. Prevention is the best treatment. Horses should be fed regularly. Sudden changes of feed should be avoided. If a horse has received unusual exercise it is wise to feed hay first, withholding water and grain until the animal is cool. A large quantity of water taken when the animal is very tired, very thirsty, hot, or following a meal may be injurious. Animals affected with colic should be kept quiet and warm.

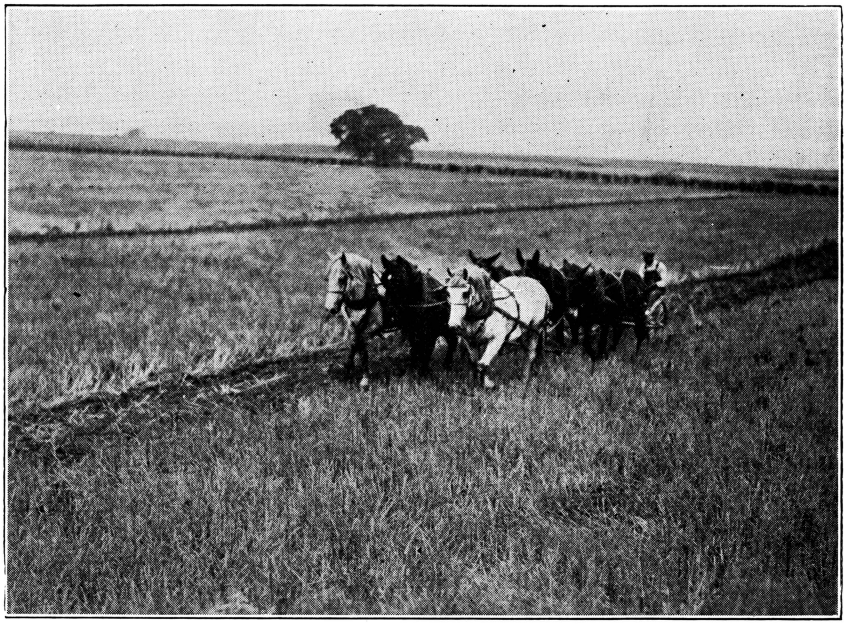

Fig 2.—A smoothly working 6-horse hitch.

Treatments for the foregoing conditions differ so widely that an accurate diagnosis is imperative. For acute indigestion a thorough cleaning out with a physic, with a sedative to lessen pain, is indicated. For impaction, however, a physic may be fatal. Therefore, competent veterinary service is essential to determine whether the illness is acute indigestion or impaction and to prescribe the treatment.

Encephalomyelitis, or sleeping sickness of horses and mules, is a disease caused by a specific filter-passing virus which affects the brain tissue of horses and mules and produces marked disturbances of the central nervous system. County agents reported that there were 23,000 cases of the disease in Missouri during 1938 and that approximately 4,500 of the animals affected died.

The recommended method of preventing the disease is vaccination with what is known as the chick embryo vaccine. Local veterinarians and the extension veterinarian of the Missouri College of Agriculture can supply additional information on using this.

MULTIPLE HITCH

Farmers have found the multiple hitch to be practical, inexpensive, and efficient.

The advantages of the multiple hitch are that it does the following:

1. Enables one man to accomplish more work per day.
2. Eliminates side-draft. This increases the power approximately 15%.
3. Equalizes the pull of the horses.
4. Prevents crowding and enables horses to be kept cooler.
5. By pulling straight away from the plows, prevents sore shoulders, necks, legs and sides.

The tandem hitch greatly increases the amount of field work that can be done by one man in a day. Experience shows that approximately one acre of ground per day will be plowed for each horse used; that is, a two-horse team will plow two acres, a three-horse team three acres, a five-horse team five acres, and a nine-horse team nine acres.

The multiple hitch is well suited to large horses for it allows room and freedom for them to work without crowding and is equally well suited to smaller horses for more can be used in a team and make up for the lack of strength in each horse.

Better equalization and straight line of draft make the individual horse more efficient. Fewer horses are required to pull a given load when they are used in tandem hitches. The equipment is mostly home-made, and much second-hand material can be used.

Bucking-Back Straps and Tying-In Chains

The only equipment needed in addition to good eveners are bucking back straps or ropes and tying-in chains as shown in Figure 3. In tying-in, a 3/16 inch coil chain 5 feet long with a cold-shut bolt snap at each end, as in Figure 3, is used. One end is snapped into the halter ring of the horse in the rear, the other end is snapped to the inside trace of the horse diagonally ahead. If a horse is slow, the lead chain is shortened so that he must quicken his space. If a wild or unbroken horse is hitched, a rope or chain is generally placed around his neck to make sure he will follow. If the rear horses wear halters the lead chain may be attached to the halter ring rather than the bit to prevent jerking on the mouth.

The buck strap or rope which is made on the same principle as a line is run through the hame rings and snapped into the bit. No. 12

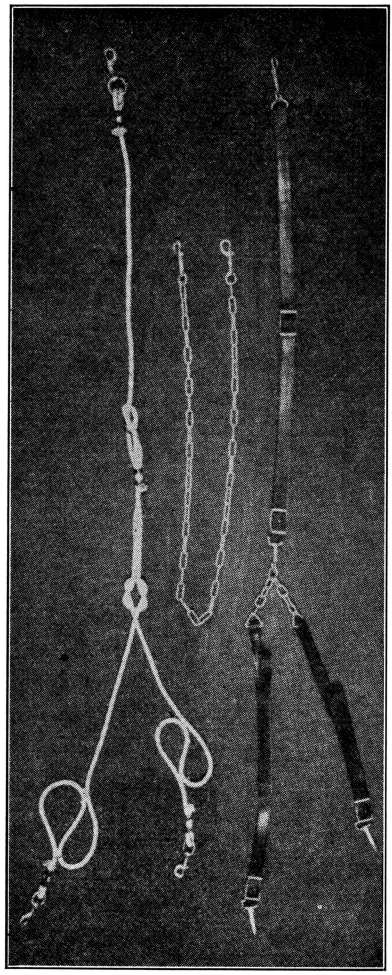

Fig. 3.

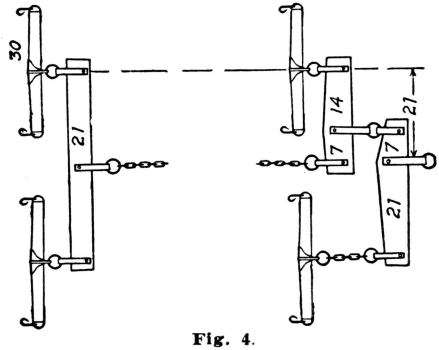

Fig. 4.

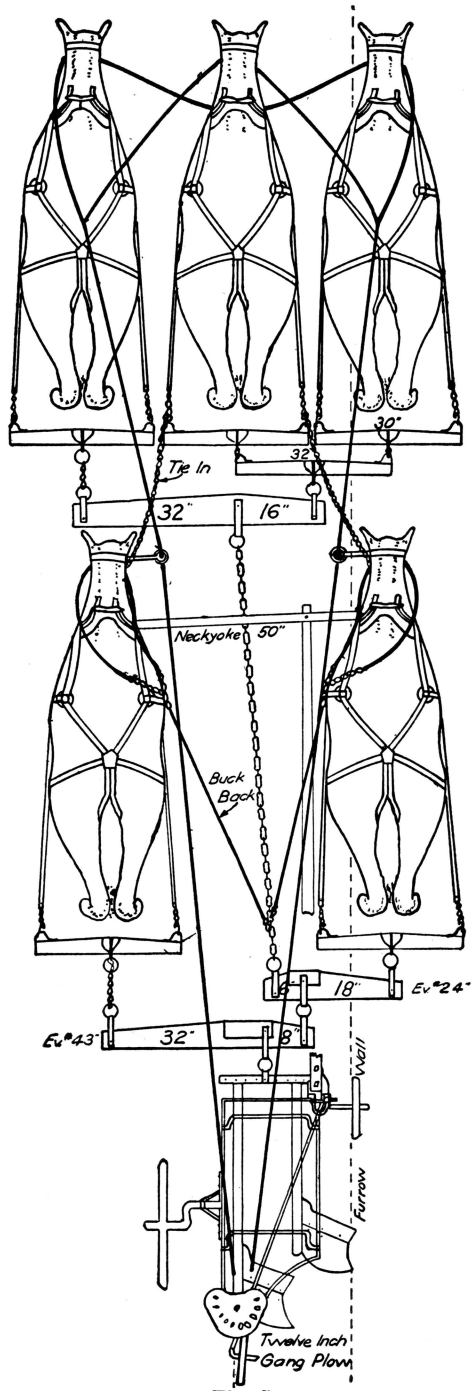

Fig. 5.

window sash cord should be used for making buck ropes. From the withers the single strap or rope runs downward fastening to the draw chain near the horses's hind legs. When three or more horses are bucked back only two can be fastened to the draw chain, but the others may have their bucking back ropes fastened to the heel chains or traces of the horse already fastened to the draw chain. If the rear horses go too fast they are held in place by a properly adjusted buck rope. Crowding or pulling away from the chain is corrected by shortening the outside and inside check of the buck rope as may be needed.

To make each buck rope, buy 19 feet of sash cord, with 13 feet used for the checks and 6 feet for the strand going to the draw chain. Securely fasten a $\frac{1}{2}$-inch bolt snap in each end of the piece cut for the checks. The 6-foot piece should have one end securely clamped around itself to form an adjustable loop which makes possible the shortening or lengthening of the buck rope. A $\frac{5}{8}$-inch bolt snap is securely fastened in the other end of the 6 foot strand to snap to the draw chain. The 6-foot strand and the check end are joined by means of a figure eight loop making possible easy adjustment of the checks. See Fig. 3.

The Four-Horse Hitch

This hitch is simple, easily made and suited for use on a sulky or gang plow. Ordinary wagon eveners and single trees are used for the lead team and rear eveners are made according to the instructions in Figure 4. The material for the eveners should be about 4 inches longer than the dimensions given to allow for the ends since the distances in the diagram are from hole to hole. A bolt through either end of the long evener will lessen the danger of splitting out.

Four big horses so hitched to a gang plow work most advantageously. Horses hitched thus suffer less from heat and crowding. There is no side draft and the pull is at right angles to the horses' shoulders. This hitch is particularly well suited for use on a sulky when the plowing is hard.

The Five-Horse Hitch

The five-horse hitch as shown in Figure 5 is particularly well adapted to use on a twelve inch gang plow under ordinary conditions. With only two horses in the rear there is ample room for the draw chain and tongue between them and, short turns can easily be made. Suspending the draw chain about eight inches from the ground at the neckyoke of the rear team helps in turning and prevents the rear horses stepping over it. This may be dispensed with after the team becomes accustomed to working together. Driving is made simple and easy by using lines on the lead horses and bucking-back ropes and tie-in chains on the rear two.

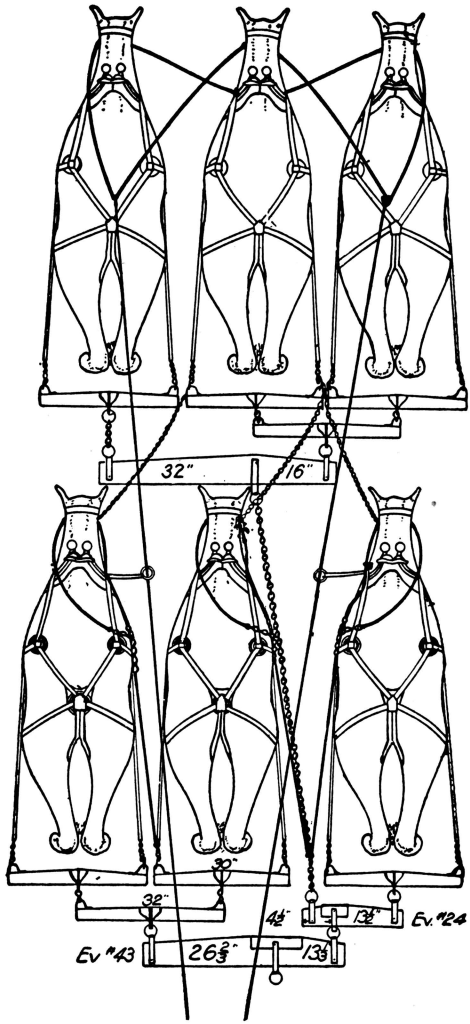

Fig. 6.

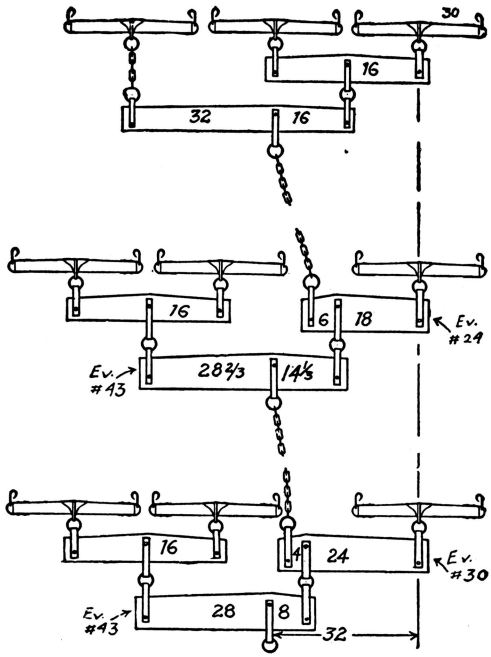

Fig. 7.

For five horses on a gang plow where the two rear horses spread more than in the four-horse hitch, a neckyoke 50 inches long is advantageous, having two-fifths of the length from the tongue to the furrow horse. An ordinary three-horse evener is used for the lead team.

By having the two rear horses spread out as shown in the diagram the driver has an excellent view of his lead team and the rear horses have ample working space. This additional space tends to keep them cooler.

The Six-Horse Hitch

This is a strong hitch for the gang plow and is well suited to plowing heavy sod. It will furnish power enough to pull a 14-inch gang. It also works to good advantage on a double disk. The team is driven with two lines to the lead horses where an ordinary three-horse evener is used.

This hitch attaches at the true center of draft on a 14-inch gang plow. The draw chain pulls at a slight angle which does not, however, affect the direction of the implement.

With three horses in the rear it is impossible to buck the outside horse back to the draw chain so his bucking-back rope is snapped into the trace of the center horse as shown in Figure 6.

The Nine-Horse Hitch

The nine-horse hitch (three, three and three) for a three-bottom tractor plow is proving a very satisfactory hitch for men who have the horses and the tractor plow. This hitch, to be satisfactory, involves the use of a cart which is fully described in leaflet No. 204 issued by the Horse Association of America. The leaflet may be obtained by writing them at Union Stock Yards, Chicago, Ill. It is also available at county agents' offices and the Extension Service, Missouri College of Agriculture, at Columbia. In the nine-horse hitch an ordinary three-horse evener is used on the lead team and both the swing team and the wheel team are controlled with the lead chains and bucking-back ropes as in the six-horse hitch. The dimensions for the eveners of the wheel and swing teams are given in diagram 7.

In making the hitch cart from the rear wheels of a wagon for the nine-horse hitch it is necessary to offset the tongue one foot to the right in order to keep it between the furrow and middle horses of the rear team. This places the tongue parallel to the furrow yet does not crowd the horses. On the rear wheels of the wagon the regular hounds serve as braces. It is satisfactory to use a 2 x 4 (oak, hickory or ash) in place of the coupling pole. It may be extended 18 inches in front of the hounds. Offset the regular tongue one foot to the right and fasten with braces. Also clamp rear end of tongue to hound.

On this skeleton build a box similar to five feet of a regular wagon box, extending three feet in front and two feet in rear of axle. Across and on top of the front of this platform put a brake beam, so arranged that wheels may be retarded or locked when desired. Then place a spring seat on this box, elevated enough to enable the driver to see all his horses plainly, and to handle the trip rope on the plow. The seat can be adjusted depending upon the driver's weight to practically counterbalance the weight of the tongue on the horses' necks.

The team is hitched to the plow by means of a chain extending from the end of the drawbar. This chain should be long enough to give room behind the cart to raise and lower the plow, and place the rear evener 18 inches in front of the cart wheels.

To attach the cart, suspend a chain from one end of axle to the other, using a clevis and placing the pin of the clevis through the draw chain and the throat of the clevis around the chain attached to the axle. This adds flexibility to the hitch and yet the cart is drawn by all the horses. The chain on the axle should swing low enough to permit the draw chain to pull in a straight line.

Starting the Multiple Hitch

The fastest walking horses should be worked in the lead and the slower ones in the rear. The hitch should be started before the rush season, so as to accustom the horses to it. It should not be expected that every horse will walk up in place until the proper adjustments are made on the buck ropes and tie chains.

If a gang plow is driven to the field with a multiple hitch, the rear wheel should be chained to prevent the plow from running on the horses. In plowing a team should never be stopped as they approach the end of the field, but turned for the next round before a stop is made.

When the team is pulling, the rear eveners normally tilt. The end attached to the draw chain works lower so that the line of draft is straight and the traces are at right angles to the horses' shoulders. When a hitch is working properly all eveners are parallel and the angle of the traces and shoulders the same. Heavy eveners for the lead team will assist in holding the traces down to the proper angle with the horses' shoulders.

In taking the team to and from the field, the lead three are hitched together in the ordinary way; the rear horses are snapped together from bit to hame by the tie chains. The driver then picks up the lead chain of the off rear horse, leads the rear team and drives the lead team.

If nine horses are to be taken, the swing and wheel teams are each snapped together by the tie chains and the tie chain of the off rear horse snapped into the inside trace of the horse immediately ahead of him.

On arriving at the field the driver brings his team to the implement from the rear, drives over the double trees, and his horses swing into regular working position when they stop. The driver then walks back between the rear horses and ties the lines to the implement; proceeds to the lead horses, hitches their traces, and snaps the tie chains of the horses immediately behind them into proper position; then hitches the traces of the rear team and at the same time snaps the buck rope into position. He is then ready to start plowing.

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J. W. BURCH, Director, Agricultural Extension Service
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