No. 795,777. PATENTED JULY 25, 1905.

J. W. R. LAXTON.

ROTARY PUMP.

APPLICATION FILED JUNE 9, 1904.

2 SHEETS—SHEET 1.

Fig. 2.

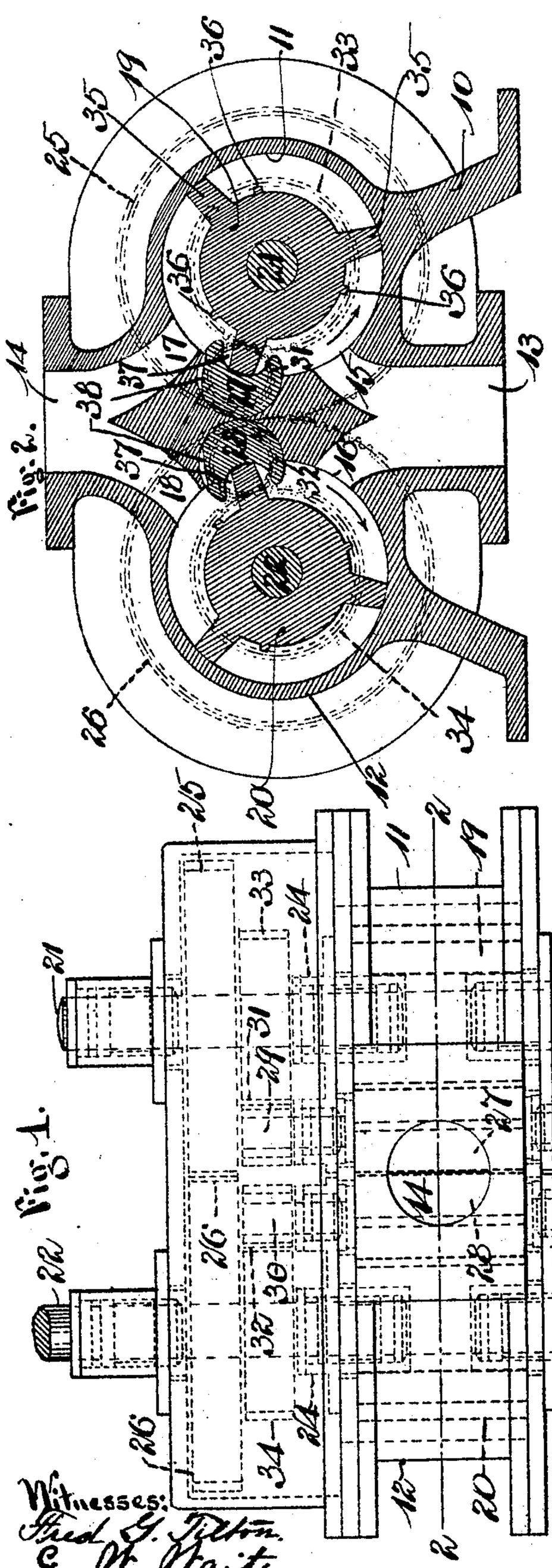

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 4.

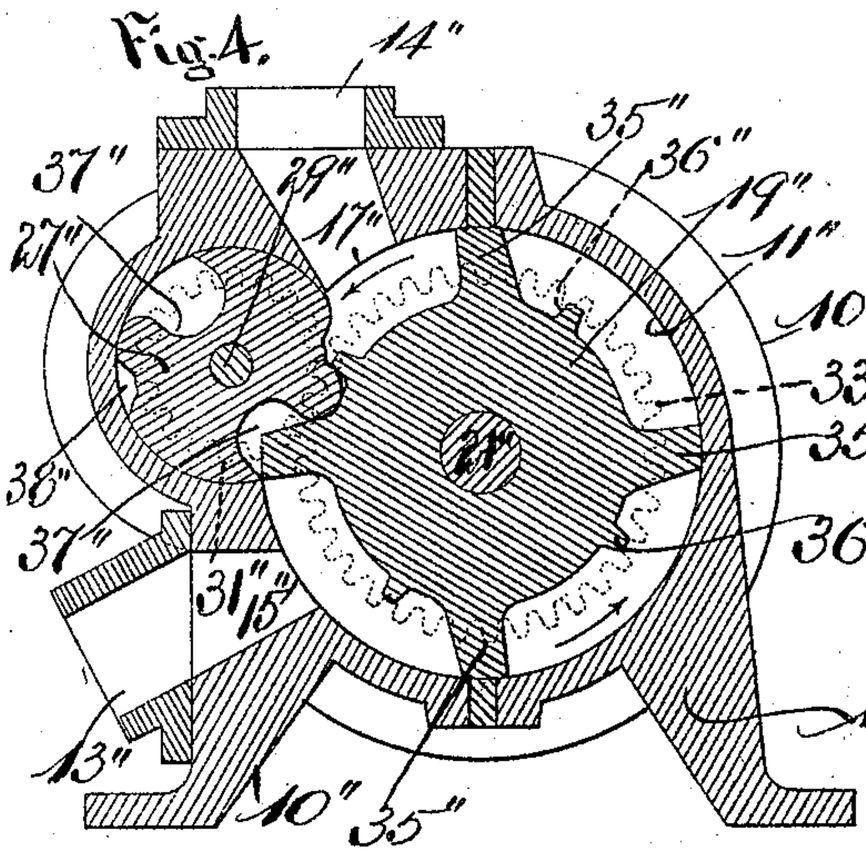
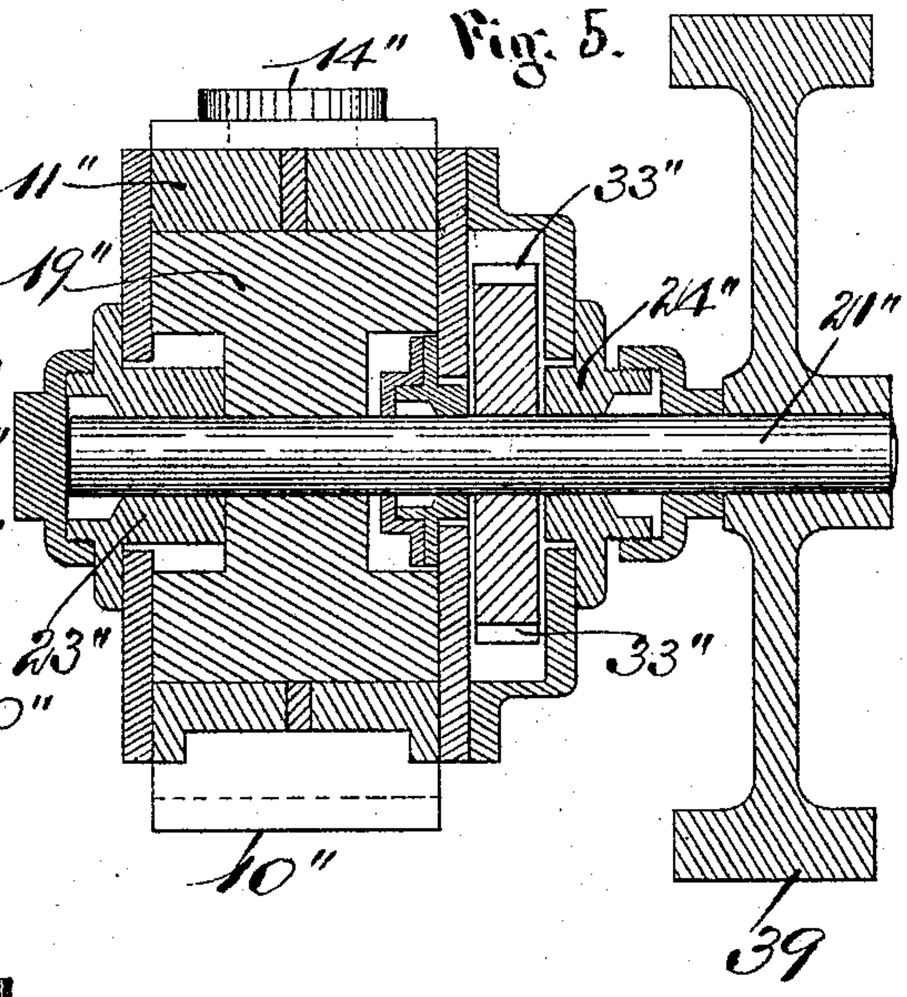


Fig. 5.



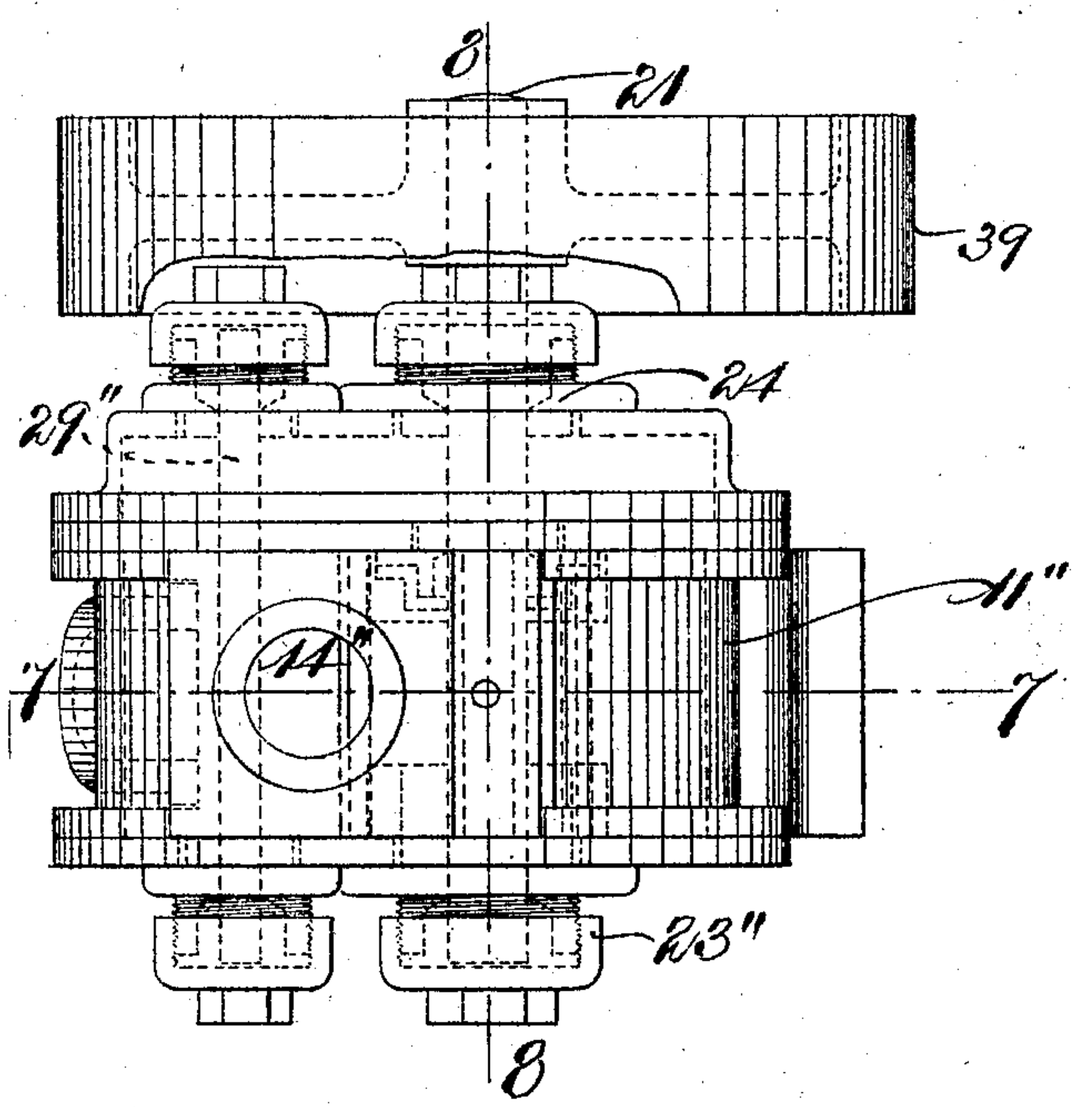


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN W. R. LAXTON, OF LYNN, MASSACHUSETTS.

ROTARY PUMP.

No. 795,777. Specification of Letters Patent. Patented July 25, 1905.

Application filed June 9, 1904. Serial No. 211,725.

To all whom it may concern:

Be it known that I, JOHN W. R. LAXTON, a citizen of the United States, and a resident of the city of Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a full, clear, and exact description.

The object of this invention is the production of a strong, compact, and simple rotary pump, and one particularly well adapted for pumping wet sand, crushed ore, and the like.

The invention consists in a rotary pump comprising in its construction a rotary piston located within a cylinder and coacting with a rotary valve, said piston and valve being of a peculiar and novel form, as hereinafter set forth.

Referring to the drawings forming part of this specification, Figure 1 is a plan view of my improved rotary pump, showing the same as constructed with two cylinders. Fig. 2 is a section taken on line 2 2 of Fig. 1. Fig. 3 is a plan view of a modified form of my invention as constructed for a single-cylinder pump. Fig. 4 is a section taken on the line 7 7 of Fig. 3. Fig. 5 is a section taken on the line 8 8 of Fig. 3.

In Figs. 1 and 2 of the drawings I have illustrated my invention as applied to a two-cylinder pump, in which 10 is the frame, and 11 12 the cylinders. A common inlet-passage 13 and a common outlet-passage 14 are provided in said frame. The cylinders 11 12 are provided with inlet-ports 15 16 and outlet-ports 17 18, respectively, said inlet-ports opening out of the inlet-passage 13 and the ports 17 and 18 opening into the outlet-passage 14. Located in the cylinders 11 and 12 are rotary pistons 19 and 20, fast to shafts 21 and 22, respectively, said shafts being journaled to rotate in bearings 23 24, provided in the frame 10. The shaft 22 is the main driving-shaft and is rotated by a pulley. (Not shown in the drawings, but which is to be fixed thereon.) The main gears 25 and 26 are fast to the shafts 21 22, respectively, and mesh with each other. Adjacent to the cylinders 11 and 12 and projecting thereinto with their peripheries constructed to contact with the peripheries of the pistons 19 and 20, respectively, are rotary valves 27 and 28. These valves are fixed upon their shafts 29 and 30, to which shafts are fastened spur-gears 31 and 32, meshing with auxiliary gears 33 and 34, fixed upon the shafts 21 and 22, respectively. It will thus be seen that as the pistons 19 and 20 are rotated in the direction of the arrows (indicated in Fig. 2) the gears 33 and 34 will turn the pinions 29 and 30 and the valves 27 and 28, said valves each revolving in the opposite direction to that in which its respective piston rotates. The teeth or lugs 35, with which the pistons 19 and 20 are each provided, fit into and contact with the interior surfaces of the recesses 37, provided in the peripheries of the valves 27 28, and the small projections 36 of said pistons fit into the recesses 38, formed in the said valves.

I have found by a practical demonstration that when the large teeth or lugs 35 alone were used, coacting with the recesses 37 in the valves, a certain amount of sand would always follow the piston around in its rotation past the valve and that this defect could not be overcome until I provided the shallow recesses 38 and the small projections 36 in the valve and piston, respectively. By this construction a perfect closure is always presented between said valve and piston.

In the operation of this machine the material to be pumped, such as sand and water and crushed ore and water, enters through the inlet-passage 13 and passes thence through the ports 15 16 to the cylinders 11 and 12 and is then carried around in the direction of the arrows, Fig. 2, by the rotary pistons 19 and 20 by means of the teeth or lugs 35. It is then forced through the outlet-ports 17 and 18 into the outlet-passage 14. On acount of its compact and powerful construction a large amount of wet material can be driven through the outlet-passage in a very short time, while water alone can be thrown in a steady and heavy stream.

In Figs. 3, 4, and 5 another form of my invention is illustrated, the same being a single-cylinder machine consisting of a frame 10″, having a cylinder 11″ and inlet and outlet passages 13″ and 14″, respectively. An inlet-port 15″ leads from the inlet-passage 13″ to the interior of the cylinder 11″, and an outlet-port 17″ leads from the interior of the cylinder to the outlet-passage 14″. A rotary piston 19″ is located within the cylinder 11″ and is provided with teeth 35″ and 36″, coacting with recesses 37″ and 38″ in the valve 27″. The piston 19″ is fast to a shaft 21″, journaled to rotate in bearings 23″ 24″ in the frame 10″. The shaft 21″ is rotated by a pulley 39 and imparts motion to a gear 33″ and from thence to the pinion 31″

on the shaft 29″ and to the valve 27″. The operation of this form of my invention is the same as in the construction illustrated in Figs. 1 and 2, except that the forms of the teeth 35″ and 36″ and of the recesses 37″ and 38″ are different. The main differences consist in having the teeth or lugs 35 of the former construction made with their faces symmetrical with respect to a radius through each, while in this latter construction said teeth 35″ are made with a forward rake. In regard to the recesses 38 and 38″ the former construction of pump shows said recess hardly more than a rather extensive flattening of the valves 27 and 28, while in the latter construction such recess is much more pronounced depression in the peripheral surface.

Another difference consists in so proportioning the gearing and diameters of the valves that where the valve 27″ in the case of the Figs. 3 to 5 construction is formed with two oppositely-located recesses 37″ in the Figs. 1 and 2 construction each valve has but one such depression or recess 37, and consequently must be rotated more rapidly.

It should be observed that the small tooth or projection 36 rises but a short distance from the periphery of the piston as compared with the large tooth or lug 35, near to whose base it is located, and, moreover, that this small tooth is at the rear of such large tooth relative to the piston's direction of rotation. Such proportion and arrangement I find to produce the best results in pumping grit-carrying liquids.

As shown in section in Fig. 5 and in dotted lines in Fig. 1, the rotary piston and valve of each pump are located in a water-tight frame or casing 10 11 and that the gearing by which said rotary parts are kept in proper rotatable relation is located in a second water-tight casing exterior to the first-named casing, thereby insuring against the accession of sand and other injurious matter to such gearing. The gear-casing shown in Fig. 1 is shown much more commodious than that in either of the other constructions illustrated in order to make room for the three sets of intermeshing gears—the two spur-gears 25 and 26, by which the shafts 21 and 22 are rotated in unison, and the two pairs of gears 31 33 and 32 34, by which the valves 27 and 28 are maintained in proper relation to their respective pistons.

What I claim as my invention, and for which I desire Letters Patent, is as follows, to wit:

1. A rotary pump constructed with a rotary cylindrical piston having teeth or lugs upon its periphery extending longitudinally thereof and projecting alternately to two different radial distances, and a rotary cylindrical valve contacting with said piston and formed with recesses to receive said teeth or lugs.

2. A rotary pump constructed with a rotary cylindrical piston having a plurality of large teeth or lugs projecting radially therefrom and located at equal distances apart, and a small tooth or projection rising a short distance from the periphery of said cylindrical piston near the base of each large tooth or lug; and a rotary cylindrical valve contacting with said piston and formed with recesses to receive said teeth.

3. A rotary pump constructed with a rotary cylindrical piston having a plurality of large teeth or lugs projecting radially therefrom and located at equal distances apart, and a small tooth or projection rising a short distance from the periphery of said cylindrical piston near the base of each large tooth or projection but at the rear thereof; and a rotary cylindrical valve contacting with said piston and formed with recesses fitted to receive said teeth.

4. A rotary pump constructed with a cylindrical piston having a large tooth or lug projecting radially from its periphery, and a small tooth or projection rising a short distance from said piston near the base of said large tooth but at the rear thereof; a cylindrical valve contacting with said piston and formed with recesses fitted to receive said teeth, and external gearing to rotate said piston and valve in proper relation.

In testimony that I claim the foregoing invention I have hereunto set my hand this 2d day of June, 1904.

JOHN W. R. LAXTON.

Witnesses:
A. B. UPHAM,
E. C. BUMPER.