back bound book when filled or partially filled with sheets, and placed in nearly an upright position (upon the rack of a piano for instance) there is no disposition in the leaves to turn over of themselves, as is the case with books bound in the usual manner, particularly when newly bound. Contrivances for keeping the book open may, therefore, be dispensed with.

This portfolio is simple in construction, and the roller back with the rings complete, and in readiness to attach to the covers, is of small cost. The expense of the article complete will depend upon the style and finish of the cover. Address the inventor as above for further information. Patented June 11, 1856.

New Printing Press.—By A. Newbury and B. Newbury, of Windham Center, N. Y.—Consists in the employment of a rotating and reciprocating printing cylinder, and also in a peculiar inking device, and fly, which catches the sheets as they issue from the press. The machine is extremely simple, and it is believed, will work rapidly and well. It may be constructed at a small cost, and is not liable to get out of repair.

Machine for Heading Bolts.—By E. Coleman and P. Coleman, of Philadelphia, Pa.—Consists of a rotating device attached to the bolt machine, whereby the bolt is turned intermittently within the jaws during the process of heading. The usual burr which is now formed on bolts below the heads is thus avoided.

Shingle Machine.—By John Broughton, of Chicago, Ill.—Consists of a disk wheel with knives, face guide, and cam attached, and used in connection with a vibrating bed. This machine is designed for cutting shingles from blocks that have been previously steamed. It is very simple, both in construction and operation. The only parts requiring any adjustment are the face guide, to give the thickness of the shingle, and the face cam, to give the taper.

Saw Set.—By A. Casey, New York City.—The main object of this invention is to save the saw blade from being strained or bent and rendered untrue, by the operation of setting the teeth to cut a broader kerf. The arrangement could not be easily explained without drawings.

Improvement in Steam Engines.—By Charles H. Reynolds, of Lewiston, Me.—This invention is applicable directly to the induction valves of a steam engine, when separate induction and eduction valves are used for each end of the cylinder; or to a separate cut-off valve arranged in the induction pipe, to act independently of the valve or valves which regulate the induction and eduction of the steam. It consists in a novel arrangement of mechanism connecting the valves with the governor, for the purpose of varying the closing movement of the valves, and thus to regulate the engine.

The Plow.—An Improvement Wanted.

"In our volumes of last year, under the above heading, will be found an article in which we called attention to a defect in the action of plows, a remedy or preventive of which would certainly be a great improvement. The defect to which the attention of our readers was called in that article, seems the *necessary* result of the present form and mode of action of the plow, which is, in reality, a *wedge*, forcibly dragged through the soil, lifting up that portion which is above it, at the expense of hardening or making more compact that portion which is below it. This mode of action has a tendency to harden and glaze over the subsoil, or that part of the soil on which the sole of the plow rests in its passage, and is productive of several injurious effects; as, for example: 1. It makes a compact surface very hard to break through or get under in subsequent plowings. 2. It makes the lower surface so dense that the roots of plants must often find it impossible, or very difficult to penetrate it; and 3. It forms a groove in which surface-water must sometimes be retained long enough to injure the growing crops.

The above is the defect which it is desirable to get rid of. The improvement wanted is some contrivance by which this defect could be prevented or remedied. Nothing of the kind has been as yet proposed, so far as we can remember, by any of our ingenious countrymen. The following proposal was lately made at an agricultural meeting in Great Britain. The object, let it be remembered, is to preserve the bottom of the furrow in a pervious condition, and to get rid of that compactness, which, in addition to the evils already named, must be a great obstacle to the perfect drainage of a clay soil. The remedy proposed consisted in the adaptation of rollers to the sole shoe, or in adding a hind wheel, notched or teethed, so that when following in the track of the sole shoe the notches or teeth may break up the smooth track formed by its action. The proposer of these two modes of improving the plow seems to think most favorably of the idea of rollers—whose mode of action, however, he does not specify—as they would not only prevent the glazing and hardening, but would, in his opinion, lessen the draft.

We submit these suggestions to our ingenious inventors and mechanics, and to our agricultural brethren of a mechanical genius, in the hope that they may prove a germ of a much-needed discovery or invention."

[We copy the above from the *Albany Cultivator*, which is one of the most practical and reliable agricultural papers in the country. The subject is one of importance. We have no doubt that inventors will respond to the call made upon them in the proper manner. The invention of a plow that will meet the requisites above described, would be a lasting benefit to the agricultural world, and bring a large fortune to the patentee. Come forward inventors, and help the farmers to a new plow.

Prevention of Smoke.

In all our Atlantic cities and villages where wood and anthracite coal are used for fuel, no smoke fills the atmosphere, and the houses have that clean and fresh appearance which excites the surprise of persons arriving here from England, where bituminous coal is employed for fuel. In various parts of our country, however, bituminous coal is now used for fuel, and it will yet become the great fuel for manufacturing and domestic purposes, owing to the magnitude of our bituminous coal fields, in comparison with which the anthracite beds are mere specks. Where bituminous coal is used (as in Pittsburg, and the cities and villages on the Ohio river) the atmosphere is redolent with smoke, and the houses have a sooty, chimney-sweep appearance. If the smoke from such fuel could be prevented, it would be a very desirable thing to all those who use it. Two inquiries, therefore, arise in regard to it, namely: what is the cause of the smoke; and can it be prevented.

Fairbairn, C. E. and M. E., of Manchester, Eng., in his lectures to engineers, presents some very useful information relating to these two questions. He says:—

"Perfect combustion is the prevention of smoke, and whenever smoke makes its appearance we may reasonably infer that there is imperfect combustion, and probably the want of attention to a few simple rules is the cause. From well-known chemical facts, 1 atom of coal gas requires 8 atoms of atmospheric air for its complete combustion; when that quantity is at its maximum, or in excess, there is no smoke; when this condition is not fulfilled, smoke is invariably present. In order to render the residue of the products of combustion transparent or smokeless, a supply of air, amounting to fifteen times that of the gases evolved, must be admitted. Should it exceed that quantity, the effect will not be smoke, but an additional expenditure of fuel to supply the loss of heat which this excess of air would require for absorption, rarefaction, &c. Hence the necessity which exists for power to regulate the admission, if not the exact, at least of an approximate quantity of air. On the other hand, should the supply be deficient in quantity (which is often the case) a dense volume of smoke is then visible, accompanied with all the defects and annoyances of imperfect combustion.

The variable changes which accompany perfect and imperfect combustion are not only visible, but may be proved by experiment.—Let any person apply his hand to the tube of an Argand gas-burner, and he will find that the instant the aperture is partially closed, the flame immediately becomes elongated, and instead of a clear brilliant light, a dull red flame with a dark volume of smoke, is the result. This shows the effect of a diminished supply of air; and the same may be applied to a steam engine furnace when imperfectly supplied with oxygen, when the gases pass off in opake volumes unconsumed, and where a considerable portion of heat is entirely lost from that cause. It has been stated that we cannot have fire without smoke, but this is not the case in steam boilers, as a well-constructed furnace, properly managed, furnishes many examples where bituminous coal is consumed in large quantities, and with little, if any, appearance of smoke. In attempting the total suppression of this nuisance two important considerations require to be attended to as essential, the first of which is, an abundance of boiler space, and the second a sufficient supply of air."

The reason why wood emits but little smoke is that it contains within itself a great amount of oxygen, to produce perfect combustion.—The reason why anthracite coal emits no smoke is that it contains no hydrogen, like bituminous coal; it is mostly composed of carbon, which is not volatile, and only becomes so when it unites with its combining proportions (C. O_2) of oxygen in perfect combustion, producing carbonic acid gas. Bituminous coal is a hydro-carbon, that is, it contains hydrogen, a very volatile gas, which at a comparatively moderate heat escapes, and lifts up some of the carbon with it, thus producing carbonic oxyd (smoke). The addition of more oxygen to it at a high heat will produce perfect combustion, prevent smoke, and increase the quantity of heat. The prevention of smoke, therefore, not only involves the removal of a disagreeable evil, but the saving of fuel also.

Great Exhibition of the American Institute at the Crystal Palace, New York.

The Exhibition opened agreeable to announcement, on the 22nd inst., but at the time of our going to press had not assumed a very orderly appearance. Indeed, the Palace was by no means in readiness for the public. A few days, however, will suffice to work a marvellous change in the face of things. The Exhibition will then become interesting, and spectators will begin to flock in by thousands.

The indications are, that the Fair this year will surpass those of previous years. The display of working machinery promises to be very large. The arrangements for motive power are on the amplest scale.

Among the mechanical novelties already on hand is a splendid steam fire engine from the Island Works, Seneca Falls, N. Y., and an air engine from the Neptune Works, of this city. We shall describe them at another time.

Next week we shall commence our more formal reports, and devote considerable space each week, during the continuance of the Exhibition, to descriptions of the principal novelties in each department.

Thrashing by Steam Power.

E. S. Judd, of Stevens' Point, Wisconsin, informs us, that last spring he and his brother, H. A. Judd, purchased a four-horse power steam engine, of Hoard & Son, of Watertown, N. Y., which they have applied with much success to thrashing grain. They first tried it with a common thrasher and separator, usually driven by four horses, but finding it more powerful than they expected, they applied it to an eight-horse thrasher, which it worked with ease to the astonishment of those who first witnessed it, and who were so well pleased with its performance that they threw up their hats, and gave three cheers for steam. He informs us that competent judges assert, that their four-horse steam engine drives the thrasher and separator with greater ease than eight horses. The farmers all like it, as it is twelve per cent. cheaper than horse power for thrashing. It is mounted on wheels; the farmers furnish them with wood and water, and they go from place to place thrashing by steam. This portable steam thrasher is a great acquisition to agriculture, and he thinks that the farmers of Illinois should devote their attention to steam thrashing as well as steam plowing. With a four horse thrasher, they have thrashed 100 bushels of wheat per hour.

A Marine Locomotive.

Mr. William Lonsdell, a machinist of Memphis, Tenn., has invented what he terms a Marine Locomotive, and which is designed to be substituted for the present steam water craft, by making the base of the boat the propelling agent, instead of paddle wheels, as now used. The invention consists in using two huge parallel hollow screws in the place of the present keel, and revolving them by means of steam power, so that they will cut their way through the water as a common screw cuts into wood. The screws are constructed of iron, and, as before stated, are hollow, but are divided into compartments, as precaution against sinking, in case of an accident.—[Washington Star.

[The idea of this locomotive is obtained from that of H. A. Frost, illustrated on page 180, Vol. 9, Scientific American. The difference between the two is, that Frost's has only one revolving hollow screw, and contains the cabins in its interior.

Geographical Expeditions.

Exploring expeditions have become quite a mania at present. One is about to be fitted out by the Pacha of Egypt to explore the upper sources of the Nile, and another projected by some Englishmen with the same object in view, but taking a different route. The Nile is still a mystic river, and we know but little more about the countries through which it flows than that left us by the traveler Bruce, nearly a century ago.

Prof. Burmeister—the celebrated botanist—of Halle University, in Germany, is about to proceed on an exploring expedition up the La Platta region in South Amcrica.

An expedition is talked of in this city, for the purpose of exploring the mountainous regions behind the Colony of Liberia, in Africa. There is much of this world respecting which we are yet completely ignorant. We hope these expeditions will remove the clouds and shadows which still hover o'er those regions which they contemplate exploring.

Uses of Cypress Bark.

We have received from C. K. Marshall, Esq., of Vicksburg, Miss., a small package of the inner bark of the cypress tree, with a description of its uses, and he directs our attention to other purposes to which it may be applied.

This bark is very fibrous, of a dark tan color, and thousands of tuns of it can be furnished at the southern saw mills every year. He believes, and, we think, justly, that it would make excellent wrapping paper. It is employed in small quantities by some boatmen for caulking boats, and it possesses the quality of repelling the attacks of all water worms. It makes very good rope, and some of the raftsmen twist its fibers, and use it for this purpose. If any paper manufacturer desires to make some experiments with it, or any of our ship caulkers for caulking the seams of vessels, he will willingly furnish them with specimens.

We are convinced that the inner bark of the cypress tree—which is the common growth of the low lands in the South—might be used as a cheap material for making mats, coarse ropes, and a hundred other things. The natural resources of our country are not half developed. We send abroad for cocoa fiber for making coarse mats and rugs, while we have a superior article, thousands of tuns of which is annually thrown away at all our southern saw mills.

Death of a Celebrated Navigator.

Sir John Ross, the celebrated Arctic navigator, recently died in Scotland at the advanced age of 80 years. His expedition to the Arctic regions, ending in 1833, lasted four years, and he sailed over the exact northern pole of our globe: indicated by the compass whirling round on its pivot.

The U. S. propeller *Arctic*, which was dispatched by our Government to sound the ocean track for the telegraph cable between Newfoundland and Ireland, has arrived at the latter country, but no report of her ocean survey has yet been made public.