

## APPLICATION FOR TRACTOR TEST

### INSTRUCTIONS:

**Three copies** are required of each application and all exhibits attached thereto.

Mail **two copies** to Agricultural Engineering Department University Farm, Lincoln, Nebr. Mail **one copy**, with your request for permit to sell, to State Railway Commission, State Capitol, Lincoln, Nebr.

Specifications will include no equipment except that supplied with stock tractors. It may include items (such as extension wheel rims) for which an extra charge is made but such items must be offered for sale by the tractor manufacturer as a part of the tractor and must not be attachments for which the tractor manufacturer is not directly responsible.

If the customer has choice of two or more makes or types of any item of equipment (such as wheel lugs) description will be given of each make or type. All of these makes or types will be sent with the tractor submitted for test.

In filling out specification sheets, if the blanks provided are not suitable for describing some part of the tractor, specifications on that part may be given on a separate sheet.

Application for test of UNCLE SAM 20-30 Tractor.

(P. O.) Menasha, Wisconsin

(Date) September 10th, 1920

Agricultural Engineering Department,

University Farm,

Lincoln, Nebr.

Gentlemen:

U. S. Tractor & Machinery Co. hereby applies for test,  
(Manufacturer)

as provided by Nebraska law, of the Uncle Sam 20-30  
(Trade Name)

Model B 19 Tractor. Specifications of this tractor are  
(Model, H. P. Rating)



given on sheets attached hereto and marked exhibits A, B, C, D, E, F, G.

H, I, J, K, L, M, N.

(A, B, C, etc.)

(Each loose sheet and each set of sheets permanently bound together to be marked as an exhibit).

All of the claims made regarding the construction and the performance of this tractor by the manufacturer either directly or through his selling agents are covered in sheets and catalogs attached hereto and marked exhibits N-P. (Each loose sheet and each catalog to be marked as an exhibit.)

In testing this tractor you are directed to use the following kinds and grades (use trade names) of lubricant for the parts named: \_\_\_\_\_

Engine--Gargoyle Mobiloil "BB"

Transmission--Gargoyle Mobiloil "C"

All printed operating instructions furnished to purchasers of this tractor are enclosed herewith and marked exhibits O.

Mr. B. C. Greiner will be the official representative of the manufacturer during the test, and will carry proper credentials. He will receive any directions you have to give and will make any requests or complaints from the manufacturer.

U. S. Tractor & Machinery Co. hereby certifies that the tractor submitted for test (Serial Number of Engine 226-21-JB; Serial Number of Chassis 1795) is a stock tractor of the model herewith described.

U. S. Tractor & Machinery Co. hereby agrees that no claims for the tractor in excess of those declared herewith will be made by the manufacturer either directly or through his agents; and that no tractor will be offered for sale either by the manufacturer



or his agents under permit based on this test, which does not correspond exactly with description given herewith; excepting such changes in claims made for the tractor or in construction of the tractor as may from time to time be approved in writing by the Board of Tractor Test Engineers and the State Railway Commission.

Respectfully submitted,

U. S. TRACTOR & MACHINERY CO.

(Signature) .....

By

Sec'y. & Asst. Treas.

(Name typewritten) .....

G. D. Harris

(Position) .....

General Manager.

(To be signed by an officer having power to make contracts for the manufacturer.)



Exhibit A.

Tractor Specifications for University of Nebraska, Department of Agricultural Engineering, and the Nebraska State Railway Commission.

1. Manufacturer's name U. S. Tractor & Machinery Co.  
Address Menasha, Wisconsin.  
Tractor submitted for test by U. S. Tractor & Machinery Co.  
Horse power rating: Drawbar 20 Belt 30  
Type 4 wheels - 2 rear wheel drive.

**ENGINE**

2. Name Beaver Model "JB"  
Manufacturer Beaver Mfg. Co.  
Engine weight 1030 lbs. Specify equipment included Bennett Kerosene Carburetor, Bennett Air Cleaner, Simplex Governor, Dixie Magneto, Sylphon Regulator

Engine mounting (mark r): Crank shaft crosswise or lengthwise R of tractor frame.

3. Number of cylinders 4 Cycle 4  
Clearance volume per cylinder 40% of total displacement of 42.5 cu. in.  
Rated R. P. M. of Crankshaft 900 Bore 4-3/4 in. Stroke 6 in.

4. Timing:  
Inlet open ° 15 Close ° 45  
Exhaust open ° 45 Close ° 10  
Ignition ° Magneto

5. Valve diameter clear 2-3/16 Dia. in.; Valve lift 3/8 in.  
Angle of seat 45 ° Material Cast Iron Head

6. Pistons:  
Weight of one with rings 7 lbs. 6 oz. Length 5-5/16 in.  
Material Cast Iron  
Piston clearance (for diameters)

First land .016 in. Second land .008 in.  
Third land .006 in. Skirt .005 in.



Exhibit B

Are pistons ground to dimensions? Yes

Are cylinders ground to dimensions? Yes

7. Piston Rings:

Make or type 45 split

Number per piston 4 Width  $\frac{1}{4}$  in.

8. Piston pin:

Length  $4\frac{1}{2}$  in. Diameter  $1\frac{1}{2}$  in. Solid or hollow Hollow

Material Shelby Steel Tubing Heat treatment Yes

Ground to dimension? Yes

Method of holding piston pin Clamped in connecting rod

9. Piston pin bearing:

a. Bearing in piston bosses Yes Removable bushing Yes

material Phos. Bronze

b. Bearing in connecting rod end No Removable bushing No

Material

c. Bearing in both Removable bushing

Material

10. Connecting rod: Length e to e  $12\frac{1}{2}$  in.

Material Drop Forging Heat treatment "E" S.A.E.

Weight complete with all bolts, nuts, bearings and piston pin in place 10 lbs.

2 oz.

Bearing cap bolts: No. 4 Size  $\frac{1}{2}$  Material Nickel Steel

Crank bearing: Diameter  $2\frac{1}{4}$  in. Length  $2\frac{3}{4}$  in. Material Babbit with Bronze back

11. Crank shaft:

Weight 73 lbs. Material Drop Forging

Heat treatment "E" S.A.E.

Counter balanced? No

12. Main crankshaft bearings. Number 3 Type Plain



## Exhibit C

## Dimensions of each Bearing.

	Diameter		Length		Material
Front	2-3/8	in.	3 1/2	in.	Babbit with Bronze backing
		in.		in.	
		in.		in.	
		in.		in.	
		in.		in.	
Middle	2-3/8	in.	3 1/2	in.	" " " "
*Rear	2-3/8	in.	4 1/2	in.	" " " "

\*Rear is flywheel end.

13. Flywheel, diameter 17-3/8 in. Weight 139 lbs.  
Solid or spokes Solid

Method of attaching (mark x):

Flange X Taper \_\_\_\_\_ Straight \_\_\_\_\_

14. Cams (mark x):

Integral X Separate \_\_\_\_\_ Cam shaft material Drop Forging

Heat Treatment No

15. Camshaft bearings. Number 3

	Diameter		Length		Material
Front	1 1/4	in.	3	in.	Phos. Bronze
		in.		in.	
		in.		in.	
Center	2 1/2	in.	3-1/8	in.	" "
		in.		in.	
		in.		in.	
Rear	2	in.	2-5/16	in.	" "

16. Timing gears (mark x for A or B.):

(a) Spur \_\_\_\_\_ (b) Helical X

Crankshaft gear material Steel

Camshaft gear material Cast Iron



# Exhibit D

## 17. Lubrication system (mark x except in G):

(a) Circulating X (f) Drilled Crankshaft X  
 (b) Non-circulating (g) Mechanical Lubricator  
 (c) Pressure feed X Make  
 (d) Gravity feed (h) Ring type  
 (e) Splash

## 18. Lubricating camshaft (mark x):

Independent lead Pressure X Splash

## 19. Piston lubrication (mark x):

Splash X Pressure X

20. Lubricating oil capacity 2 1/2 gals.

## 21. Oil-pump type (mark x):

Plunger Gear X Individual

Location Crank Case Bottom

## 22. Governor:

Make Duplex Model "P" Type Fly-ball actuating valve

Open Enclosed Completely enclosed

23. Ignition system: (Give information for all makes or types supplied on stock tractors of this model.)

Magneto Yes H. T. X L. T. Make Dixie Model 46

Impulse coupling Automatic Make Sumpter

Magneto H. T. L. T. Make Model

Impulse coupling Make

Magneto H. T. L. T. Make Model

Impulse coupling Make

Battery system None Make Model

Battery system Make Model

Battery Make Type Volts Amp. Hours

Battery Make Type Volts Amp. Hours



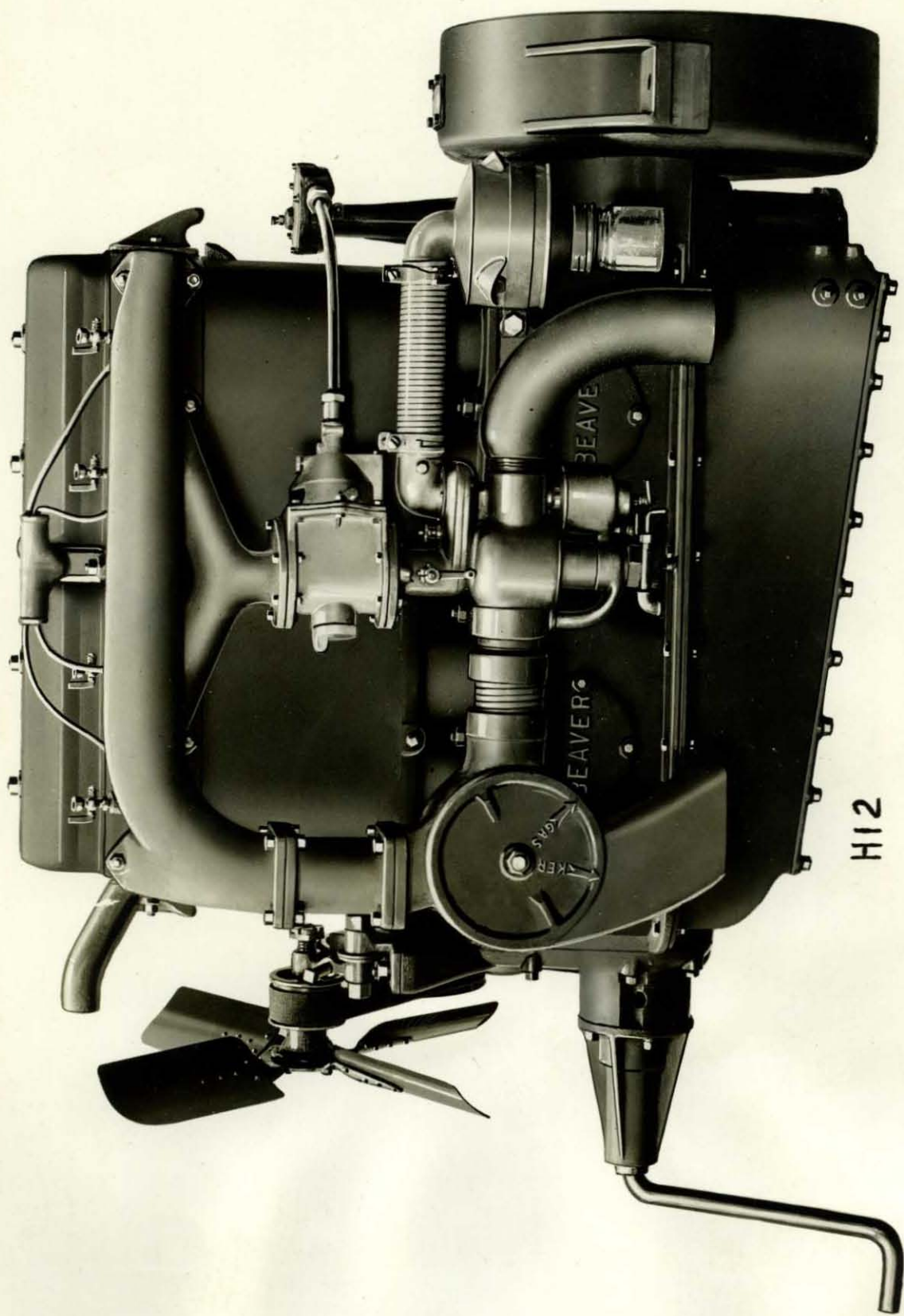


Exhibit 9

Beaver #29



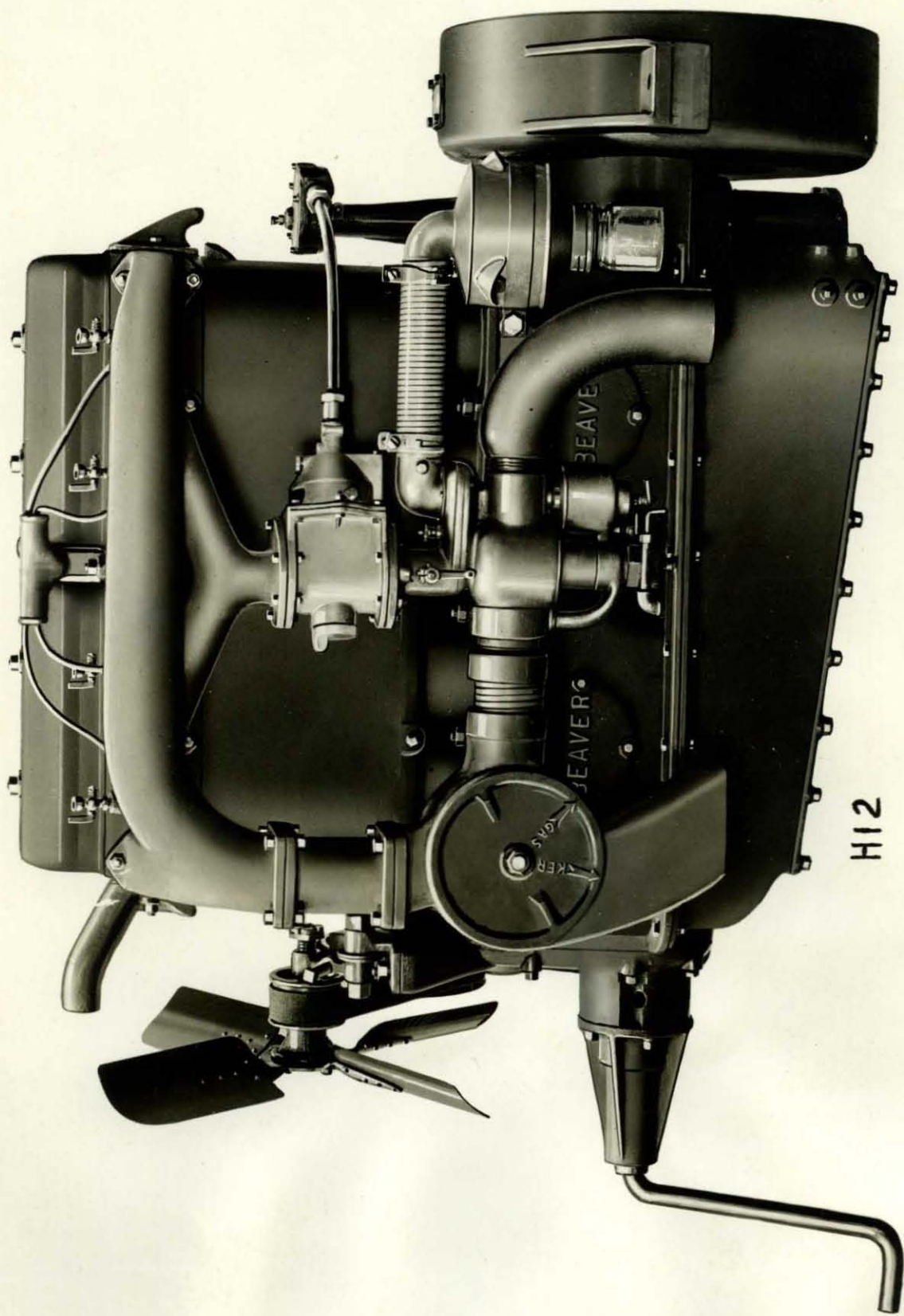


Exhibit 9

Beaver #29



Exhibit E

24. Starting device. **None Standard Equipment**

Electrical ..... Make ..... Model ..... Volts .....

Air Pressure Make ..... Model ..... Pressure .....

25. Spark plugs.

Make or makes **Champion** .....

Size and thread **7/8"- 18 S.A.E.** Type: Standard or long shank **Standard** .....

26. Carburetion system:

Carburetor: (Give information for all carburetors supplied on stock tractors):

Make **Bennett** Size **1 1/2"** Model **EEC with EE-11R Bowl** Fuels **Gas, Kero or Distallates** .....

Make ..... Size ..... Model ..... Fuels .....

Make ..... Size ..... Model ..... Fuels .....

27. Exhaust heat used for (mark x):

Air ..... Fuel .....

Mixture in carburetor **X** Mixture in manifold .....

28. Hot-water jacket on (mark x):

Carburetor ..... Manifold .....

29. Enclose cut or blue print (size 8 1/2" x 11" or 11" x 17") and explanation showing shape and dimensions of intake manifold and application of exhaust heat to air, fuel, or mixture if so used. **Photographs attached.**

30. Water injected with fuel: Yes **Yes** No .....

Describe control valve **Water adjusted by needle valve in carburetor.** .....

31. Fuel tanks. Number **One tank** Capacity Gasoline **3 1/2** gals.,  
**two compartments.**  
Kerosene **22** gals.

Location **Over clutch housing behind motor** .....

32. Air cleaner: Make **Bennett** Size **1 1/2" with 1-7/8" ell.** .....

(Mark x) (a) Dry centrifugal **X** (b) Strained thru cloth or screen .....



# Exhibit F

(c) Water ..... (d) Other type (describe) .....

## 33. Cooling system:

Cooling fluid Water If oil give specification of oil .....

Capacity of system 13 gals.

## 34. Radiator:

Make Perfex Type Cellular Important dimensions .....

## 35. Circulation of cooling fluid: Thermosyphon Yes Pump Centrifugal

Type of pump Centrifugal Pump delivery gal. per min. at rated speed of engine .....

150 gal. estimate

## 36. Air circulation:

By exhaust nozzle ..... By fan X

Fan diameter 22" Number of blades 4 Speed at rated .....

speed of engine R. P. M. 2200 Type drive Belt

## 37. Belt pulley:

Diameter 11" Face 8 1/2" Material Pressed Steel

Is face of pulley lagged No If so with what material .....

Speed R. P. M. (at rated speed of engine) 1000  
900

If gear drive, give gear ratio crank shaft to pulley shaft 1 to 1

Belt pulley shaft bearings: (Describe each bearing)

Type	Make	Size	Material
<u>Tapered Roller</u>	<u>Timken</u>	<u>Cone</u>	<u>Alloy Steel</u>
<u>"</u>	<u>"</u>	<u>Cup</u>	<u>"</u>
<u>Tapered Roller</u>	<u>Timken</u>	<u>457</u>	<u>Alloy Steel</u>
<u>"</u>	<u>"</u>	<u>462</u>	<u>"</u>

## CHASSIS.

### 38. Clutches:

For transmission: Type Disc Make Twin Disc Size 12"

On differential (if used) type None Make ..... Size .....



# Exhibit G

For belt pulley (if separate clutch)

Type Jaws Make Nuttall Size \_\_\_\_\_

39. Brakes: (Describe each brake)

(a) Type Contracting band When gears are in neutral, does brake control belt pulley or traction wheels? Traction wheels  
(Contracting band or shoe)

By which lever or pedal is brake operated? Individual pedals on both rear wheels

(b) Type Contracting band When gears are in neutral does brake control belt pulley or traction wheels? \_\_\_\_\_  
(Contracting band or shoe)

By which, lever or pedal, is brake operated? \_\_\_\_\_

(c) Differential brake (if used). Type Not used

How controlled \_\_\_\_\_ Can both differential brakes be set at once? \_\_\_\_\_

40. Transmission:

Manufacturer R. D. Nuttall Co. Type Sliding gear

Enclosed to what extent Completely enclosed

41. Reductions (pairs of gears) engine to drive wheels.

Speed	Number of Gear Reductions	Gear Ratio, Engine to Drive Wheels
1st (low)	<u>3</u>	<u>51.8</u>
2nd	<u>3</u>	<u>36.1</u>
3rd		
4th		
Reverse	<u>4</u>	<u>74.1</u>

42. Give following information for each gear wheel.

U. S. TRACTOR & MACHINERY COMPANY  
Transmission.

41. REDUCTIONS (Pairs of Gears) Engine to Drive Wheel

Speed	Number of Gear Reductions	Gear Ratio Engine to Drive Wheel
1st (Low)	$3 \frac{42}{20} \times \frac{52}{13} \times \frac{68}{11}$	51.924 to 1
2nd	$3 \frac{42}{20} \times \frac{48}{13} \times \frac{68}{11}$	



42. Give following information for each gear wheel:

Location	Type Gear	Pitch Dia.	No. Teeth
(a) End of clutch shaft	1 Bev. Drive Pinion	4"	20
(b) On spline shaft	1 " " Gear	8.4"	42
(c) On Spline Shaft	1 H.S. Shifting Pinion-Spur	4.25"	17
(d) On Differential Spider	1 H.S. Spur Gear	12"	48
(e) On Spline Shaft	1 L.S. Shifting Pinion-Spur	3.25"	13
(f) On Differential Spider	1 L.S. Spur Gear	13"	52
(g) On Differential Shaft	2 Master Pinions - Helical	3.3897"	11
(h) On Axles	2 Master Gears-Helical	20.9545"	68
(i) On Reverse Shaft	1 Reverse Pinion-Double Spur	3.25"	14
		5"	20
(j) On Clutch Shaft	1 Bev. Gear, Pulley Driver	5"	25
(k) On Pulley Shaft	1 Bev. Gear, Pulley Driven	5"	25
(l) In Differential	3 Bevel Pinions	3"	12
(m) In Differential	2 Bevel Gears	7.5"	30

Face	Inches	Finish	Material	Heat Treatment.
(a)	1 1/2	Grind Bore, Hub & Backing	40-50 C Drop Forging	Nuttall BP
(b)	1 1/2	" " Backing	" " " "	" "
(c)	1 1/2	" " "	" " Upset "	" "
(d)	1 1/2	" Web	" " Drop "	" "
(e)	1 1/2	" Bore	" " Upset "	" "
(f)	1 1/2	" Web	" " Drop "	" "
(g)	2 5/8"	" Bore	" " Upset "	" "
(h)	2 1/2"	" Bore	Rolled Forging	" "
(i)	1 1/2"	" Bore	40-50 C Drop Forging	" "
(j)	1-1/8"	Grind Bore, Hub & Backing	40-50 C " "	" "
(k)	1 1/8"	" " " "	" " " "	" "
(l)	1 1/2	" " & Backing	" " F.S.	" "
(m)	1 1/2	" " Hub & Backing	" " Upset "	" "

43. Shaft Bearings. (Give Information for each bearing used in transmission and rear axle.)

Location	Type	Make	Size	Material
End of axle	2-Roller	Timken	Cat. 5752-5720	Steel
Axle Housing	2-Roller	"	" 5752-5720	"
Ends of Differential Shaft	2-Roller	"	" 6357-6321	"
Ends of Spline Shaft	2-Roller	"	" 4555-4520	"
Hub of Bev. Drive Pinion	1-Roller	"	" 462-4520	"
Hub of Driven Pulley Bev.	1-Roller	"	" 462-4520	"
Pulley Housing	1-Roller	"	" 457-4520	"
Clutch Shaft, Front	1-Roller	"	" 419-412	"

44. Differential

Make R. D. Nuttall Co. Type Bevel  
Open or Enclosed? Open Can it be locked? No.



Exhibit H.

43. Shaft bearings. (Give information for each bearing used in transmission and rear axle.)

*Location	Type	Make	Size	Material
Pilot Bearing	Roller	1-Hyatt	17010	Alloy Steel
Countershaft	"	2-Timken	Cone 4555	Cup 4520 Alloy Steel
Differential	"	2-Timken	" 6357	" 6321 " "
Rear Axle	"	4-Timken	" 5752	" 5720 " "
Drive Shaft (front)	"	1-Timken	" 419	" 414 " "
" " (Rear)	"	1-Timken	" 462	" 452 " "
Belt Pulley (Pinion)	"	1-Timken	" 457	" 452 " "
Belt Pulley (outboard)	"	1-Timken	" 462	" 452 " "

\*Location may be given by reference to cut or blue print attached hereto if desired.

44. Differential:

Make Nuttall Type Bevel

Open or enclosed? Enclosed Can it be locked? No

45. If chain drive is used, give make and description of chain

46. Traction speeds at rated engine speed.

Also mark by (x) speed normally used for plowing.

Speed	Miles Per Hour
1st (low) <u>2.6</u>	<u>2.6</u> <u>2.87</u>
2nd	<u>3.75</u>
3rd	
4th	
Reverse	<u>1.75</u>

47. Wheels, driving.

Number 2 Cast solid? No Section of spoke Tapered 1.0 to .6 sq. in.

Shape of spoke section Rectangular Spokes cast in or built up Built up



SEMI STEEL

12 REQ R.H.

12 REG L.H.

L.H. # WP-16-A



MENASHA, WIS.

CHK 76023

APR. 26 1903

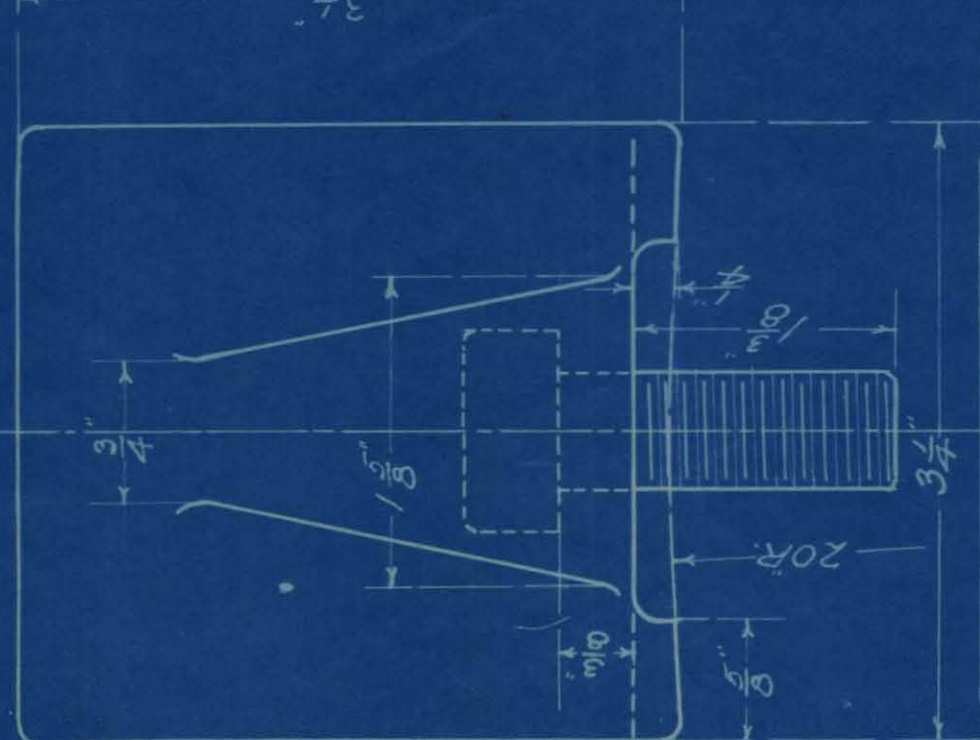
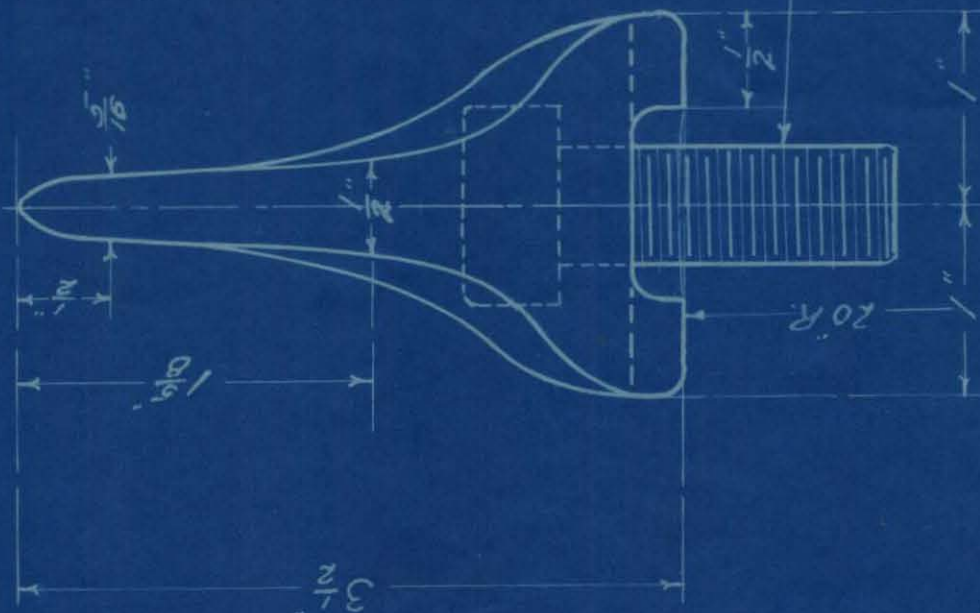
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DATE

WA-15-A.



SPADE LUG  
GREY IRON 48 REQ.



$\frac{5}{8}$ " x  $1\frac{3}{4}$ " MACH. BOLT  
WITH HEX. NUT.

U. S. TRACTOR & MACH. CO.  
MENASHA, WIS.

DR. *A.P.G.* 9/6/19 CHK. *A.P.G.*  
TR. *A.P.G.* 9/6/19 APR. *A.P.G.*

CARD	DATE

WAI4A



# Exhibit I.

Diameter 50 " in. Face 12" in.  
 Extension rims width \_\_\_\_\_ in. Lugs: Give description and dimensions of  
 each type of lug furnished on stock tractors in Nebraska See blueprints of  
WA-14-A and WA-15-A, Spade Lugs and Road Cleats respectively

How is power transmitted to the rim? Live Axle

48. If track laying type, number of tracks \_\_\_\_\_

Length of track bearing on ground \_\_\_\_\_ width of each track \_\_\_\_\_ in.

49. Drive wheel axle.

Live X Stationary \_\_\_\_\_ Diameter 3 in. approx.

Material Carbon Steel

50. Non-driving wheels, number 2

Cast solid? No Section of spoke .5 sq. in.

Shape of spoke section Rectangular Spokes cast in or built up Built up

Diameter 36" in. Face 6" in.

51. Bearings of non-drive wheels (describe each bearing).

Location	Type	Make	Size	Material
<u>Inner</u>	<u>Roller</u>	<u>2-Timken</u>	<u>Cone 3381 Cup 3320</u>	<u>Alloy Steel</u>
<u>Outer</u>	<u>"</u>	<u>2-Timken</u>	<u>" 2795 "</u>	<u>" "</u>
<u>Knuckle (upper)</u>	<u>"</u>	<u>2-Timken</u>	<u>" 3191 "</u>	<u>" "</u>
<u>" (lower)</u>	<u>Plain</u>	<u>2-own</u>	<u>1-3/8 x 1 1/2</u>	<u>Phos. Bronze</u>

52. Steering arrangement.

Knuckle type X Swinging axle \_\_\_\_\_

Other type (Describe) \_\_\_\_\_

Reversible \_\_\_\_\_ Non-reversible X

53. Static weight on each wheel. (Tanks and radiator full, wheel lugs attached.)

Wheel	Weight, lbs.
<u>Left front wheel</u>	<u>930 pounds</u>
<u>Right front wheel</u>	<u>930 "</u>
<u>Left rear wheel</u>	<u>1460 "</u>
<u>Right rear wheel</u>	<u>1460 "</u>



Exhibit J.

Total weight (as above) 4780 pounds

54. Frame.

Cast \_\_\_\_\_ Material \_\_\_\_\_

Built up X Material 4" - 6 $\frac{1}{4}$  lb. Channel

Hot riveted \_\_\_\_\_ Cold riveted \_\_\_\_\_ Bolted X

Description 4 in. side channels are connected by a cast iron front  
frame member and tied together with  $\frac{1}{2}$ " x 3" flat stock bars in  
rear

55. Frame mounting (mark x).

To drive wheels. Spring \_\_\_\_\_ Rigid X

To non-drive wheels. Spring X Rigid \_\_\_\_\_

56. Drawbar.

Height 16-1/8" in. Vertical adjustment (give limits) 7 in.

Lateral adjustment 20 in.

Swiveled? Yes Point of swivel how far forward or back of rear  
axle? \_\_\_\_\_ in.

57. General dimensions.

Wheel base c to c front and rear wheels 85" in.

Tread c to c: front wheels 68" in.; rear wheels 42" in.

Width over all 74" in. Length over all 148" in.

Height over all 72 $\frac{1}{2}$ " in.

Turning radius (outside circle over all) \_\_\_\_\_



Exhibit K.

58. The following items of equipment included in the above specifications are supplied at an extra charge .....

.....The foregoing specifications represent regular  
.....equipment and there is no extra charge for any  
.....of the items.  
.....