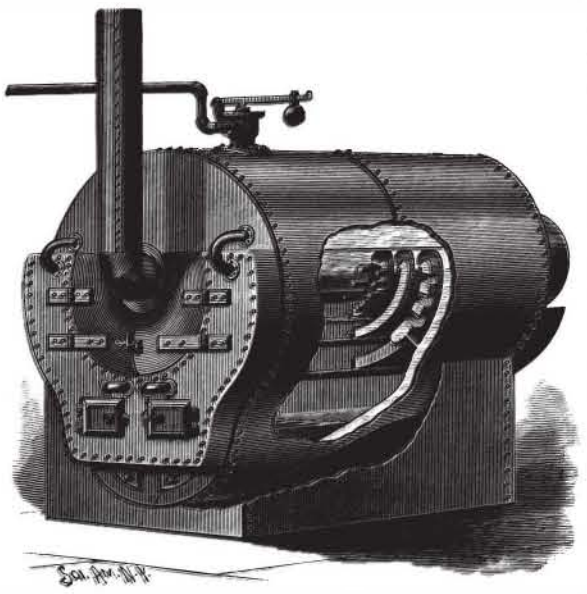
THE MANUFACTURE OF READY MIXED PAINTS.

No one who is unacquainted with the manufacture of ready mixed paints has any idea of the great amount of time and care which are expended in the mere operation of mixing. At first sight it would seem as though the proper mixture of white pigment with linseed oil could be easily secured, and was a very simple mechanical operation. As a matter of fact, however, the process is long and tedious, and requires the construction of a large amount of heavy and costly machinery. The quality of a paint depends very largely upon the intimate mechanical mixture of the atoms of oil and pigment, and experience has proved that this can only be secured by many hours of manipulation in the various agitators and mills of a paint factory.

The accompanying illustration, which is a vertical section taken through the factory of the James E. Patton Company, of Milwaukee, will give the reader some idea of the construction in a modern paint works. The operations commence on the highest floor of the factory and are carried on continuously in machines which are placed on the succeeding floors, the contents being finally gathered in storage tanks on the lowest floor. The first machine is known as a chaser, and it is here that the dry white pigments and the linseed oil first come in contact. Pigments and linseed oil are placed in the right proportion in an apparatus which works somewhat on the same principle as a common mortar mill. Here they are worked up into a rather stiff paste, and as soon as the mixture has reached the proper consistency it is dropped into a mill which is built somewhat on the lines of an agitator. From this mill the material passes through double mills located on the ground floor into a final finishing mill. In passing through these machines the paint is ground to a remarkable fineness, and as it leaves the last mill sufficient linseed oil is added to the mixture to bring it into the proper state of consistency for the brush. The paint is then carried into long, horizontal steel reservoirs, inside of which are shafts which carry a number of steel propeller wheels, which serve to keep the paint in a continual state of agitation. As the thrust of the wheels is in the direction of the final outlet from the tanks, they drive the fluid in that direction. Below the storage tanks is a series of large cylindrical tanks into which the white liquid is drawn in the quantities required. Here it is tinted by mixing certain unvariable proportions of coloring pigment with it, each tank having, of course, its own color.

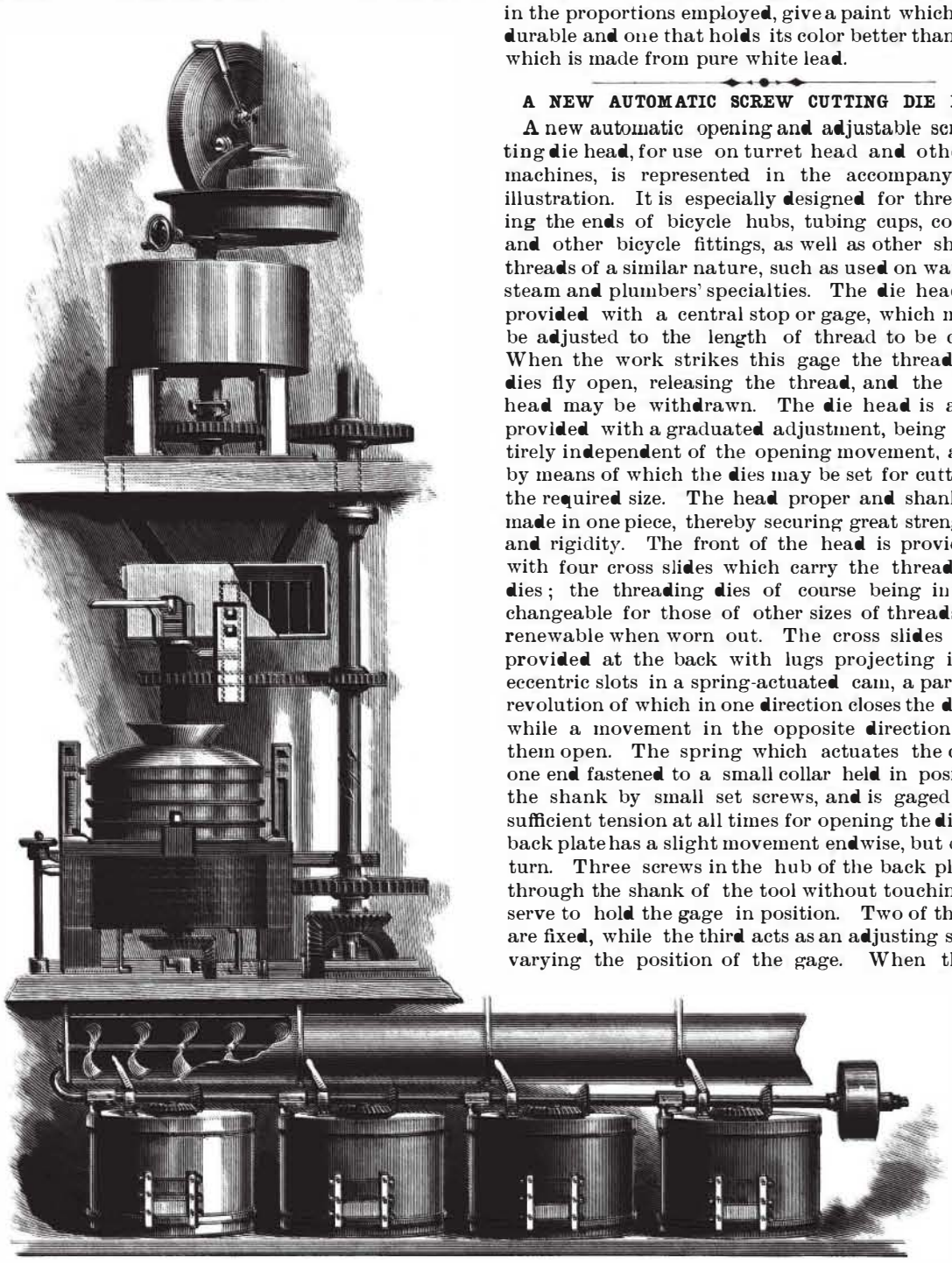
Centrally placed within each tank is a vertical shaft, to which are attached a number of agitators, the shaft being driven by means of bevel gearing from a horizontal shaft arranged above the tanks.

The liquid in the storage tanks is kept in a state of continual agitation until it is finally drawn off into barrels for shipment. The constant agitation is necessary, of course, to prevent the solid pigment from settling in the tanks, and it serves to keep the liquid paint at the proper consistency.



BARNES' BOILER.

Although the excellence of a paint depends largely upon the thoroughness with which the materials are ground and mixed, it is also determined largely by the quality and proportions of the pigments. It is a mistake to suppose, as many people do, that the body of all paints is formed of pure white lead. The product of the factory of which we are speaking consists of a mixture of lead with oxide of zinc or other unchangeable pigments, the long experience of the manufacturers having shown, it is claimed, that these constituents, in the proportions employed, give a paint which is more durable and one that holds its color better than a paint which is made from pure white lead.

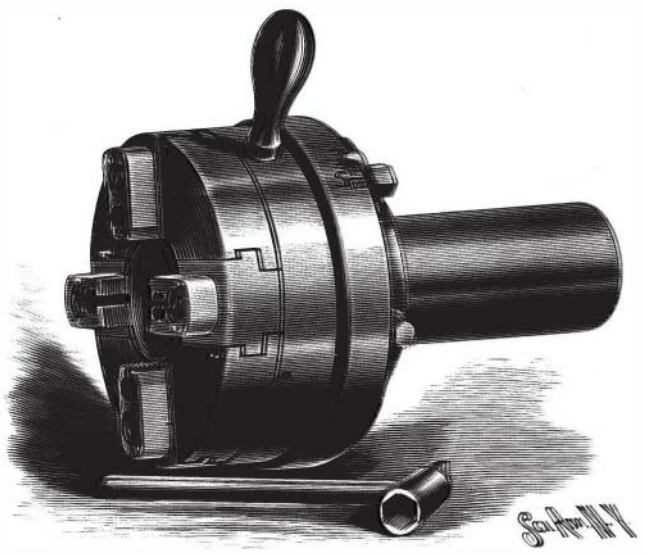


THE PATTON PAINT MILLS, MILWAUKEE, WIS.

A NEW AUTOMATIC SCREW CUTTING DIE HEAD.

A new automatic opening and adjustable screw cutting die head, for use on turret head and other screw machines, is represented in the accompanying illustration. It is especially designed for threading the ends of bicycle hubs, tubing cups, cones and other bicycle fittings, as well as other short threads of a similar nature, such as used on water, steam and plumbers' specialties. The die head is provided with a central stop or gage, which may be adjusted to the length of thread to be cut. When the work strikes this gage the threading dies fly open, releasing the thread, and the die head may be withdrawn. The die head is also provided with a graduated adjustment, being entirely independent of the opening movement, and by means of which the dies may be set for cutting the required size. The head proper and shank is made in one piece, thereby securing great strength and rigidity. The front of the head is provided with four cross slides which carry the threading dies; the threading dies of course being interchangeable for those of other sizes of threads or renewable when worn out. The cross slides are provided at the back with lugs projecting into eccentric slots in a spring-actuated cam, a partial revolution of which in one direction closes the dies, while a movement in the opposite direction throws them open. The spring which actuates the cam has one end fastened to a small collar held in position on the shank by small set screws, and is gaged to give sufficient tension at all times for opening the dies. The back plate has a slight movement endwise, but does not turn. Three screws in the hub of the back plate pass through the shank of the tool without touching it and serve to hold the gage in position. Two of the screws are fixed, while the third acts as an adjusting screw for varying the position of the gage. When the work strikes the gage, the back plate is moved back enough to release the locking pin from the cam, which instantly flies around and the dies are opened. The locking pin passes through a circular slot in the back plate long enough to allow all necessary adjustment for the diameter of the screw. The index plate covers the slot, and by a pointer indicates the adjustment by graduations on the circumference of the back plate, the graduations being made to read by hundredths. The die head is closed by the small handle shown, and the dropping of the locking pin into the hole in the cam locks the dies securely. The die head may also be closed automatically by means of a pin screwed into a threaded hole opposite the handle, and attaching a taper piece to the tail stock or bed of the machine, which will engage the pin as the head is brought back. It will be seen that every part of the die head is most effectively protected from chips and dirt.

This die head is manufactured by the Geometric Drill Company, New Haven, Conn., who have established a wide reputation for the ingenious tools and high class of workmanship they produce, being especially identified with their patent system of geometric drilling and turning. They also have the distinction of making the smallest as well as the largest automatic screw-cutting die head for turret lathe use, as they furnish these tools for threading any size from No. 17 wire gage to 6 inches diameter inclusive.



A NEW DIE HEAD.

AN IMPROVED BOILER.

The illustration represents a boiler in which a series of segmental and longitudinal water legs form passages or channels for the products of combustion, the channels being connected together alternately at opposite ends of the boiler, whereby the products of combustion are caused to traverse the channels consecutively. The improvement has been patented by Thomas Barnes, of Vancouver, Canada. An auxiliary shell is formed in its lower half with a water leg sufficiently depressed at its front end to afford room for the fire box, ash pit, etc., and the fire box at its rear end opens into channels formed by water legs, one of which extends about half way the length of the boiler, while the other extends from one head of the boiler to the other. There is a hood on the front end of the boiler into which the channels open, and on its rear end are two hoods, one above the other, the lower one being water jacketed and the upper one being held on the rear end of the shell, the hoods being preferably made in the shape of hinged segmental doors, so that they may be readily opened for conveniently cleaning the channels as well as the flues. The latter are somewhat less in diameter than the inside width of the corresponding water leg, so that each flue is completely surrounded by the water in the leg. When the hoods are closed, the smoke and gases from the fire box pass by the lower channels through the lower rear hood, then forwardly and through the front hood, and by other channels to the upper rear hood, from which they again pass forwardly by an upper channel and flue to the smokestack. The boiler is provided with suitable drain pipes and manholes, and is designed to utilize the heat generated to the fullest advantage.

The Manna of the Desert.

The manna sent to the Israelites on their journey out of Egypt to the Holy Land is regarded as identical with an edible lichen in Kerner and Oliver's "Natural History of Plants," and the older view that it was the sap of a tamarisk, exuded under the influence of a parasite, is held to be without foundation. Mr. M. J. Teesdale reviews the subject in the February number of Science Gossip, and the evidence he brings forward is opposed to the conclusion to which reference has been made. He shows that an exudation from the twigs of the tamarisk (Tamarin gallica) has more points of resemblance with the manna of the Israelites than either the edible lichen or the sweet gums exuded by leguminous shrubs, such as Alhagi maurorum or A. desertorum—both known to the Arabs as camel's thorn.