# United States Patent [19]

**Wyslouch et al.**

[11] **3,921,836**

[45] **Nov. 25, 1975**


[54] **ARTICULATED HYDRAULIC TRAVELLING LOADER**


[75] Inventors: **Zenon Wyslouch; Eugeniusz Brachmanski,** both of Wroclaw, Poland

[73] Assignee: **Fabryka Maszyn Budowlanych "Fadroma"**, Wroclaw, Poland



[22] Filed: **Nov. 1, 1973**

[21] Appl. No.: **411,811**

[30] **Foreign Application Priority Data**

Nov. 4, 1972 Poland ..... 158617

[52] **U.S. Cl.** ..... **214/142;** 180/51

[51] **Int. Cl.²** ..... **B60P 1/16**

[58] **Field of Search** ..... 180/51, 14 R, 14 A, 12, 180/11, 53 R, 66 R; 214/142



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,862,999 | 6/1932 | Ball | 180/53 R |
| 2,689,621 | 9/1954 | Donley | 180/53 R |
| 3,305,039 | 2/1967 | Molby | 180/51 |
| 3,334,702 | 8/1967 | Granryd | 180/11 X |
| 3,349,932 | 10/1967 | Wagner | 180/51 X |
| 3,366,260 | 1/1968 | Salna et al. | 180/51 |
| 3,521,720 | 7/1970 | Korotkin | 180/66 R X |



*Primary Examiner*—Kenneth H. Betts

*Attorney, Agent, or Firm*—Haseltine, Lake & Waters



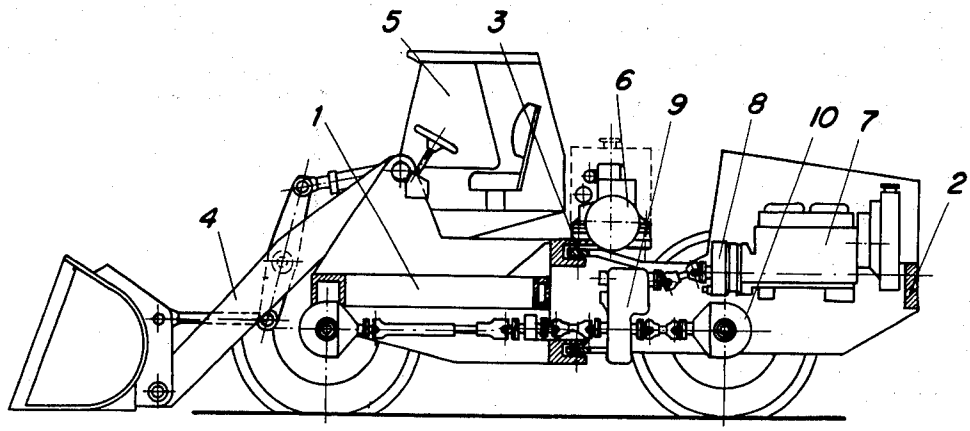
[57] **ABSTRACT**

In heavy-duty hydraulic loaders, the employing of a common internal combustion engine for driving the traversing gear of the machine, and the hydraulic pumps of the working system of the machine is disadvantageous for constructional and operational reasons. In the design according to the invention, two separate internal combustion engines are employed, the one of which drives exclusively the traversing gears of the loader chassis, the other one drives the hydraulic pumps of the working systems, and the auxiliaries.

The engine driving the hydraulic pumps is situated on the front part of the articulated frame of the loader. The traversing gears and the engine driving them are situated on the rear part of the loader chassis.

It is preferable to arrange the engine driving the pumps, behind the driver's cab, transversely to the longitudinal axis of the machine, above the articulated joint of the frame.


**3 Claims, 2 Drawing Figures**



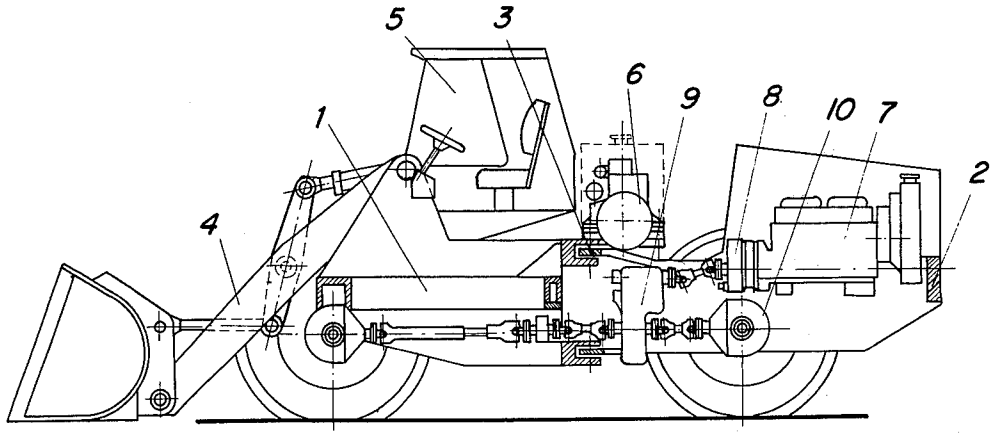



Fig. 1

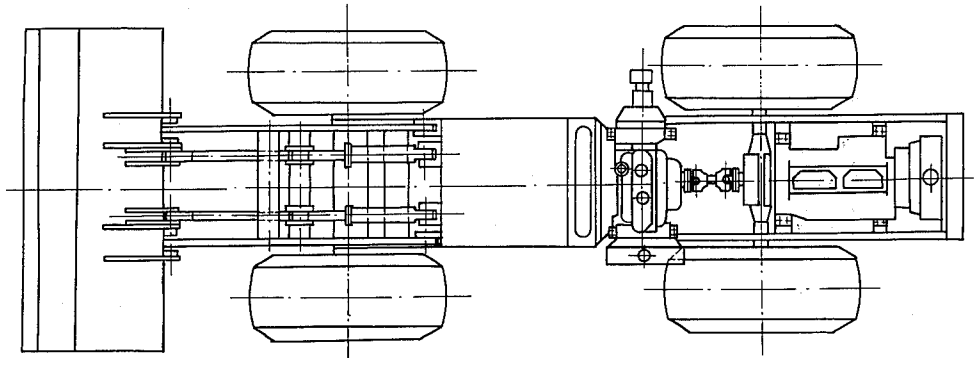


Fig. 2

# ARTICULATED HYDRAULIC TRAVELLING LOADER

The invention relates to a hydraulic bucket loader mounted on a wheeled chassis, the frame of which consists of two parts connected with an articulated joint.

There are known wheeled hydraulic loaders in which the traversing gear and the hydraulic system actuating the working unit are driven by a common internal combustion engine.

The trend to increase the performance of loaders entails the necessity of to mount hydraulic systems showing larger and larger power requirements. In modern loaders the power consumed by the pumps of the hydraulic system exceeds in some phases of the working cycle 50% of the entire power rating of the driving engine of the machine. The peak power requirement of the hydraulic system occurs during shoveling the excavated material, connecting with cutting it. Simultaneously the highest power consumption by the traversing gear of the machine occurs. That results therefrom that the cutting of the ground and taking the excavated material to the bucket occurs during the travel of the entire machine forward.

The phenomenon described above causes a necessity of to mount for the loader driving engines much more powerful as it would result from the power requirement for the traversing drive of the machine. In consequence thereof the engines of known loaders operate in most cases under disadvantageous conditions. On one hand, at long travels of the machine the traversing gear consumes only a dozen or so percents of the engine rated power, and on the other hand at the time of taking up the excavated material, when the power consumption by the hydraulic system rapidly increases, the power requirement for the traversing drive increases too. That leads in the consequence to an overloading of the engine. In both cases the engines operate with insufficient performance.

Moreover, the application of engines having the power rating higher than the power requirements of the traversing gear entails a necessity of a re-dimensioning of said units. The gearboxes, the torque converters, and the driving axles of known loaders must be calculated with taking such excess power into account, and that causes an increase of their dimensions and weights, thus also of manufacturing and operating costs of the machine.

The object of the invention is to eliminate the disadvantages of known loaders, as described hereinabove, and the task leading thereto consists in providing a mutually independent operation of both systems of the machine: the hydraulic working system and the traversing gear.

According to the invention said object is achieved by employing separate internal combustion engines for driving the working system, and the traversing gear.

Namely, on the rear part of the articulated frame of the loader the engine is mounted, driving the traversing gear of the machine, and its auxiliary systems — as the steering and the braking system —, the working system of the machine, actuated by means of hydraulic servomotors however is driven by an other engine mounted on the front part of the frame behind the driver's cab and above the articulated joint.



This engine, differently as the former one, is preferably mounted transversely to the direction of travel of the machine.

The fundamental advantage of the specified design is the possibility of proper matching the power of the engines to the specific operating conditions of both systems. The smaller engine of the traversing drive can in such a case work for a longer time with high utilization of the loading rating, but without overloading resulting from the temporary high power requirement of the pumps of the hydraulic system. The engine driving the working system can however develop a considerable power at the time of the peak power requirement, and during longer travels of the machine said engine may be stopped at all.

In the consequence, both engines operate within the range of better performances, are more economical, and in case of heavy-duty machines the employing of two engines having lower power ratings is even cheaper than the application of single greater units.

Further advantages of the design according to the invention consist in the possibility of free increasing of the performance of the working system, through application of a suitably greater engine for driving the pumps, without necessity of to introduce any modifications into the traversing gear drive. When smaller engines are amployed, the proper selection of them is more simple, owing to narrower ranges of the power ratings of subsequent units.

Moreover, the application of two separate engines admits to design the loaders more advantageously. The loadings of the front and the rear axle of the machine can be better distributed, what significantly influes on the tractive properties.

It is of particular significance in heaviest machines, where a very great engine is mounted behind the rear axle of the loader.

Further, the arranging of the working system engine on the front part of the articulated frame of the loader admits to simplify the supplying of the working medium from the pumps to the distributors and servo-motors. In known designs the oil must be fed from the rear part of the frame by means of long flexible conduits or rotary connectors, if the pumps are arranged near to the engine, or it is necessary to transmit the drive from the rear part of the machine to the front one, where the pumps are mounted. In the design according to the invention the hydraulic system is more simple, and the conduits are more compact, what increases the performance and the reliability of the system.

The subject of the invention is shown by the way of an exemplary embodiment in the accompanying drawing, where -

FIG. **1** is the longitudinal sectional view, and

FIG. **2** is the top view of the loader according to the invention.

As shown in the drawing, the machine is provided with a frame composed of two parts, the front part **1** being connected with the rear part **2** by means of an articulated joint **3.**

On the front part of the chassis the working system **4** is mounted, and the driver's cab **5,** behind which the internal combustion engine **6** is situated, driving the hydraulic pumps of the working system **4.**

On the rear part **2** of the chassis the internal combustion engine **7** is situated, driving the traversing gears of the loader: the torque converter, the gear box **9,** and the driving axles **10.**

What is claimed is:

1. A self-propelled articulated loading machine which comprises:

a. first and second frame sections;

b. an articulated joint interposed between and connecting said frame sections to permit relative movement therebetween;

c. front and rear wheel-bearing axles mounted respectively on said first and second frame sections;

d. a hydraulically operable jib and loader mechanism carried by said first frame section;

e. a driver's cab carried by said first frame section;

f. a first prime mover mounted on said first frame section behind said driver's cab located a predetermined distance behind said front axle such that it serves as a counterweight for said jib and loader mechanism, said first prime mover being drivably connected to said jib and loader mechanism;



g. a second prime mover operable independently of said first prime mover mounted on said second frame section behind said rear axle and drivably connected to at least one of said front and rear axles; and

h. first and second control systems connected respectively to said first and second prime movers.

2. An articulated loading machine as defined in claim 1, wherein said second prime mover has a power rating sufficient to provide tractive power for said machine during all phases of the work cycle, such power rating being less than the power rating of said first prime mover.

3. An articulated loading machine as defined in claim 2, wherein said first prime mover is mounted on said first frame section transverse of the longitudinal axis of the machine and vertically above said articulated joint.

* * * * *