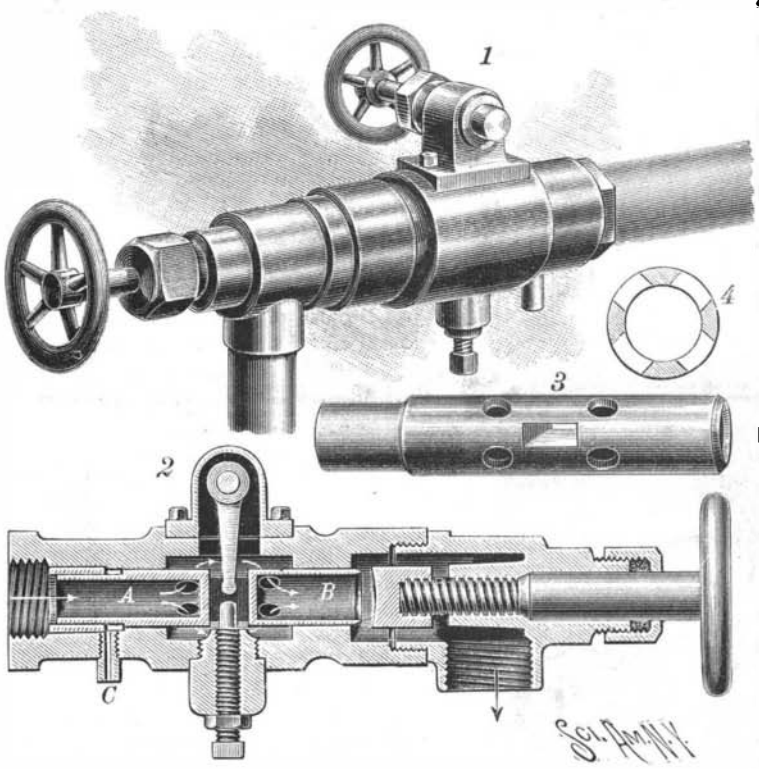
AN IMPROVED ENGINE GOVERNOR.

This is a governor through which the steam passes on its way to the engine, and the speed of the engine is thereby regulated to a nicety by its control of the steam supply, without using any gearing or exterior mechanism. The improvement has been patented by Mr. William H. Watson, of No. 6 North Peters Street, Jackson Square, New Orleans, La. Fig. 1 represents the application of the device, Fig. 2 being a sectional view. The governor comprises an elongated casing, for convenience made in two parts, screwed together, through which the steam flows to the engine, the casing being internally thickened on opposite sides of its center, and affording steam-tight bearings for a sliding regulating piston, shown in Fig. 3. The piston has at its opposite ends the cylindrical chambers, A B, independent of each other, and connected by means of ports and a central chamber in the casing, as indicated by the arrows, Fig. 4 being a cross section of one set of ports. The chamber B is of somewhat larger diameter than chamber A, affording ready passage for the steam, and consequently, when the engine is working easy, the piston slides in one direction, but when the engine is working hard, the back pressure moves the piston in the opposite direction, thus closing and opening the steam supply. The exit end of chamber B is beveled, and by changing the pitch of the bevel the chamber may be made to discharge the steam more or less easily, and the inlet end of the piston is reduced and held in a bushing, forming a chamber from which leads a vent pipe, C, thus forming an air cushion which gives the piston an easy and steady motion. Opposite the outlet end of chamber B is arranged a percussion plate, against which the piston moves to shut off the flow of steam, the plate being held in a chamber in the outlet of the governor, and the end of the plate toward the piston being preferably concave. The plate is carried on the threaded end of a spindle, which projects through a stuffing box, and has on its outer end a hand wheel by which the plate may be nicely adjusted to permit the right throw of the piston, which is moved back and forth automatically by the shifting steam pressure. If the piston should ever stick from rust or other cause, it may be moved by hand to limber it up by means of an arm projecting through a slot in the center of the piston, a screw secured in a plug in the casing entering the opposite side of the slot. The arm is carried by a shaft provided with a hand wheel, by turning which the piston may be slipped back and forth in the casing. The invention also provides different means, more particularly adapted for locomotive use, for moving the piston by hand.



WATSON'S STEAM ENGINE GOVERNOR.

Sensations of Drowning.

To stand helplessly on the river shore and witness the struggles of a drowning fellow-being is a harrowing experience, and little less heart-rending to contemplate, but, in matters of this kind, like many others, "things are not what they seem." At any rate, death by drowning is not as horrible as it may seem to the onlooker. The thought of being dragged along the muddy bottom of the river and found later in some out-of-the-way, willow-tangled spot is what adds to the horrors of such a death. The dread of such a fate is really worse than the fate itself. I once left this world by that route as nearly as one can and get back. It was an accident, and was some twenty years ago.

A companion and myself were bathing in the Ohio River. At the point where we were a large raft of logs was lashed to the bank, and for quite a long while we amused ourselves by jumping from the raft into fifteen feet of water to see who could bring up the largest number of white gravels each time. We went down several times with varying success. The last time I made the effort I filled my lungs with air and leaped far out into the river and went to the bottom head first. I groped about for a handful of gravels and spent more time in the search than I should have done. The water was warm, however, and I had no fears of drowning. When I could stay down no longer I started swiftly for the surface, and when within a foot or two of the top of the water my companion, not knowing exactly where I was, jumped headlong into the river. His head struck me squarely between the shoulders and knocked the last ounce of air out of my lungs, and a deluge of water at once took its place. The weight of his body falling on me produced a terrible shock, and I sank to the bottom of the river like a stone. That is where I got my experience in drowning. When the water rushed into my lungs and stomach it felt for all the world like a pleurisy pain, which has also given me a tussle in later years, but was over in a second. Then my body settled quietly to the bottom and my arms fell limp at my side.

In my half-conscious condition I could see all my relatives and acquaintances crowding about and looking down on me with tearful faces. All the events, it seemed, of my prosy career passed slowly in review, and the good, bad, and indifferent acts stood out before me in bold relief. Even little school boy tricks claimed attention. I knew I was drowning and remember thinking, "Why, this is not so hard after all!" I wondered where my body would be found, and shuddered at the thought that it might never be found. I also wondered whether or not my companion had become alarmed and run away and left me to my fate, or whether he was diving here and there to find me. Then I pictured my burial, and how the clods would resound on my coffin when it was lowered into the chilly grave, and my fate would be pointed out to other boys by anxious mothers as a warning.

At the next stage I could hear bells softly ringing in the distance, together with little tinklings and chirrups sounding in my ears. Then I began to see pretty pictures. The colors of the rainbow danced before my eyes and intermingled and formed into all sorts of odd shapes. I had no pain and no fear of what was expected to follow. I seemed to be enchanted at the scene before me. Everything was light and calm and moved about without any visible impelling force. It was like looking into a large mirror with every beautiful thing that the most vivid imagination could conjure up revealed thereby. The last stage which I entered increased the beauty of the surroundings. All discordant noises ceased and were superseded by the softest, sweetest music that could be thought of. Apparently I had been transported to a place flooded with bright, calm sunshine. It was neither too hot nor too cold, but seemed like a clear autumn day. Then I seemed to rise from the ground and float off into space like thistle down. Higher and higher I went until I seemed to look down on the world from a great height, and then came a blank. The next thing I knew I was lying on the raft with my companion looking down on me with a pale face. After several unsuccessful attemps he had succeeded in finding me and getting me out of the water. By vigorously rolling me over a log he had succeeded in rekindling the spark of life that remained. For the next half hour I think I suffered a great deal more than for the same length of time before or since. I shall never forget how it feels to drown, but would not advise any one to try it to find out for himself. Resuscitation is too painful.—*Mr. C. A. Hartley, in the Cincinnati Times-Star.*

The Useful Arts.

A knowledge of many useful arts is essential to the existence of man, nor is it easy to imagine the possible existence of any race, or even tribe, totally ignorant of the useful arts. On the other hand, to perceive the absolute truth and to represent this in marble or on canvas, to place before the eyes of men correct imitations of what nature has created, is the highest of gifts. In proportion as the individual or race gives a preference to the objects invented by mankind over nature's creations, so will the taste of that individual or race be low, unintellectual and remote from truth; his sympathies with the living world have been thrust into the background by the mathematical and logical inventions of human nature; he traces all to utility, the goddess he worships, and boldly proclaims that nature herself in her inventions had utility in view. Without being aware of it he worships human reason, and denies that anything exists beyond it. By carefully noting the artistic efforts of a race, we may arrive at a tolerably clear idea of the view that race took of the external world. Now in that view are included the character and nature of the civilization of the race.

Artesian Wells in Dakota.

Work has been quietly going on in South Dakota for the past year which seems to prove that the artesian wells of the James River valley are as valuable and reliable a kind of water power as could be wished, and from all indications will continue to be so for years to come. Already a number of electric light and flour mill plants have been installed, and are in daily operation.

The artesian well district of South Dakota is located in the valley of the James River, covering a tract about 40 miles wide and 200 miles long. The James River is about half way between the Missouri and the eastern boundary of the State. The water-bearing rock is found at from 900 to 1,000 feet from the surface. The first and most vital question that comes up is as to whether the supply is reliable, and can be depended on to continue with its present pressure, as more wells are sunk and a greater volume of water is drawn from the underground source.

There are good reasons for thinking that the supply is practically inexhaustible. These reasons are based both on the theories advanced by the United States government geologists and on observed facts in connection with the sinking of wells. The government theory is founded on the fact that the same stratum in which the water is found outcrops in the beds of the upper Missouri and Yellowstone Rivers and at the base of the Rocky Mountains. The water, sinking in this porous stratum of rock, follows it for hundreds of miles, until tapped by the South Dakota wells. It has long been believed that there is more water in the Missouri River above the Great Falls than there is 30 miles below. For 25 or 30 miles below the falls the river bed is composed of the same sand formation in which the South Dakota wells get their water. If this theory is correct, as it probably is, the supply of water to these wells may be looked upon as inexhaustible—at least as much so as the sources of our Rocky Mountain streams. Another fact that would point strongly to the truth of this theory is that during the June rise in the upper Missouri River the pressure in the wells rises. No diminution in pressure has been noticed in any of the wells in the district, except by clogging up with mud, due to improper piping. The city well at Redfield has been down seven years. Its pressure has been constant, although numerous other wells have since been sunk at no great distances from it. This well furnishes a direct pressure system of water works supplying all the domestic needs of the city, and so great confidence is placed upon the pressure and supply that the fire department requires no fire engines. The closed pressure of this well is 177 pounds and cost for maintenance is absolutely nothing.

About a mile and a half distant is another well, used for running an electric light plant and for irrigation. A description of this well will suffice to give a fair idea of all. It is 1,000 feet deep, and six inches in diameter from top to bottom. When closed, the pressure is 165 pounds. When allowed to flow freely through the six-inch pipe, it yields 2,027 gallons per minute, and rises to a height of 16 feet in the air. When the water is escaping through a two-inch pipe the well pressure is 128 pounds, and with a 2¾ inch opening 95 pounds. From this it is estimated that with a four-foot Pelton wheel, 80 horse power would be developed with a two-inch opening, and 100 horse power with a 2¾ inch. With the plain undershot wheel at present in place, 50 horse power is developed, and it is calculated that about 15 more is available with it. The flow is absolutely steady. This well cost $3,000.

At Chamberlain a 150 barrel flour mill and light plant, formerly run by steam, is now using "well power." These two plants were started in September, 1893. At Huron a well is about to be sunk by the city, for electric lighting purposes. The first electric light plant in the State, run from a well, is at Mellette, a town of 400 inhabitants. It is safe to say that very few plants in the world are doing a paying business in so small a place. This plant is thriving, however, and has connected 10 four-ampere arcs and 150 sixteen-candle power incandescents. The well is only four and one-half inches in diameter from top to bottom, but it operates, besides the electric light plant, a flour mill, which grinds 150 barrels of flour a day and 50 bushels of feed per hour. This work would require an engine of 40 horse power. The well is 910 feet deep. Its pressure when closed is 178 pounds. The flow is 1,600 gallons per minute.

The outlay for an 80 horse power well is about $3,000, the interest on which would be $2.25 per horse power per annum. This, with the interest and depreciation on the water wheel, is the only expense for primary motive power, aside from labor. A $300 or $400 building gives the wheel and dynamo a good shelter. The repairs to the water wheel ought to be almost zero, and the skill of the men employed for attendance does not begin to be that required in a steam plant.—*Street Railway Review.*