Aug. 20, 1935. H. J. DICKENSON 2,011,757

MOTION TRANSMITTING DEVICE FOR PUMPS

Filed Jan. 30, 1935

Fig. 1.

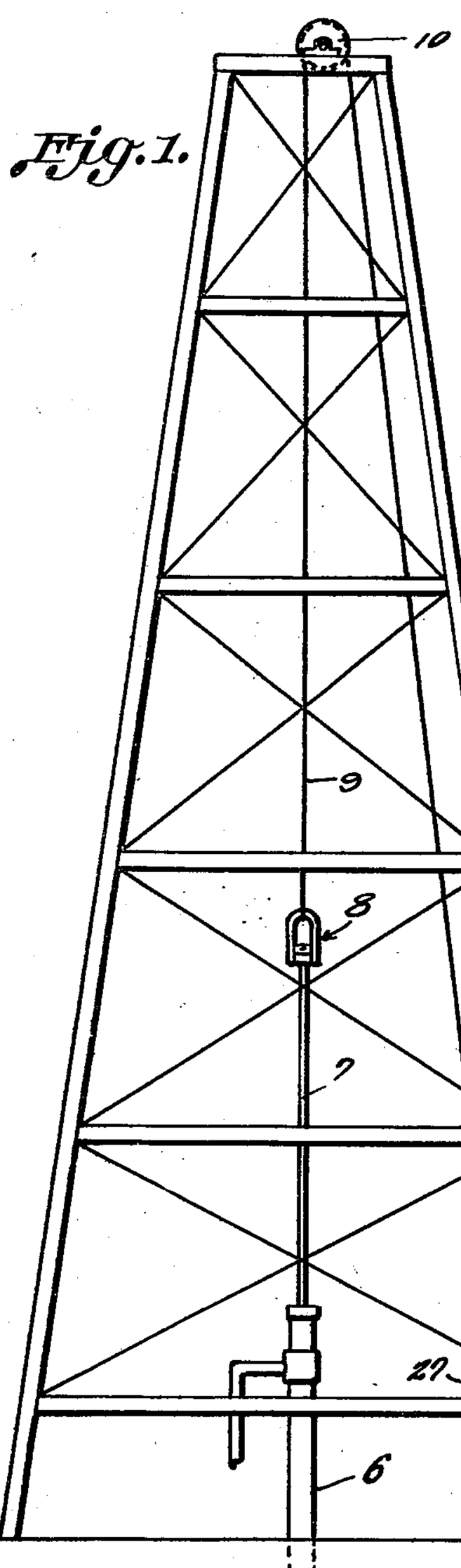

Fig. 2.

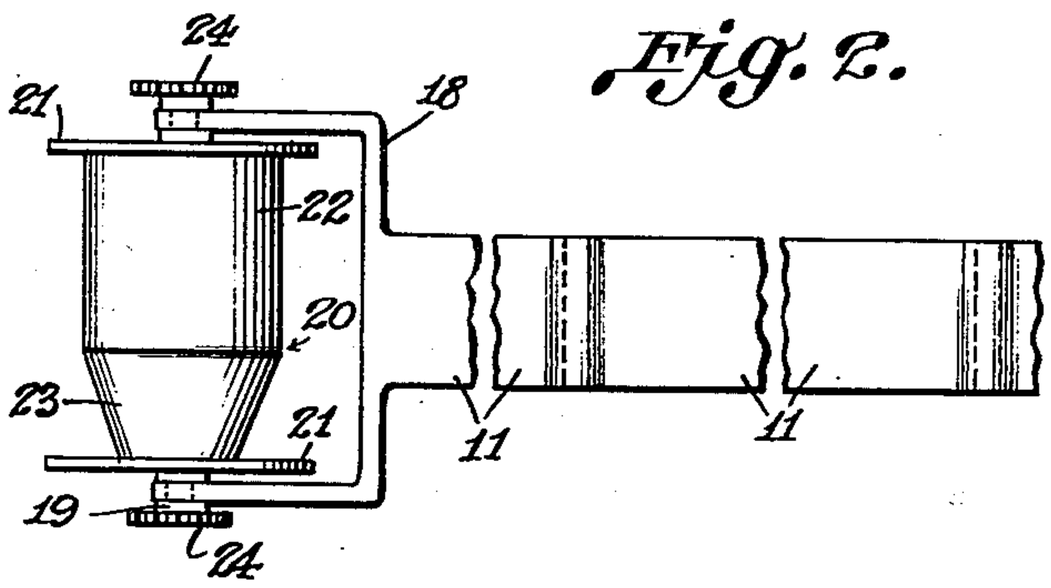

Fig. 3.

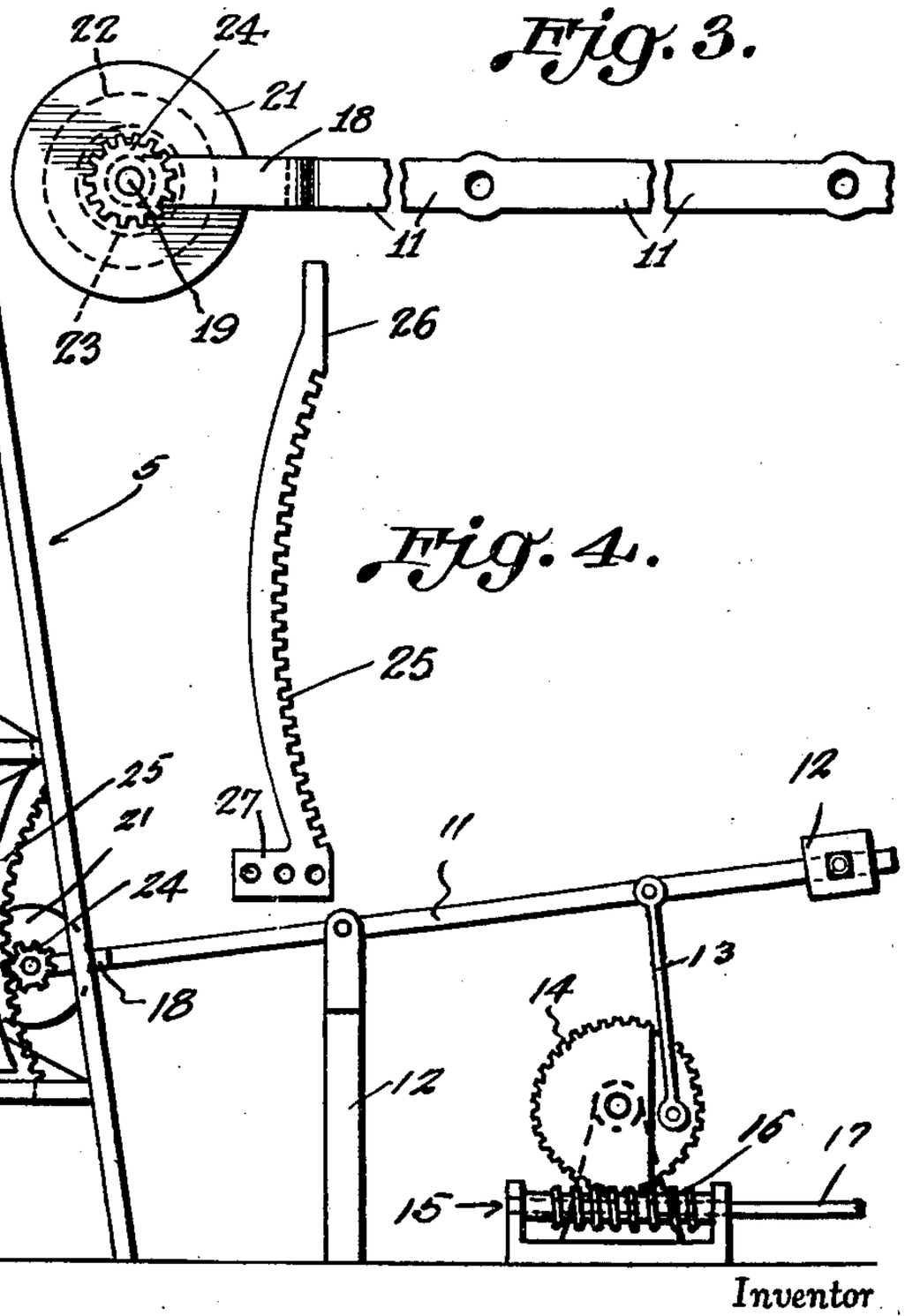

Fig. 4.

Inventor

Herbert J. Dickenson

By Clarence A. O'Brien

Attorney

Patented Aug. 20, 1935

2,011,757

UNITED STATES PATENT OFFICE

2,011,757

MOTION TRANSMITTING DEVICE FOR PUMPS

Herbert Jordan Dickenson, Gladewater, Tex.

Application January 30, 1935, Serial No. 4,141

8 Claims. (Cl. 255—5)

This invention relates to a motion transmitting or power supply device susceptible of use in oil fields and elsewhere, the same having been designed especially with a view toward adapting it for use in conjunction with conventional oil well equipment.

The purpose of the invention is to provide an ingenuous structural assembly of interconnected mechanical elements including a suitable source of power, a walking beam, a sucker rod operating cable, and coordinated drum arrangement, wherein all of said parts have been carefully selected and mechanically coordinated to make for simplicity and expediency of operation in the hopes of providing a device susceptible of overcoming certain recognized disadvantages and to thereby accomplish the desired results in a more dependable and satisfactory manner.

As is evident, my primary aim is to accomplish these results through the instrumentality of a structure characterized by distinguishing features and special mechanical adaptations, and in so doing to promote progress and to improve generally power transmission jacks and the like now employed in the fields.

Other features and advantages will become more readily apparent to those skilled in the art upon reading the succeeding description in conjunction with the accompanying illustrative drawings.

In the drawings, wherein like numerals are employed to designate like or corresponding parts throughout the views:—

Figure 1 is an elevational view illustrating the complete assembly and showing a derrick and pump and the way in which the invention cooperates therewith.

Figure 2 is a contracted top plan view of the drum equipped end of the lever or walking beam.

Figure 3 is a side view of the structure illustrated in Figure 2.

Figure 4 is an elevational view of one of the specially designed arcuate racks.

In the general set up or arrangement depicted in Figure 1 it will be noted that the conventional derrick is referred to by the numeral **5**. The conventional pump casing is denoted at **6** and the reciprocatory sucker rod is indicated at **7**. This is provided with a special swivel coupling **8** to which the operating cable **9** is attached. The intermediate part of the cable is trained over an appropriate sheave or pulley **10** located at the top of the derick while the depending stretch of said cable extends down for attachment to the walking beam **11**. This walking beam, which is of special construction, is pivotally attached to a suitable standard **12** mounted on the platform or base (not shown) within the vicinity of the derrick. The walking beam is pivoted between the center and one end and on this overhanging end is a counterbalancing weight **12** which is selectively and manually adjusted to provide sensitivity of control and effectiveness of operation. Inwardly of this slidable weight is a pitman rod **13** which is pivotally attached to the beam at one end and eccentrically attached to a gear **14** at the opposite end. This gear is rotatably mounted on a suitable base **15** which also carries a worm **16** forming a part of the power shaft **17**. Obviously the parts **16** and **14** are in driving mesh and the power shaft **17** is adapted to be connected with a motor or other prime mover (not shown).

I now call attention to the operating end of the walking beam. As shown in Figures 2 and 3 this is provided with a fork **18** the free ends of the arms of which are provided with bearings to accommodate trunnions or journals **19** on the ends of a rotary drum **20**. This drum is obviously for reeling and winding the cable **9**. The disk-like heads at the ends are denoted by the numerals **21** and are of appropriate proportion. The drum itself includes a cylindrical body portion **22** and a tapered reduced end portion **23** on which the initial winding, at the start of the stroke of the sucker rod, begins. The trunnions carry pinions **24** and these are in constant mesh with the teeth of a pair of spaced parallel stationary rack bars **25**. As intimated there are two of these rack bars **25** and they are of duplicate construction and each has its upper end **26** constructed for attachment to an adjacent part of the derrick. The lower end is formed with a laterally directed apertured foot or bracket **27** which is suitably designed and arranged for attachment to the lower frame bar of the derrick, as shown in Figure 1. Obviously the rack bars are mounted in relation to the pinion to provide the requisite operating connection. It is evident, therefore, that the initial winding takes place on the tapered end **23** of the drum **22** where the greatest pressure is produced. That is to say, the initial upward movement of the sucker rod **7** develops a proportionately greater strain and stress than the remaining part of the stroke after said sucker rod is set into motion. Therefore, the tapered end **23** compensates for this. To secure a better balance, however, the counterweight **12** may be properly adjusted. It is further evident that the winding and unwinding of the cable on the drum,

as it is turned through the instrumentality of the rack and pinion means, is sufficient to alternately raise and lower the pump rod or equivalent device.

By way of comparison with more expensive and complicated power supply devices it is evidenced that the motion transmitting means herein described and illustrated is relatively simple, yet sufficiently practical and dependable to fulfill the requirements of a structure of this type.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawing. Therefore, a more lengthy description is regarded as unnecessary.

Minor changes in shape, size, and re-arrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

What is claimed is:—

1. In a structural assembly of the class described, a relatively stationary vertical standard, a walking beam pivoted on the upper end of said standard, a source of power operatively connected with one end portion of said walking beam, a cable winding and reeling drum mounted on the opposite end of said walking beam, said drum being provided with actuating pinions, and a pair of fixed arcuate rack bars with which said pinions cooperate in order to rotate the drum alternately in opposite directions.

2. In a structural assembly of the class described, a component part in the form of a walking beam, said walking beam being provided at one end with a counterweight, the opposite end being formed with a fork, the arms of said fork having bearings, a drum having journals mounted for rotation in said bearings, said journals being provided with pinions, said drum including a hub portion and heads confined within the limits of the arms of said fork, said hub portion embodying a cylindrical major part at one end and a reduced conical or tapered part at the opposite end for the purposes described.

3. As a new article of manufacture, a rack for use in association with an assemblage of the class described, said rack comprising a longitudinally curved bar provided with rack teeth, said bar having its upper end constructed for attachment to a derrick or the like, the lower end being fashioned into a laterally directed apertured attaching bracket for adjustable attachment to an adjacent part of said derrick.

4. In a structural combination of the class described, a pump, a sucker rod mounted for reciprocation in said pump, said sucker rod being provided at its upper end with a swivel coupling, a derrick, a pulley on said derrick, a cable attached to said swivel coupling at one end and trained over said pulley, a standard, a walking beam mounted on said standard, said walking beam being provided with a drum to which the lower end of said cable is connected, and coacting means between the drum and the derrick for rotating the drum and winding the cable thereon.

5. In a structural combination of the class described, a pump, a sucker rod mounted for reciprocation in said pump, said sucker rod being provided at its upper end with a swivel coupling, a derrick, a pulley on said derrick, a cable attached to said swivel coupling at one end and trained over said pulley, a standard, a walking beam mounted on said standard, said walking beam being provided with a drum to which the lower end of said cable is connected, and coacting means between the drum and the derrick for rotating the drum, said coacting means including a pair of spaced parallel fixed arcuate racks and cooperating pinions carried by the drum.

6. In a motion transmitting structure for pumps, a relatively fixed support, a lever pivoted on said support, power supply means operatively connected with said lever, a cable winding and reeling device carried by said lever, said device being provided with a rotating pinion, and a rack bar relatively fixed in relation to the support and lever, said pinion being operatively engageable with the teeth of said bar for the purpose of rotating said winding and reeling device alternately in opposite directions.

7. In a structural combination of the class described, a derrick, a pulley mounted at a predetermined point on said derrick, a pump associated with the derrick, said pump including a sucker rod mounted for reciprocation, said sucker rod being provided at its upper end with a swivelly attached coupling, a sucker rod reciprocating cable attached at one end to said coupling and having its intermediate portion trained over said pulley, a support located adjacent said derrick, an arm pivoted intermediate its ends on said support, a rotary drum attached to one end of the arm, said cable being connected with said rotary drum, said drum having a rotating pinion, and a rack bar mounted on said derrick, said pinion being operatively engageable with said rack bar, together with means for actuating said arm to raise and lower the drum, whereby to rotate the pinion and drum and to wind and unwind the cable in the manner and for the purposes described.

8. In a structural assemblage of the class described, as a new article of manufacture and a component part of said structure, a walking beam constructed for pivotal connection intermediate its ends to a supporting standard, a manually adjustable counterweight slidably attached to one end of said beam, the opposite end of the beam being provided with opposed bearings, a cable reeling and winding drum having journals at its ends mounted for rotation in said bearings, said journals being provided with pinions, said drum including end confining heads and a hub portion between said heads, said hub portion including a cylindrical part and a reduced tapered end.

HERBERT JORDAN DICKENSON.