

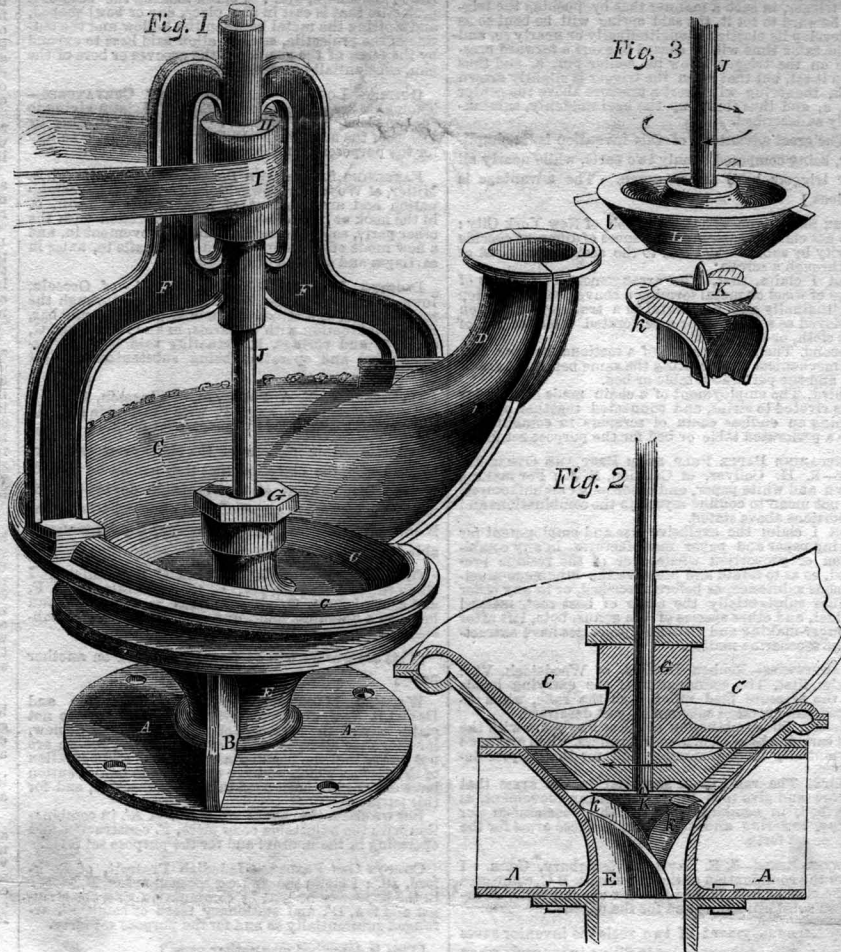


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ANDREWS' CENTRIFUGAL PUMP. 126-1



This invention is certainly entitled to a place of no small merit among the array of appliances for raising water which everywhere met our view in strolling through the Crystal Palace. The common suction pump, the simplest and oldest of pumps, is in many cases "shelved" in places where a continuous stream is required, and rotary ones, in a great measure, take its room. Now to rotary pumps there is a slight, but very slight, objection, and that is, that in sending the water round such a sharp curve as is usual, a large amount of power is expended in overcoming the resulting friction. The pump we are about to describe endeavors to overcome this difficulty by drawing the water up a spiral passage, and making it strike the revolving piston at the angle which it will continue in its passage through the pumps.

In our engravings, Fig. 1 is a perspective view of the whole arrangement; Fig. 2 a section through the pump; and Fig. 3 shows the piston and spiral piece separated. Similar letters refer to the same parts in each.

A is the bottom flange, to which is screwed the suction pipe, and which forms the base of the pump. B is a piece supporting and giving strength to the body of it, C, which is formed of a spiral tube, increasing in diameter to the delivery pipe, D. E is the neck or narrow portion. F a support for the piston rod, J. G is the stuffing box, H the pulley, and I the band.

In Fig. 2, K is a concave-shaped cone, having three spiral pieces or flanges, *k*, so placed on it as to divide the suction pipe into three passages, and it is firmly fixed in the pump; on its top is a small stud or pin, projecting as seen at Fig. 3, and this forms the lower axle of the piston, L, which carries three small fan-like projections from its surface, *l*, and these by revolving very quick produce the

vacuum, and drawing up the water, it meets them at exactly the angle which it will have to continue in its exit, so that no force is lost in twisting the water round, as every one knows it is much easier to send water on in the way it is already moving than to send it on in any new direction.

This is one of the most perfect pumps we have seen; and persons interested can judge for themselves by going to the Crystal Palace, where there are two at work. It was patented in America, August, 1854; and Great Britain and France, November, 1856.

This pump is the invention of W. D. Andrews, 414 Water street, New York, from whom all particulars may be obtained.

**Metal Work.**

Works executed in metal should have a distinctive character about them, differing in treatment from those employed when the work is executed in other materials, such as wood, glass, or stone. In metal work, the ductility and tenacity of some of the metals—the value, color, and power of reflecting light in others—are elements which ought to be considered in the design and execution. Nothing is more common at the present day than to see the conditions reversed (that is, to see imitations in cast iron of what should be wrought), a form copied in the most fragile of metals which was originally produced in the most ductile—or attempts made to substitute, by means of the molder's art, the triumphs of the hammerman's skill. In works of this class, in the ancient and middle ages, the conditions were rarely reversed. Fitness in material and in purpose was observed, and ornamentation was always subordinate to the purpose. Thus, in the preparation of the metal work for the ark in the tabernacle, and for Solomon's temple, those portions exposed to much wear

policy of management is "penny wise and pound foolish." 126-3

"The expenses of operating well-managed roads are generally from fifty to sixty per cent of their gross earnings."

"The wear and tear of track and machinery are very nearly in the ratio of the speed of the trains; therefore (within reasonable limits) the slower the speed the less will be the expenses, when considered with reference to the amount of business done."

"The safest and most profitable speed is about twenty miles per hour for passengers, and ten miles for freight trains, and they should never exceed these limits except in cases of emergency."

He complains of the reckless manner in which railroads are managed in reference to high speeds, and advises a reduction of it to a much lower standard. There are 88 railroad corporations in the State; the total length of track (double and single) in operation, is 3,576 miles; the total expenditure in their construction has been \$136,689,690.

The foregoing extracts deserve attention. We shall finish with the following one, which deserves to be written in letters of gold:—

"The employes upon a railroad, who have business intercourse with its patrons or the public, should be men of integrity, gentlemanly manners, firm purpose, and unexcitable temper."

**Railroad Management.**

The New York State Engineer—Silas Seymour—in his report, dated the 15th ult., imparts some very excellent advice regarding investments, and the management of railroads. He says:— 126-2

"Disinterested parties should never be induced to invest in a railroad enterprise without first making an allowance larger than any limit yet ascertained, for exaggerations in the reports of engineers, and statements of other parties, who have either already invested or are to be benefited by its construction."

"The road and outfit should always be of the first-class, and kept in perfect condition."

"The control of the operating department should always be in the hands of men of sound judgment, large experience, and inflexible honesty."

"The true and only reliable source of revenue and profit to railroad companies is the local business naturally pertaining to the country and towns through which the road passes, or at which it terminates. This business should always be encouraged, by doing it upon the most reasonable terms, and to the satisfaction of those who create it."

This is good and much-needed advice, for some of our railroads, in their stupid management, act upon opposite maxims. Instead of encouraging the local business of towns along the lines, especially in passengers, they actually discourage it. Thus the New York and Erie Railroad charge three cents per mile on way trains, running at the rate of thirteen miles per hour, and only two and one-fourth cents per mile on express trains, running at the rate of twenty-five miles per hour. This