HYDRAULIC RAMS, THEIR PRINCIPLES AND CONSTRUCTION

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649401956

Hydraulic Rams, Their Principles and Construction by J. Wright Clarke

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

www.triestepublishing.com

J. WRIGHT CLARKE

HYDRAULIC RAMS, THEIR PRINCIPLES AND CONSTRUCTION

Trieste

HYDRAULIC RAMS

THEIR

PRINCIPLES AND CONSTRUCTION.

HYDRAULIC RAMS

THEIR

PRINCIPLES AND CONSTRUCTION.

INCLUDING SOME EXPERIMENTS CARRIED OUT BY THE AUTHOR AT THE REGENT STREET POLYTECHNIC AND VARIOUS PARTS OF THE COUNTRY.

BY

J. WRIGHT CLARKE,

AUTHOR OF "PLUMBING PRACTICE," "LECTURES TO PLUMBERS," "CLARKE'S TABLES," "PUMPS," ETC.

WITH THIRTY-SIX ILLUSTRATIONS.

LONDON:
B. T. BATSFORD, 94, HIGH HOLBORN.

1900.

PREFACE.

THE Author, when a boy, was fascinated by the working of a hydraulic ram, which he had frequent opportunities of seeing, near his home in the country; since then he has had to do with a great many, both old and new. The experience he has gained in practice, and from a large number of experiments with a ram especially fitted for the Regent Street Polytechnic, has been of great value to him for both practical and lecturing purposes.

Thinking the subject matter of this little book would be of interest to his fellow-workers it was published in the "*Plumber and Decorator*," and, as it has been asked for, it is now issued in its present handy form.

No claim is made to literary merit, but the Author hopes this may be found useful, and meet with the same kind reception that has been accorded his other books.

J. WRIGHT CLARKE.

November, 1899.

LIST OF ILLUSTRATIONS.

HYDRAULIC RAMS.

A HYDRAULIC ram is a machine with no moving parts, excepting two working valves and sometimes one air valve, and is used for raising a portion of the water which works it to a height, such as from a valley to a cistern in a house, or a reservoir or water tower, in some elevated position.

Before describing the ram and its capabilities it will be advisable to explain certain principles in hydro-mechanics and thus help to make the action more clearly understood.

In earlier lectures the principles of what is commonly known as "water-hammer" in pipes were explained, and also the appliances used by plumbers for preventing the objectionable noises made when the flow of water in pipes is suddenly arrested.

In those lectures the action of air vessels was explained and also their object, which is to slowly arrest the impetus, or momentum, of the water moving in a pipe when a cock attached to it is suddenly closed.

If, instead of fixing an air-vessel to the service-pipe, and near the bib-cock, the end of the pipe was continued upwards above the level of the cistern, or reservoir, as shown by diagram, Fig. 1, and water allowed to flow out of the cock, on quickly closing the latter the water will rush up the pipe A, to a considerable height above the level of that in the cistern, and then subside again to the level line.

As another illustration, it has been found in practice that where a service-pipe from a cistern had an air-pipe fixed below the stock-cock, as at B, it has been found necessary to turn the end, out of which water spouted, over the top edge of the cistern, when a bib-cock on the service-pipe has been suddenly closed.

When arranged as shown in the diagram the water nearly all runs out of the pipe A, when the bib-cock is first opened. But when suddenly

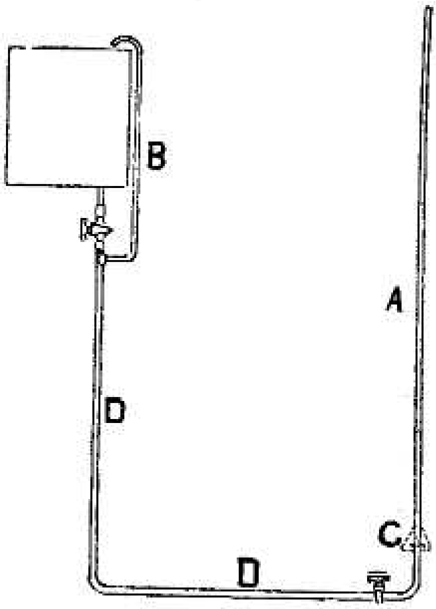

FIG. 1.

closed the water will rush up much above the cistern level, having only an air resistance, and, unless the pipe is continued high enough, escape out of the top end.

By fixing a valve, which opens upwards, where shown by dotted lines at C, the water is retained in the pipe A, so that the latter does not partially empty when the bib-cock is opened. By constantly opening and suddenly closing the latter a considerable quantity can be raised to a height above the level of the cistern. But, as the water in the pipe is in a state of inertia, or motionless, some of the power is spent in putting it in motion, and not so much is driven out of the top as would be the case if an air-chamber was fixed just above the valve at C.

The longer the pipe D D, and with a clear way bib-cock, not less in diameter than the pipe, the greater the height to which the water would be raised.

To still further show the power of water, when suddenly checked it is only necessary to recall memories where lead-pipes have been split in the sides, and after repairing or renewing them, had again to repeat the repairs or renewals. The writer has samples of lead-pipes split both longitudinally and transversely. A sketch of a $\frac{3}{4}$ in. lead bend is shown by Fig. 2,

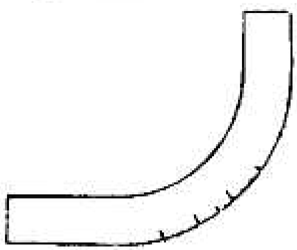

FIG. 2.

and that the cracks were not from any defect in the manufacture of the pipe or workmanship, when making the bend, was evidenced by bending other portions of the same pipe without any defects being found. It is for such reasons as this that screw-down valves are sometimes preferred to cocks with keys, as they are closed more slowly. By these illustrations it will be understood that moving water has considerable force. In the example shown by Fig. 1, the water in the pipe D D, is first put in motion by gravity, and, being in motion, has neither the will nor the power of itself to stop, but keeps moving until an opposing force takes effect.