

DISCUSSION.

MR. A. W. TOURNAY-HINDE said that about seven or eight years ago Mr. H. W. Kerle turned his attention to this subject and devised several forms of elevators for this purpose, the simplest arrangement among them being the attachment of a balance weight to a piston rod, fixed to the underside of the piston, and protruding below the bottom of the cylinder. This weight was so proportioned that it would raise the car and attendant without the use of any water, and if the car when at the top were loaded with passengers or goods it would then descend and overcome this balance weight. If it were required to lower the empty car it was then necessary to use a small amount of water. Again, when the descending load was sufficiently heavy, an arrangement existed to return water to the accumulator instead of allowing it to exhaust. When a heavy load was lifted then water was used.

There were several other designs made so as to give a greater variety in the use of power, and some half-dozen of these lifts of various kinds—some multiplying rope lifts, and some hydraulic balances—were put up in Sydney, but one of the principal troubles was the following:—

In the event of the car starting from the bottom with a full load, then the valve line was pulled by the attendant until the valve had opened the passages supplying water to the full area available and the car commenced to ascend. When it became necessary to stop the attendant reversed the hand-line, and here the trouble commenced, for before the valve could be brought back into the stop position, it had to pass, say, from the third power to the second, and then to the first, and it

sometimes happened that the lift stopped at the second power, and then when a person was getting out and had one foot in the car and one on the landing the car commenced to ascend, for the load was lightened, and if to prevent this the valve line was brought right into the stop position, then sometimes number one power would not support the load at all, and the car descended before it could be made to stop, and to bring it level with the landing it was necessary to repeat the whole operation again.

In order to overcome this trouble, Mr. Kerle designed a special automatic valve, to control the water after it had passed the starting valve, and before it entered the cylinders. It was arranged in this way: The valve was of piston type, with various ports and openings to the cylinders; the spindle protruded through the top cover of the valve casing, and on the cover were arranged two vertical guides or columns, which had threaded over them rectangular weights, so placed that the higher the spindle rose it carried more and more of these weights. The spindle was attached to a piston working in a cylinder in the lower part of the valve casing, and this piston was actuated by the pressure due to the weight of persons or goods in the car, in somewhat the same manner as Mr. Duncan had devised. This automatic valve, used in conjunction with the ordinary starting valve, effectually overcame the trouble, and really did the same thing as Mr. Duncan's arrangement, the difference being that in Mr. Kerle's case the differential areas were in the lift machine itself instead of being independent.

The independent machine, however, had this advantage that it could be added to existing elevators, where there was sufficient room.

The next person in the field was a Mr. Lawrence, who, some four years later, brought out a machine which was fairly well known to some of the members. It was somewhat complicated, and it was not much of an advance upon what had already been done; it was not automatic in its action, and relied

upon the attendant in charge to regulate the supply of pressure to the different areas.

Soon after the appearance of this machine Mr. Norman Selfe brought out a two-power elevator, which he called the "Victory." It was a simple machine but contained some of the defects of the earlier machines of Mr. Kerle's, for the starting valve controlled the supply to the different areas, instead of an independent valve actuated by the lift itself. The hand wheel to this starting valve was, however, automatically permitted, when the load was sufficiently heavy, to further revolve, and allow the attendant to use the second power, but it was impossible to bring the valve back to the stop position without first passing the first power position, causing the same uncertainty in the stopping as Mr. Kerle experienced in his earlier machines.

Latterly an English inventor had patented combinations of cylinders and rams which would give as many as twelve different grades of power. An automatic controlling valve was used, of a similar kind to the one used by Mr. Kerle, but instead of controlling it by means of a hydraulic communication between the lift cylinder and the valve, he attached the main overhead sheave, carrying the car, to a lever which worked the valve, so that as more weight was placed in the car the end of the lever was more depressed or tilted, and the water admitted accordingly.

To proportion the consumption of water to the work to be done in a hydraulic elevator was, no doubt, the right direction for improvement, but owing to the extra cost involved, complication of parts, and extra attendance required, it did not follow that the saving in hard cash was so large as the saving in the water consumed.

Mr. Duncan, however, seemed to have so much faith in his apparatus, that he was prepared to place the machines free of cost, and simply relied for his payment on the receipt of a portion of the saving effected by the use of the apparatus.

Mr. H. W. Kerle said it was some years since he had much to do with lifts, but he would attempt to show what he had done in this matter, and the Association could then criticise the relative merits of the patents. He was not in a position to criticise, because he was not aware of the advantages of Mr. Duncan's patent; but, as far as he could see by the drawings, he (the speaker) thought he had anticipated him by about five years. The first idea he had in this matter was by making use of a cylinder and fitting a piston to the head of the ram, and thus obtaining differential areas of the piston and the ram. He also took advantage of the weight in the lift itself, and theoretically the idea was to allow the lift to ascend by its own weight and to overcome that weight when the cage was at the top by admitting a small area of water underneath the ram to bring the cage down; that was the first pressure. The second pressure was after the ram was down, and the amount put in the cage was more than sufficient to allow the cage to go up without the admission of further water, to allow the water to come in on the lower and top side, thus making use of the area embraced by the ram itself. If that was not sufficient the water could be excluded from the ram, and thus make use of the whole of the area of the piston, thus giving three powers. The valve was theoretically right, but practically was worthless, and this was the difficulty. He designed other types of valves, but without success. At the time he was working out the question of the multiple hoist he had under consideration the question of adopting the same principle to ram lifts, which idea he had since patented. In the balancing of direct-acting lifts the difficulty was not in the lift itself, or in the principle connected with it, but in the difference in the weight of the ram when in and out of the water. Mr. N. Selve had overcome this difficulty in what he considered a very mechanical and satisfactory manner.