

The Prall Steam Pump.

In these days of progress, speed and invention, machinery must take the place of hand power, wherever such a thing is possible, and we are continually replacing one piece of machinery with another, if the slightest improvement is manifest. This is especially the case with pumps, of which there are probably more varieties and modifications than in any other class of machinery, with the exception, perhaps, of washing machines. In each of these inventions we try to simplify as much as possible the complications of previous articles. With simplicity of construction we attain not only that desirable object, cheapness, but gain space, reduce friction, and lessen the liability of the machine getting out of order. One of the late inventions in the line of steam-pumps, which shows a wonderful simplicity of construction and operation, is called the Prall Automatic Steam-Condensing, Vacuum and Force Pump. We recently saw this pump in operation at the Pacific Iron Works on First street, in this city (San Francisco), where it can be seen by those interested.

The cylinders are made of metal, lined with wood. Into the upper end of these cylinders a small steam-pipe is led from the boilers, the pipe being opened and closed by a simple two-way valve. A flat plate is placed opposite the mouth of the steam-pipe in the top of the cylinders to deflect and diffuse the steam as it enters. To the bottom of the cylinders is connected a single suction-pipe. Simple check valves are placed on both the suction and discharge-pipes to prevent a reflux of the water passing upward. The valve-chambers are constructed with face-plates, which admit of ready detachment, so as to admit of removing and replacing the valves. A small injection-pipe communicates from one cylinder to the other, through the valve-chamber, and throws a jet of water into the steam as soon as soon as it has driven the water out of the cylinder. A vacuum is thus formed, which draws the water from the suction-pipe and again fills the cylinder.

The automatic movement of the steam-valve, which admits and shuts off steam at the proper moment, is produced by means of a diaphragm of rubber, or of thin elastic metal, and connected with the valve by a simple rod. This diaphragm is placed between two disks, which are slightly dished on their inner sides to admit of a play or movement of the centre of the diaphragm between them, equal to the extent of movement required in the valve. This diaphragm is connected to the cylinders by water channels moved by alternate pressure on each side, thus admitting steam to one cylinder by downward movement, and to the other by upward. An air-valve is placed in the upper part of each cylinder, admitting a little air into the top of the cylinder whenever a vacuum is formed.

In the operation of pumps thus constructed the pressure of the water in the cylinder when filled, bearing against the diaphragm, will bear it up against its upper plate. The movement communicated through the rod to the upper valve is sufficient to open the valve wide. If steam be now admitted through the steam-pipe, it will pass through the valve at the upper end, and entering the cylinder will be diffused by the plate placed under the opening, into a stratum of air upon the water. The stratum of air serves to prevent all agitation of the water by the steam when it enters, so that it will spread itself quietly and evenly over the entire surface, and operate directly and as effectively as if upon the piston of an ordinary steam-pump. The very thin film of air being instantly heated at the first contact of the steam, all further condensation of the latter is entirely prevented, and the full pressure of the steam is brought to bear upon the water, to force it out of the pump through the discharge-pipe, noiselessly, and without friction, to any desired height, in proportion to its initial pressure. When, however, the steam, in expelling the water from the cylinder, follows it into the discharge-pipe, it is partially condensed, and the pressure on the under side of the diaphragm is so far removed as to cause the latter to move and close the steam-valve, whilst sufficient water is simultaneously withdrawn from the injection-pipe to complete the entire condensation of the steam, and produce a vacuum which will cause the cylinder to promptly fill from the suction-pipe. As soon as the cylinder is filled, the diaphragm will again move under the pressure thereof, steam will again be admitted, and the operation of the pump thus repeated. One cylinder is being filled while the other is being emptied, so the flow is continuous, and no intermittent action is apparent.

In one of the simplest adaptations of the pump for operating with steam at a pressure of from one to five pounds, the delivery-pipes are arranged entirely beneath the pumping cylinder, so that the water may discharge by gravity alone, or with slight additional aid. The condensation of steam admitted at this low pressure will produce a vacuum which will cause the pump to fill, even when placed at a height of thirty feet above the water, by means of atmospheric pressure, the admission of steam being sufficient to cause a rapid discharge of the water thus elevated. Very small pumps made to operate in this manner with a low pressure of steam are constructed especially for agricultural purposes, to be used by farmers and stock-risers, in connection with the boilers and cauldrons employed for steaming food for cattle, etc., thus enabling them with but a comparatively slight expenditure of fuel to raise all the water required for stock or irrigation.

As a mining pump it has a great advantage from the fact that there is no exhaust steam, the steam being condensed in the cylinders after it performs its work, so one of the great inconveniences of pumps in mines is removed. As there are no pistons, piston-rods, stuffing-boxes, levers, cams, cranks or fly-wheels, it requires no lubrication, and is not liable to be affected by mud, sand or grit of any kind passing through it. With no moving parts, other than the valves, it is not likely to need repair, and as the water flows quickly in and out of the cylinder, it is noiseless in operation. The one we saw at work ran beautifully, there being no intermittent action whatever. The simplicity of its construction and fewness of its parts are greatly in its favor, as it can be sold cheaply.

The pump requires a cubic foot of steam under a given boiler pressure to displace and elevate a cubic foot of water to a height due that pressure, and every foot of steam does double duty—by exerting a pressure to force the water out of the cylinder and by creating through its condensation a vacuum, the pressure of the atmosphere is utilized in filling the cylinders. It only requires a pressure of from one to two pounds of steam to raise the water to an extreme height of thirty feet, and for every foot of elevation above this point one-half pound of additional pressure is necessary. The pump is a model of simplicity in itself, and will repay anyone interested in such things to the Pacific Iron Works and examine its operation. There is little doubt but that it will be extensively used in mining operations for the reasons above mentioned, and as it does not require an engineer to run it, being automatic, it can be applied in many places where steam-pumps have not before been used. Small sized pumps of this pattern are made for independent boiler feeders, and will operate to feed boilers automatically, slowly or rapidly, at any pressure.

It is also adapted to raising large quantities of water for irrigating crops. By thus utilizing the condensing power of the steam, there can be no process by which water can be elevated at so little expense. A company has been organized to manufacture this pump, with the following Board of Trustees: Ira P. Rankin, A. G. Stiles, R. F. Knox, Eugene N. Rietze, and A. P. Brayton. The special manufacturing agency is at the Pacific Iron Works.—*Pacific Rural Press.*

The Hunchback and His Secret.

High up on the brown, shaggy mountain side there stands an old stone cross, cracked, lichened, mossed, and sinking on one side into the ground; and beneath the cross there bubbles a clear, holy well, to which few go now, except the sheep that crop the rich green grass that springs around its brink. Beside the well sat a little boy, and as he looked into the crystal water, his tears dimpled it like rain.

"It only tells me what I knew before," said the disappointed little fellow, with a sigh. The little boy was weeping because he was a hunchback. His big, sad eyes melted the heart like minor melodies, but there was nothing else beautiful in his stunted, distorted, feeble frame. His mother lavished fondness on him at times, but at other times there was a look in her eyes which it was hard to bear,—the mortifying pity of crushed hope. His father looked at him as if he wished he had never been born. His sisters were kind to him after a fashion, but their proud love was reserved for his beautiful younger brother, who patronized and promised to protect him with half-contemptuous compassion. Outside of his own family the little hunchback was either ignored or coarsely pitied or made the butt of most cruel ridicule, and the victim of downright brutality. He felt very lonely, in a world which he loved because it was so full of beauty—among so many people, whom he longed to love if they would only let him.

He had heard the old tales that were told of the curing powers of the deserted holy well. It bubbled up as brightly as ever it had bubbled; why should it not be as good a doctor as ever it had been? He determined to try it. Fearing to be laughed at, he kept his determination to himself, and started without telling any one to the mountain side. As he passed through the village street he was jeered at and pelted by the village children; but a good-hearted woman rushed out from her wash-tub, with brawny, bare, soap-suds arms, and drove off his young tormentors by sounding boxes on the ear, and breath-taking thumps upon the back, and teeth-chattering shakings by the collar. The little boy was grateful for his protectress, but he thought it hard that he should need protection, and when she said, "Poor little boy, it is not his fault that he is such an object," her pity made him feel sore.

But he left the village behind him, and got out into the sunny country beyond, where he met no one to twit him with his ugliness, and the pain of his poor little smarting heart was lulled. It was a glorious day in June. The trees were out in full leaf, but the leaves had not yet lost their fresh, May green. The mottled hemlock stalks in the ditches were covered with a veil of creamy lace. Purple and gold vetches grew in and about the hedges, and the meadows and patches of turf between the ditches and the road were tufted with white and red and yellow clover-heads. The purple thyme was breathing out honey beneath the sun's warm kiss. The fox-glove was nodding its claret-colored bells, and the globe flower was tossing about its golden falls like a conjurer. The little boy picked handfuls of honeysuckle blossoms, and sucked

the sweet bugles as he walked. The traveler's joy and the bryony were trying, like birds'-nesting boys, which could climb the high. Where a clump of trees hung over the swampy margin of a pond, witch's nightshade put out its pretty pink flowers. The pond glowed with the golden drooping-lipped vases of the water-flag, and purple water-violets and cinquefoil trembled on its banks. The pimpernel snuggled its little pink face into its mossy pillow. All along the lanes dog-roses put forth their straggling sprays, and littered the ground with their shell-like petals. In and out crept the silver-leaved, golden-blossomed silver weed, mixed with the snowy bell of the bindweed, and beneath the plantain stood gay in its gala suit of pink and silver. The pink and purple crane's-bills were both in blossom, and when the little boy left the plain and mounted the hillside, bluebells were tossing as if fairies were ringing an insubstantial peal, and the butterfly orchis was pouring out its delicious fragrance to mingle with the sweet scent of the mint and thyme. Larks sang overhead, golden-banded wild bees went booming about, lilac-colored butterflies fluttered hither and thither, the bells of a distant church were chiming merrily; in a meadow down below—too far off for him to fear teasing from them—haymakers were singing and laughing.

"In this beautiful, happy world," mused the little boy, "how is it that I am so ugly and sad?" He toiled up to the holy well; the black-faced sheep that had been drinking its clear water and cropped its lush grass, scampered off; and, kneeling down, he curved his hand into a cup, and dipped into the well. Thrice, according to old custom, he drank of the holy water, thrice he sprinkled it over his head; but he became no stronger, no handsomer. "It only tells me what I knew before," said the little boy, as he sat looking into the liquid mirror. "Everything is beautiful except me," he murmured. "No, there's an ugly thing," he added, as humpbacked as I am. What is it? It looks like a bit of dry stick, and yet it seems to be alive. It's moving."

As he spoke the humpbacked bit of stick cracked, and there came forth a beautiful butterfly, which soon spread its wings of orange-tipped white, and flew off to a Hawthorn bush hard by. The little boy, stretching himself on the sunny grass watched, for a long time, the beautiful insect fluttering over the beautiful mass of creamy blossom, flecked with red and green. Presently it flew off and began to flutter around him. It alighted on his ear, and whispered something to him; and then butterfly and Hawthorn bush—nay, more, the very mountain itself—suddenly vanished. But, after having been spoken to by a butterfly, the little boy could be astonished at nothing.

He was no longer a little boy, but a man. He was still a hunchback, but he had ceased to be sorry for that. When people, as was still sometimes the case, slighted or insulted him on account of his ugliness, he would smile and whisper to himself, "Ah, if they only knew—but that's a secret!" Two brothers were going to fight, but the hunchback ran between them, and, being ashamed to strike such as he, they ceased from their quarrel long enough to cool, and finally shook hands over the hunchback's head.

In a bare room, an almost blind old woman lay alone, bedridden. Every one belonging to her was dead. She was a peevish old woman, interesting in no way, and in the wide world there was not a soul cared whether she lived or died, until the hunchback found her out. He brought her food, and physic, and clothes; he brought her coals, he brought her cooling fruits. He sat with her, reading and talking. Sometimes the ungrateful, ugly old woman snapped at him for being so ugly; but the hunchback simply smiled, and went on being kind to her.

A young woman, without a penny, alone in a great city, and maddened by her loneliness, had thrown herself, with a loud shriek, into the black, gas-lit river of which the hunchback, when he saw it as a man, remembered that he had read when a boy. There was none to care for her but the hunchback. He had dragged her out and calmed her and comforted her, and got her work; and at last she had married an honest husband, and lived to have a swarm of pretty little faces swaying about her like roses around a bush; and wife and father and the little roses all blessed the hunchback.

Another lonely girl, whose face had once been a pure little rose, but had been sadly blighted, he had found wandering reckless in the same great city; but he had lured her back to her quiet country home; and once more father and mother, sisters and brothers, blessed the hunchback.

One of the most cruel of his village tormentors, grown up like himself, was almost ruined—would be completely ruined if he had to pay immediately a sum of money he owed the hunchback. "Ask him to have mercy on you, and give you a little grace," said the man's wife. "It's no use," the man answered, moodily; "I never had any mercy on him, and, of course, he'll take it out of me now."

"Then I'll go and ask him," cried the wife; and when she had told him of his old tormentor's troubles, the hunchback freely forgave him all. The man professed to be very grateful, but afterward he spread a report that the hunchback had only given up his claim because he knew that he had been a cheat in pretending to have one. And again the hunchback forgave the man all.

A fearful plague raged in the village. In almost every farm-house and cottage there were some persons down with it. Almost all not smitten with it had fled in their selfish terror. There was no one left to bury the dead. Scarcely any one was left to comfort the dying, and to cherish and rescue such of the sick as might be saved, except the hunchback. Ugly as he was, he went from house to house like a sunbeam, the only ray of hope to the poor creatures with whom he sat up night and day.

But his turn came to be stricken down. His eyes were sealed, his limbs frozen; and then his face was transfused, and then the hump expanded into snowy wings, on which he fled away to rest. The secret was out. "We always said he was an angel, and that his wings were packed away in the hump," exclaimed the sufferer who watched his flight. But when his eyes opened, he saw again the orange-tipped butterfly and the Hawthorn bush. He was again a little, feeble, ugly boy, lying on the warm grass beside the holy well.

Somehow, however, as he walked down through the heather, thinking over his strange experiences, he felt that his pilgrimage to the holy well had not been made in vain.

The Rebuilding of Boston.

THE CITY TO LOOK BETTER THAN BEFORE.

The full and encouraging review of what has been done and what is doing in the burned district gives a more complete idea of the work as a whole than anything that has before been published. According to the official returns there were 778 buildings destroyed by fire on the 9th and 10th of November. The street widenings and the enlargement of estates will reduce materially the number of structures that will cover the same territory when it is again built upon. The list of building permits comprise nearly 170 structures, which will cover at least one-quarter of the entire territory available for building. The list will moreover be greatly extended within a few weeks, as soon as the important questions still at issue are settled.

It is by no means to be taken as a matter of course that the speediest rebuilding possible on the burned district is something altogether to be desired. Several cities have made a serious mistake by building too rapidly, and although we have no fear that there will be a surplus of warehouses in which to do the business of the metropolis, there are symptoms of a disposition on the part of some of the builders to take the material that is available rather than to wait a few weeks for better. We cannot afford to make any more mistakes in our business architecture. The buildings must be substantially constructed or we shall be no more secure than we were six months ago. It may turn out that the delays in official quarters, which have been so vexatious, will in the end prove a great benefit to all who have felt aggrieved by them.

The evidence we have collected is sufficient proof that the general appearance of the rebuilt district is to be far more agreeable than it was before the fire. The streets are to be more convenient and better adapted for business and for the display of fine architecture. And the buildings are to be both more elegant and of much greater variety. There will be a large number of marble fronts, which, altogether perhaps not more imposing than granite, will relieve the monotony of uniform material. We regret that there is not to be one street of the regular appearance of Pearl street before the fire, but variety is preferable to variety nowhere. And satisfactory as was the general effect of the district before the fire, it will be much more attractive a year or two hence. Some of the buildings are to be as elegant and costly as any in America, and very few will be inferior to those which formerly covered the same sites. It is to be hoped that the final settlement of street lines may soon be reached, so that the reconstruction may not be too tardily accomplished.

Already we are profiting by the good arising from the terrible scourge, and a priceless benefit it will be in return for so great a cost. Boston will be greater, richer, and wiser for it. Our commerce was never so good as it is to-day; has never shown so great an increase as in the week just past. We are reaching out our strong arms on every side; enlarging our borders, improving our streets, revising our laws, enriching our city, and bettering our people.—*Boston Advertiser.*

How OAKES AMES LOOKS.—The Washington correspondent of the New York Sun draws the following pen portrait of "Old Mobilier":

Ames is the most cheerful-looking person of the whole sorry lot. I see the Sun calls him that "great and good man." Great he certainly is. He is the most ponderous member of either House. He stands about six feet three inches, and weighs well on toward 300. He has immense arms and feet, and his long jaws and stupendous nose constitute by far the greater part of his person above the broad, round, stooping shoulders. He is pointed out a hundred times from the galleries every day as Old Mobilier. It was an amusing spectacle to see him recently with his great feet resting on the arms of a neighboring chair, looking over, in his heavy way, the famous "memoranda" wherewith he was going to corner and crush those who had taken his stock and money, and then repudiated them; while in remote corners of the hall some of his victims could be seen nervously watching his aged eye and bobbing about like birds under the charms of a serpent.

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Suits, col'd Molestin Pants, Pan Jackets, Cotton

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