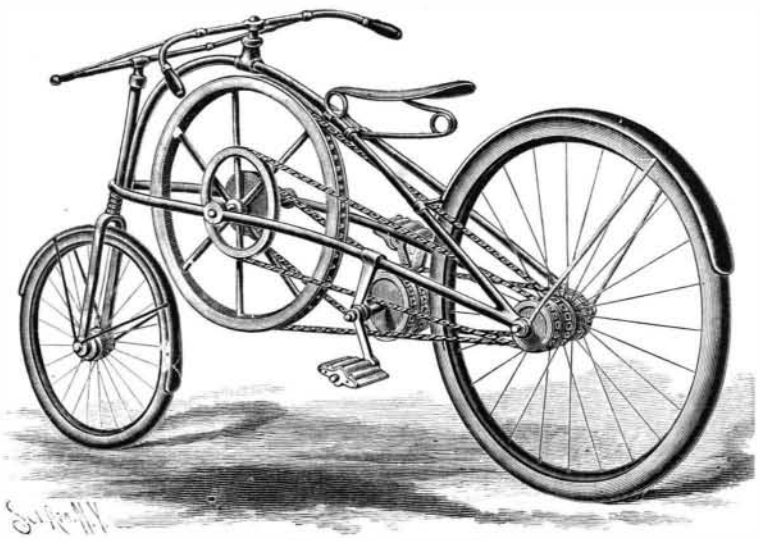
### AN IMPROVED BICYCLE.

The system of differential gears provided in the wheel shown in the illustration is designed to enable it to be run very easily at an ordinary rate of speed, or to be run slowly and with great power, or very rapidly, as desired. The main frame has an upwardly curved backbone extending from front to rear, and the driving axle is journaled in hangers depending from opposite sides of the frame. On the axle is a double sprocket wheel of small diameter, a chain from which turns over a small wheel on the hub of the rear wheel,



JENKINS' BICYCLE.

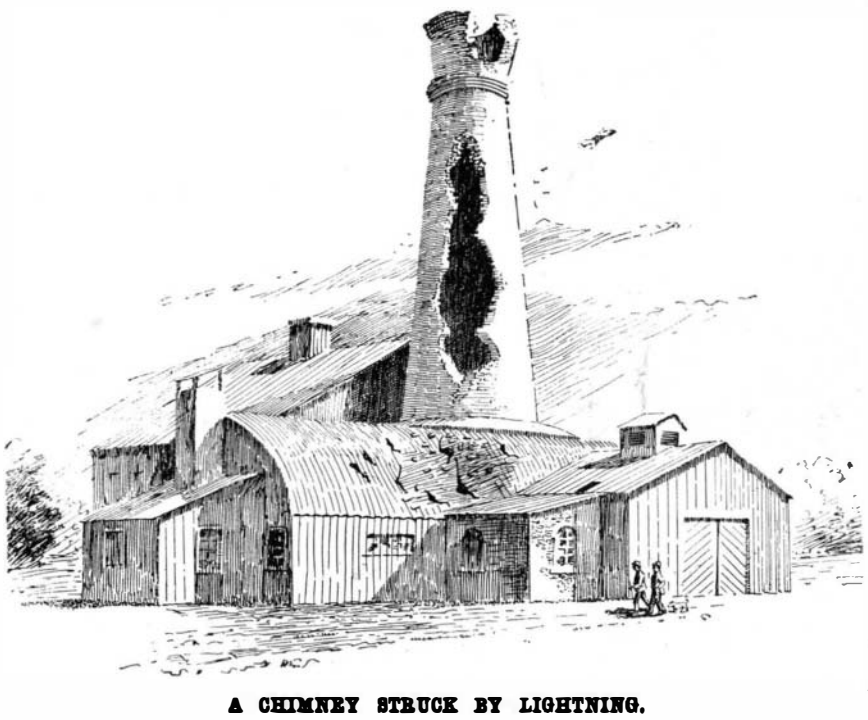
while another chain extending forward from the same wheel drives a small wheel on the hub of a fly wheel. The periphery of the fly wheel also has a chain connecting with a small sprocket wheel on the hub of the rear wheel, and the latter wheel has likewise a sprocket chain connection with a sprocket wheel of intermediate size produced on the fly wheel. This gear arrangement allows for three changes of speed, one rate for slow driving over hilly and difficult roads, one for moderate work, and one for driving as fast as possible, in each case the main sprocket wheel serving as a fly wheel and assisting in keeping up a constant and steady motion.

Further information relative to this improvement may be obtained of the patentee, Mr. Anthony D. Jenkins, in care of H. Bentley, East Walnut Lane, Germantown, Philadelphia, Pa.

### LIGHTNING DAMAGES A CHIMNEY.

*To the Editor of the Scientific American:*

I send you a sketch of the chimney of the Flint Glass Co., of this city (Meriden, Conn.), which was struck by lightning several months ago, on a Sunday morning at 3 A. M. The chimney is the upper part of the furnace where the glass was melted and is about 100 feet high. The hole extends very near the entire length of the chimney. The chimney is considered unsafe, as the bricks are continually falling. You will notice that the bolt struck the top first, then skipped about 15 feet, tearing the bricks out to the base of the chimney, leaving a hole clear through one side of the chimney. There were no lightning rods on the chimney or building. There are no high buildings anywhere near the chimney, although there are a few small outbuildings not over one story high. The roof of the large building is heavy corrugated iron. The chimney is cracked very badly and appears to be very shaky. Coincident with the stroke, the local and long distance telephones were all burned out within a radius of one-fourth mile. FRANK C. WHITE.



A CHIMNEY STRUCK BY LIGHTNING.

### Electricity in Surgery and Medicine.

The enormous strides made by the new force in commerce and industries of late years have been, to a certain extent, paralleled by the application of electricity in medicine and surgery. The electric motor turns the drill of the dentist, bores out all the noses of mankind in the hands of the rhinologist, and may run the saw and the trephine of the surgeon. The electric light is made to illuminate all the cavities and interiors of the human body, so that "the pestilence that walketh in darkness" in the black recesses of our viscera is sought out and driven away by the electric search light. It is nothing now to put an endoscope into the stomach and scrutinize its walls from one end to the other, and in a dark room the very size of the stomach is determined by the translumination of the abdominal walls when a light is turned on inside of that viscus.

Electricity furnishes heat for the cautery with which morbid surfaces may be healed, wounds stimulated, and tumors extirpated.

The electrolytic needle removes the hairs of the bearded women, eradicates birthmarks, decomposes tumors, coagulates aneurisms, and in its most romantic role manufactures those most desired ornaments of the feminine physiognomy, lovely dimples.

The electro-magnet pulls out the beam from our neighbor's eye, when the beam is in the shape of a piece of iron, and when the operation is intelligently directed by the ophthalmologist, it may hunt up and draw out wandering needles.

One of the new features of electric medication is the introduction of drugs into the human body through the skin. This is done by placing solutions of any drug upon a sponge, which is made the positive pole and placed against the skin. When the current is turned on, the drug is actually driven through the skin into the tissues. The application is not at all painful. Thus cocaine has been driven in over a painful nerve, and neuralgias have been relieved by it. Many other drugs have been used in this way. This property of electricity is known as cataphoresis. Operations have been performed after anæsthetizing the skin and subjacent tissues cataphoretically.

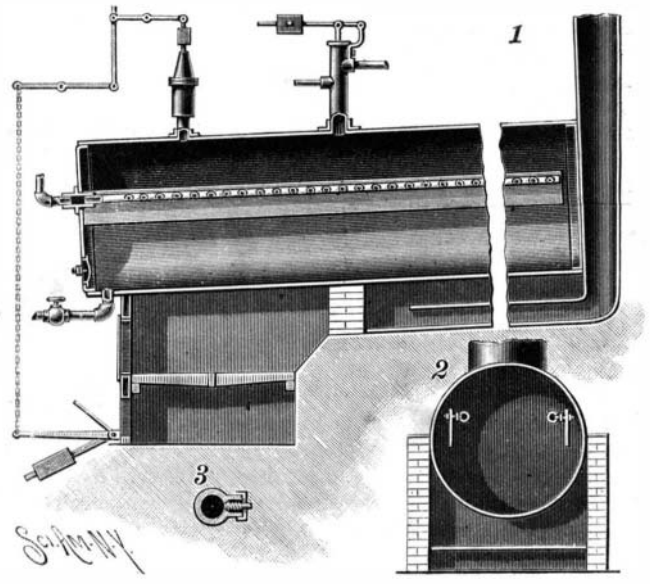
The neurologist, perhaps, finds a large therapeutic field for electrical exploration. With the continuous current he soothes the pains of peripheral nerves, calms down an excited brain, stimulates healthy processes in a diseased spinal cord, exercises paralyzed muscles, rejuvenates overworked limbs, and aids in the rebuilding of tissues in members that have wasted away. Sometimes he calls in to his aid the interrupted and the alternating currents, and occasionally takes into service the static sparks evolved from his big glass wheels and Leyden jars. The method of the working of electricity in disorders of the nervous system is much more obscure than in the maladies mentioned above, where heat, light, electrolysis and cataphoresis produce effects at once apparent to the senses. Not able to demonstrate objectively the value of electricity in some of the chronic nervous diseases, a great deal has to be accepted on faith. There is dispute in some quarters as to its intrinsic value here, and many incline to the idea that suggestion has a good deal to do with improvement in patients of this kind treated in this way.

Besides its employment as a therapeutic agent, electricity has considerable value as a means of diagnosis in many neurological conditions. For instance, the resistance as measured by the rheostat is reduced in exophthalmic goitre and increased in hysteria. The muscular contractions produced in paralysis from injury to certain parts of the nervous system are so different from contractions produced by electricity in paralysis due to lesions in the brain, as an example, that their differentiation constitutes an important aid in distinguishing these affections one from another. Then, too, in the surgery of the brain and spinal cord, which has newly sprung into existence, electric stimulation of parts of the brain and of nerve roots is very valuable in localizing the exact region to be operated upon. Indeed, much of our knowledge of the localization of functions in different parts of the surface of the brain is owing to electricity made use of by physiologists in their marvelous experimental researches in cerebral domains.

Altogether electricity occupies an extensive place in the armamentarium of the physician. All parts of the human economy are explored by its beneficent light, and there is no cell so secretly hidden that it may not be influenced by this wonderful force, which may be made to penetrate skin, muscle, bone, blood, nerves, and viscera. No one can yet place a limit upon its possibilities as a remedial agent, for each year new apparatus, new devices, new forms of current, and new methods are made available to the medical profession in its noble warfare against the diseases which assail mankind on every hand. It is not in vain that man has sometimes looked heavenward for aid in sore affliction, for has not the lightning been drawn from the clouds to become his friend and heaven-born ally? —*N. Y. Sun.*

### A NOVEL STEAM BOILER.

In the boiler shown in the illustration the feed water is discharged upon heated plates arranged longitudinally within the shell of the boiler. The improvement has been patented by Messrs. Max and George Hise, of Grahamton, Ky. Fig. 1 is a side sectional view and Fig. 2 a transverse section. The brick work is built around and nearly over the entire boiler shell, within which are longitudinal pipes connected with the feed pipe, and each provided with a series of nozzles for discharging water onto a plate held parallel to the supply pipe, and supported by arms or brackets projecting from such pipe. Each of the nozzles, as shown in detail in Fig. 3, has an inwardly closing valve to prevent the steam in the boiler shell from passing into the supply pipe. The dome of the boiler is preferably in the shape of a tube, from which lead steam pipes, and in the upper end of which is the usual safety valve, and on the boiler top is also a vertical cylinder in which works a piston whose rod is connected by levers and chains with a damper in front




M. AND G. HISE'S BOILER.

of the fire box. When the steam pressure forces the piston outward the damper is closed automatically, opening again as the pressure decreases.

### How to Keep Young.

We find this circulating in the newspapers. The author is unknown to us. It contains much truth.

"Past grief, old angers, revenges, even past pleasures, constantly dwelt upon—all dead, decaying, or decayed thought—make a sepulcher of the soul, a cemetery of the body, and a weather-beaten monument of the face.

"This is age.

"The women who never grow old are the student women—those who daily drink in new chyle through memorizing, thoroughly analyzing, and perfectly assimilating subjects apart from themselves.

"Study is development—is eternal youth.

"The student woman who makes wise use of her acquisitions has no time to corrugate her brow with dread thought of the beauty-destroyer leaping fast behind her.

"Not considered or invited, old age keeps his distance. Brain culture, based on noble motive, means sympathy, heart gentleness, charity, graciousness, enlargement of sense, feeling, power. Such a being cannot become a fossil."

THE captains of ships which carry bricks have to be very careful. An ordinary brick is capable of absorbing a pint of water. So with a cargo of brick in the hold serious leakage may quite well go on undetected, for the water that enters is sucked up as fast as it gets in. If this should be the case, the consequences are bound to be most serious.