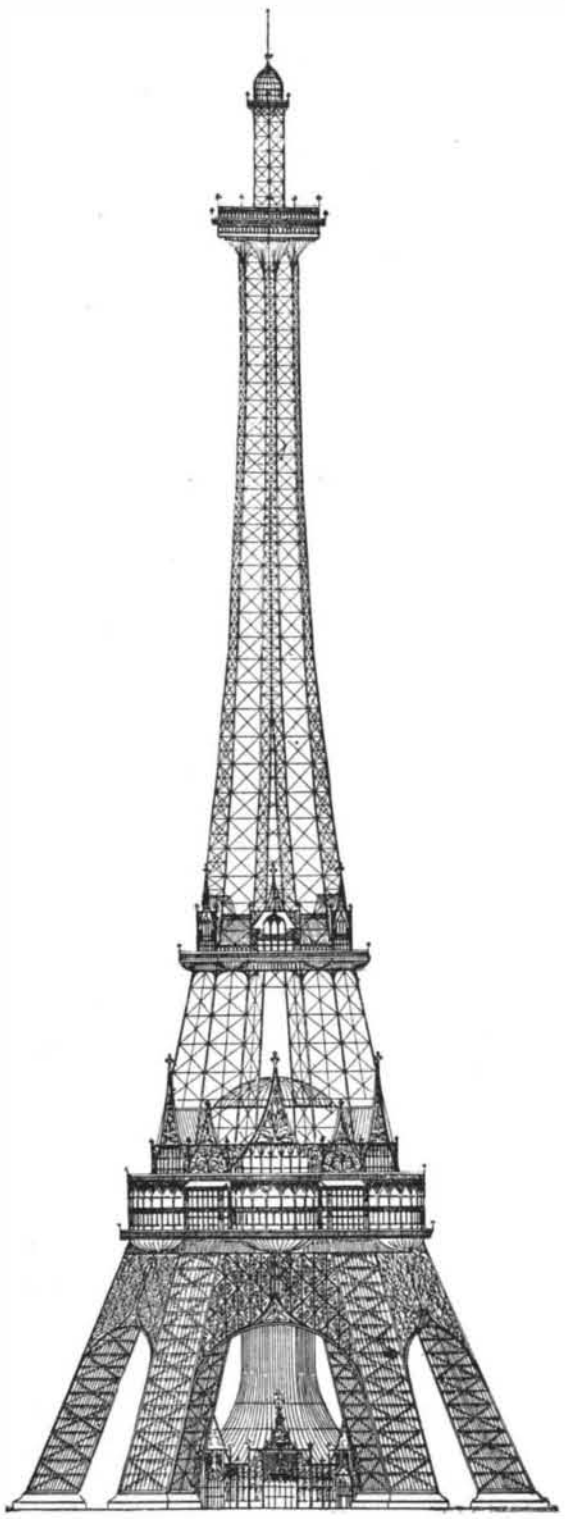
THE PROCTOR TOWER.

The building and grounds committee of the Columbian Exposition have accepted the design for a tower which we illustrate herewith. The tower is to be of steel, 1,100 feet high, surmounted by a tall flagstaff. Ten elevators will carry passengers to the top. Four of these will run to the first landing, 200 feet above the ground; two will run to the second landing, 400 feet above the ground, stopping at the first landing; while two others will run up without stop to the second landing; and from the second and third landings two will shoot up into the dome, 1,000 feet above the ground. The capacity of these elevators is 8,000 people per hour one way, or 16,000 people an hour up and down. The tower will be one glow of electric light from base to dome, the very top being illuminated by powerful search lights, which will throw a brilliant glow over the exposition.

Electricity will be used in numerous ways. Safety devices, telephones, signaling apparatus, ventilating



THE PROCTOR TOWER.

fans, being a few of the necessary things that will be operated by this subtile force.

Hydraulic power, in all probability, will be used for running the elevators in the tower. Motors, however, will be used to operate pressure pumps that supply the water to the hydraulic cylinders.

Messrs. Holabird & Roche, well known architects of Chicago, and Mr. C. T. Purdy, mechanical engineer, have the work of the tower in hand—a fact which is a sufficient guarantee of its perfect construction.—*Electrical Industries.*

Preserve for Binding.

The publishers of the SCIENTIFIC AMERICAN would advise all subscribers to preserve their numbers for binding. One year's issue (52 numbers) contains over 800 pages of illustrations and reading matter. The practical receipts and information contained in the Notes and Queries columns alone make the numbers worth preserving. Persons who have subscribed since the commencement of this year can have the back numbers sent them on signifying such wish. Their subscription will then expire with the year.

The Bone Grafting Experiment.

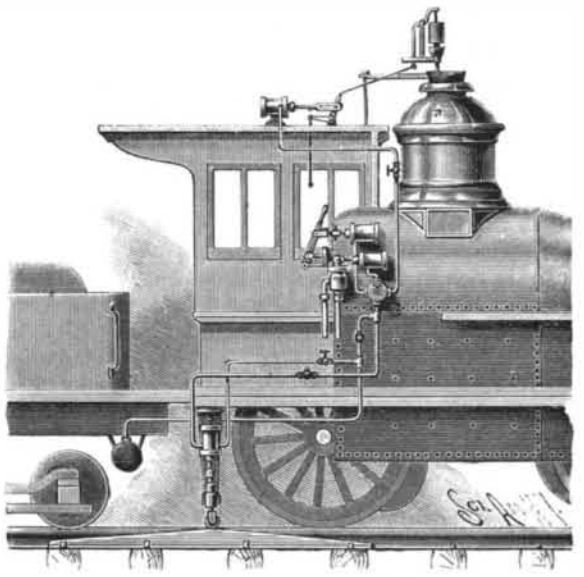
In the New York Charity Hospital, in November last, as described in the SCIENTIFIC AMERICAN of November 29, Dr. A. M. Phelps grafted a bone from a dog's leg in the shin bone of a boy, under circumstances which attracted general attention. Both boy and dog were bound side by side on a cot, where they might be kept as comfortably as possible for several days, anæsthetics were administered but moderately, and a piece of the bone about an inch and a half long was taken from the dog's limb and inserted in that of the boy, where it was ingeniously secured in position, care being taken not to injure the arteries or any important portion of the circulatory system of either. It was designed that the vitality of the dog should contribute to the growth of the bone in place in the boy's leg, which, it was estimated, would require about thirty days, and an artery of the dog was, therefore, conducted to the grafted bone, and muscle was stitched to muscle and skin to skin, to promote, if possible, a mutual growth. After three days the boy and dog became apparently comfortable together, and at the end of six days the wound was naturally healed, but at the end of eleven days there was an apparent shrinkage of the dog in the dressings, allowing of motion, and endangering the pulling of the graft from position, and the bond of union between the boy and the dog was then, on this account, severed. The operation had not been successful, but the bone graft was covered with an irregular new growth, and circulation was shown to have been established between the boy and dog. At the end of five weeks the graft was removed from the boy's leg, but the stimulation it had caused is said to have set up a reparative process, which gives hope that the original fracture may reunite. The boy now walks with the aid of one crutch or a cane, and the dog was carefully treated after the separation. Dr. Phelps is confident that bony union would have taken place with the graft if actual contact could have been maintained for a longer period, and says that "the operation is a success in so far as it establishes the principle that it is possible to grow large masses of tissue from an animal to man, and to establish the circulation until the union takes place between opposite species without danger to either. It also demonstrates that a growth of new bone takes place when a section of bone is transplanted and its nutrition maintained by the artery of the animal. This, if continued for four or five weeks, would probably unite a fracture."

Solutions of Celluloid.

Dr. Charles Ehrmann says: "Alcoholic solution of celluloid has been said to be an exceedingly fine retouching varnish. But celluloid is in reality not more soluble in alcohol than ordinary gun cotton or xyloidine. When small and tiny shreds of celluloid are macerated in alcohol of 95 per cent, the substance swells up like gelatine in water; the alcohol permeates its pores and dissolves the camphor contained, so that the final result is a solution of camphor, nothing else. We do not deny that a thin stratum of camphor upon the gelatine film will assist materially retouching with a graphite pencil, but the medium is by no means celluloid, which has proved to be so excellent to retouch upon. After macerating the celluloid in alcohol, and a thorough dissolution of camphor, washing it in water and drying, it will burn with detonation, exactly like gun cotton—proof enough that the alcohol had no other effect upon it than that above stated."

A STOPPING AND SIGNALING MECHANISM FOR LOCOMOTIVES.

A mechanism designed to automatically stop the locomotive and sound the whistle at or near stations, while not interfering with the operation of the engine by the engineer in the usual way, is shown in the accompanying illustration, and has been patented by Mr. James C. Gross, of No. 617 Adams Avenue, Scranton, Pa. At any station, curve, or switch at which it is designed to operate the mechanism is placed an auxiliary double-inclined track rail, near the main rail. On the under side of the locomotive is a vertical cylinder carrying a piston which is normally pressed downward by a spring, and the downwardly extending piston rod is engaged by a socket on a sliding rod carrying on its lower end a roller adapted to pass over the auxiliary rail. Connected with the lower end of the cylinder is a pipe from a reservoir of compressed air or any fluid under pressure, and the lifting of the piston by the action of the auxiliary rail on the roller admits pressure to the cylinder, from which an oppositely arranged outlet pipe in which is a check valve leads to a small reservoir. From the latter lead a number of pipes, one to a cylinder, with piston and mechanism by which the brakes are automatically applied, another to a mechanism connected with the throttle valve, to shut off steam from the engine, and another to a mechanism for operating the whistle. When the engineer desires to sound a signal, shut off the steam and apply the brakes, at places other than those thus provided for, he shuts off the pipe from the power reservoir to the vertical cylinder, and opens a valve connecting such pipe with the small reservoir, by which the several mechanisms are then simultaneously operated directly, and independently of the vertical cylinder, with its piston operated by the auxiliary



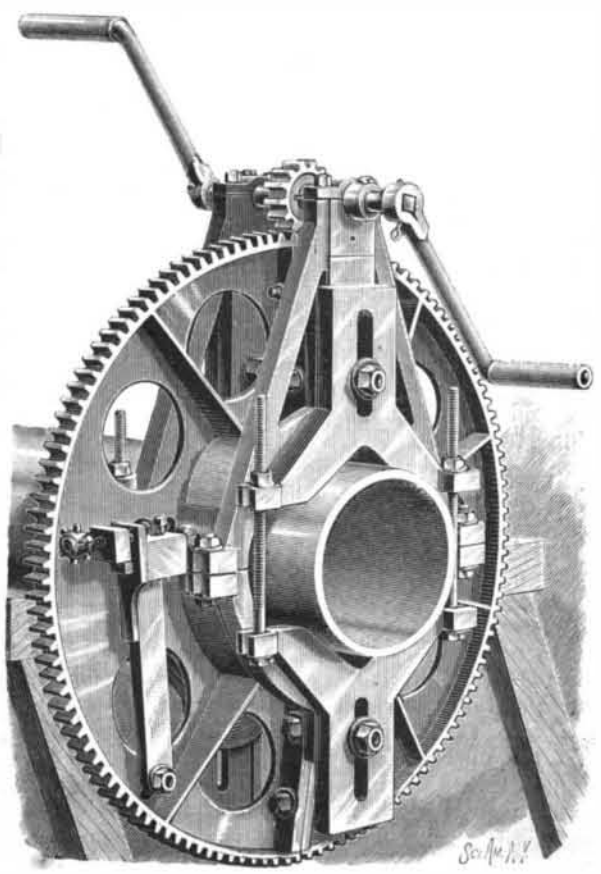
GROSS' LOCOMOTIVE ATTACHMENT.

track rail. To reset the apparatus it is only necessary to open an escape valve releasing the pressure in the small reservoir.

AN EFFICIENT PIPE CUTTING MACHINE.

The illustration shows a machine, patented by Mr. W. H. Garland, of Somerville, Mass., for cutting cast iron water and gas pipes of all sizes, from four to twelve inches in diameter. It has two side plates or frames, each having a circular hole to receive one end of the hub of a large toothed wheel composed of two semicircular parts, with flanges united by bolts. In the upper ends of the side frames are bearings for a shaft on which is a pinion engaging the teeth of the large wheel, the shaft having squared ends on which are suitable crank handles. On the side frames are upper and lower clamps, each having a vertical slot for the reception of a bolt to confine the clamp in proper position upon pipes of different sizes. The upper and lower clamps are connected by screw bolts passed through ears in the clamps, by which the latter may be brought into firm engagement with the pipe. Adjustably secured upon the rotating gear or large wheel is a Slate cutting-off tool, the arrangement being such that the cutting edge of the tool can be always brought into proper central line to cut freely into the pipe, while the feed is automatic, and the tool cuts very fast as it is made to travel about the pipe by the rotation of the gear wheel. This machine can be readily handled by two men and run by from one to four men when at work. The parts are interchangeable, and a particularly important feature of the improvement is that the parts may be separated to attach the machine to running pipe in the trench, whereby a great saving in time is effected, as compared with the methods now usually followed.

For further information relative to this invention address Mr. George A. Lloyd, East Cambridge, Mass.



GARLAND'S PIPE CUTTING MACHINE.