O. M. HATCHER AND E. A. BYE.

COMBINED DRAW BAR AND DYNAMOMETER.

APPLICATION FILED OCT. 14, 1916. RENEWED MAY 17, 1920.

1,361,990. Patented Dec. 14, 1920.

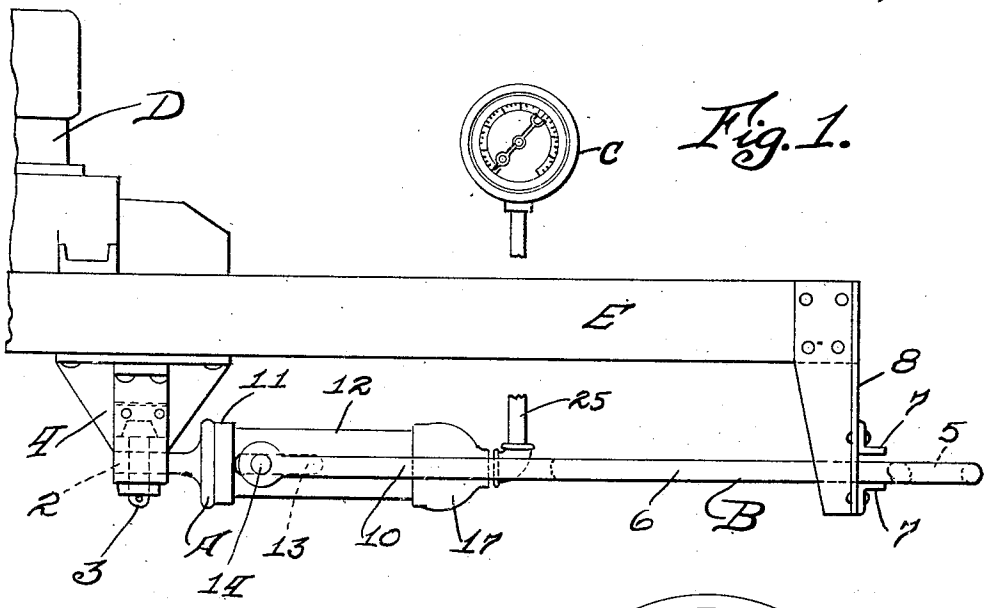


Fig. 1.

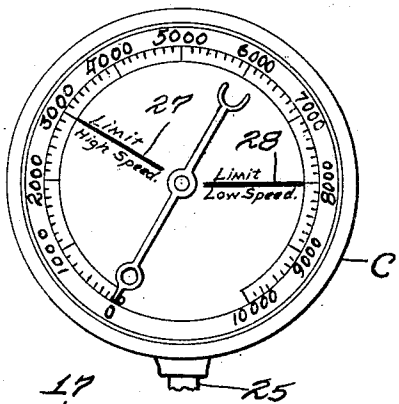
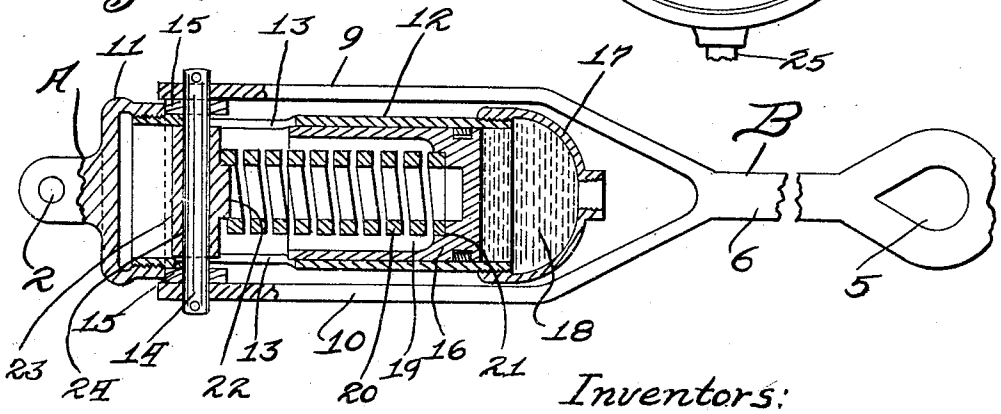


Fig. 3.

Fig. 2.



Inventors:
Oscar M. Hatcher and Edwin A. Bye.
by: H. G. Bradbury.
Attorney.

UNITED STATES PATENT OFFICE.

OSCAR M. HATCHER AND EDWIN A. BYE, OF MANKATO, MINNESOTA, ASSIGNORS TO MAYER BROTHERS COMPANY, OF MANKATO, MINNESOTA, A CORPORATION OF MINNESOTA.

COMBINED DRAW-BAR AND DYNAMOMETER.

1,361,990. Specification of Letters Patent. Patented Dec. 14, 1920.

Application filed October 14, 1916, Serial No. 125,738. Renewed May 17, 1920. Serial No. 382,081.

To all whom it may concern:

Be it known that we, OSCAR M. HATCHER and EDWIN A. BYE, citizens of the United States, residing at Mankato, in the county of Blue Earth and State of Minnesota, have invented a new and useful Improvement in Combined Draw-bars and Dynamometers, of which the following is a specification.

This invention has among its objects to combine into a single element for use on tractors and other vehicles, a draw bar and dynamometer which will simultaneously serve the function of connecting the load to the tractor, of absorbing shocks in draft and of indicating the amount of load, so that the operator may prevent overloading while the tractor is in operation.

Further objects will be apparent from the following description and to these ends our invention comprises the features of construction and combination of parts hereinafter more particularly described and claimed.

In the accompanying drawing forming part of this specification, Figure 1 is a side elevation of a detail of a tractor frame showing our invention connected thereto for use; Fig. 2 is a longitudinal section of our invention, part of the structure being broken away, and Fig. 3 is a face view of the indicator.

One exemplification of our invention is illustrated by the accompanying drawing, but it will be understood that various modifications are contemplated within the scope of our claim.

In the drawing, the draw bar proper is constructed with two main elements A and B, the element A having an eye 2 through which the king pin 3 is engaged to anchor the draw bar to the yoke member 4 secured on the frame E of the tractor, whereby the device is free to swing laterally, and is detachably anchored to the frame. The member B of the draw bar is also formed with an eye or loop 5 for attaching a load to be drawn by the tractor. Immediately ahead of the eye 5 is a shank 6, which is guided freely in a longitudinal channel formed by a pair of transverse angle members 7 secured to a depending bracket 8 on the back end of the frame 5. The lowermost of the members 7 supports the rearward end of the draw bar, but both bracket members are spaced apart and serve to guide the shank 6 while it moves laterally to accommodate the load.

The forward end of the shank 6 is bifurcated into two forwardly extending arms 9 and 10. The rearward portion of the member A is formed with a cylindrical head 11 threaded internally and secured by its threads to a rearwardly extending cylinder 12. This cylinder is formed with a pair of longitudinally and oppositely disposed slots 13 in which a connecting pin 14 is guided, said pin being secured through the forward ends of the sides 9 and 10 of members B. The slots 13 terminate a short distance back of the forward extremity of the cylinder 12, said forward end thus acting as a stop to limit the forward movement of the connecting pin 14 and the member B on member A. A pair of washers 15 interposed between the sides 9 and 10 and the wall of the cylinder 12 serve as bearing members sliding on the wall of the cylinder and as spacing members to hold the sides 9 and 10 free from the cylinder wall.

Reciprocably disposed in the cylinder is a piston 16, and secured over the rearward end of the cylinder is a cap 17, which with the piston forms a pressure chamber in which is placed oil or other liquid 18. The piston 16 is formed with a cup 19 in which is placed a helical expansion spring 20, said spring being seated within a circular recess 21 in the inner end of the cup 19 and over a stud 22 formed upon a back stop 23. This back stop has an opening 24 in which the pin 14 is journaled. The spring 20 acts as a shock absorber, as does also the liquid contained in the compression chamber formed by the cap and cylinder.

The pressure exerted upon the liquid is registered upon a gage C, in pounds, said gage being connected with the chamber in the cap 17 by a pipe 25 or other duct, which may be flexible or rigid according to the construction of our invention, which is employed. In use the draw bar as illustrated is free to swing laterally and to a limited extent up and down according to the load or pull. One trouble which has heretofore occurred in the operation of tractors is overloading. A farmer who is usually unskilled in mechanics will as a rule unknowingly overload the machine because he has had no method of knowing how heavy a load is being drawn. This is especially true in plowing, where there is 100% more or less variance in loads at different depths and in different kinds of soil. This vital objection is entirely overcome by our invention, the operator be-

ing able to determine at any time by observing the indicator what amount of load the tractor is pulling. As the load becomes greater, the piston correspondingly moves, causing the liquid to assume a greater or less pressure, as will be indicated by the gage, according to the traction power of the tractor. This load is evenly distributed by the bifurcated draw bar member and the disposition of the helical spring on the longitudinal axis of the cylinder and its back stop. As the tractor moves ahead over tending obstructions on the road or in the field, the expansion spring 20 and the liquid also minimize the jar on the tractor and load.

The gage is provided with safety indications according to the number of speed reductions the power unit carries. In the drawing, the pointer is adapted to indicate by the safety mark 27, the number of pounds at which it is safe to operate the tractor when running at one speed reduction and by the indication 28, the number of pounds which it is safe for the tractor to pull without overloading at another speed reduction. As many of these safety indications may be provided on the dial of the gage as there are speed reductions under which the tractor is adapted to be operated by the usual internal combustion engine power unit D for example.

The construction illustrated is extremely simple, inexpensive and accurate in indicating the amount of load. While the construction illustrates two draw bar elements movably coupled together with the dynamometer and shock absorber interposed, yet we desire to have it understood that these parts may be rigidly coupled together or united when desired and the elements employed reduced in number and modified in construction within the spirit of our invention.

In accordance with the patent statutes, we have described the principles of operation of our invention, together with the apparatus which we now consider to represent the best embodiment thereof, but we desire to have it understood that the construction shown is only illustrative, and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claim.

Having described our invention, what we claim as new and desire to protect by Letters Patent is:

A combined draw bar and dynamometer, comprising, in combination, a cylinder, a piston reciprocable in said cylinder, a cap detachably secured over one end of said cylinder to complete a liquid compression chamber therein, liquid pressure registering means connected with said cap, a back stop slidable in said cylinder, a shock absorbing spring interposed between said piston and back stop in said cylinder and a pair of draw bar elements, one being pivotally connected with said back stop to provide up and down swinging motion and the other pivotally supported to provide lateral swinging motion.

In testimony whereof, we have signed our names to this specification.

OSCAR M. HATCHER.
EDWIN A. BYE.