equivalent mechanism for giving the proper periods of motion and rest to the frisket carriage, and each and all the parts attached to it by means of the combination consisting of the arm, o 4, the rocking bar, o 3, the incline plane by which said bar is disengaged, the shaft, O, and the crank, n, 13.

Third, I also claim the combination of one or more feed frames, with the frisket or friskets or mechanism for receiving the sheet to b printed, the same being substantially as set forth.

Fourth, I also claim the described mode or any other essentially the same of securing against the plat en the sheet to be printed, whereby it is not only kept steady and prevented from bagging, but it is also. after the production of an impression upon it separated from the types in a proper and safe manner.

Fifth, I also claim constructing the pitman as described, or in any manner substantially the same, the bearing surface, i 1, the shoulder, i 2, and the joint, h 5, constituting its essential characteristics, so as to allow said pitman to be operated and to produce effects in the manner substantially as specified.

Sixth, I also claim, in combination with the described mechanism for producing the impressions, the treadle, K 4, or its equivalent, to prevent impressions being taken or produced while other parts of the press are in motion whenever such prevention may be desirable.

Seventh, I also claim the combination of the double frisket carriage, the bed, platen, and the rollers for inking the type with two sets of inking mechanism, the whole being made to operate together substantially as explained, and the several parts being constructed and connected substantially as set forth.

Eighth, I also claim the combination consisting of the platen (when constructed substantially as stated). the bed and distribution cylinde s.

Ninth, I also claim the combination of a crank with the carriage, n 6, for the purpose of carrying the inking rollers over the form, and for giving the friskets, n', their proper motions and periods of rest.

Tenth, I also claim the mode of constructing the winter, E, or bottom bar, as shown in Figs. 8 and 34, or any equivalent device, by which inconvenient hight in the machine is avoided, said winter being made with a ledge or shoulder near its lower part upon which the toggle joints are sustained, substantially as described.

Eleventh, I also claim the combination of the fountain with one or more distribution cylinders, and a traveler, L, the same being for the supply and distribution of the ink, substantially as described.

Twelfth, I also claim placing the apparatus for the supply and distribution of ink, so that the distribution cylinders rest over or nearly over the fountain, the roller which takes the ink from the fountain roller being pla ed between the fountain and the cylinders, K 6, K 5, in the manner substantially as shown.

Thirteenth, I also claim the mode described of laying the ink upon the types by passing the rollers, K 5, K 6, between the bed and platen, said rollers being brought to a stand in their horizontal movement for the purpose of recei ing their supply of ink from a cylinder or cylinders substantially as stated.

Fourteenth, I also claim the described mode by which the nuts, g' g', which sustain the impression are brought to their proper positions and secured there, that is, by the hoops, g 2, set screws, g 3, and pins, g 5, substantially as specified.

Fifteenth, I also claim the mode of producing the impressions by means of toggle joints applied to the under or reverse side of the bed, substantially as described.

Sixteenth, I also claim the combination of the rocker shaft, d 2, and the levers, d', with the bed, the same being for the purpose of keeping the bed level, substantially as described.

EXTENSION.

MACHINES FOR SPLITTING LEATHER—Alpha Richardson, of Boston, Mass. Patented April 16, 1844—extended April 16, 1858: I claim the arrangement specified of the gage and feed rollers of a leather splitting machine, so that the bilge of the lower side, or the axis of the former shall be directly over or in the same vertical plane with the edge of the knife, while the axis of the latter is a little distance out of said vertical plane, and its upper bilge is a little abo e the level of the edge of the knife for the purposes recited in the specification.

The Horse Power of Locomotives.

MESSRS. EDITORS—"What is the horse power of a locomotive under the following circumstances, namely, cylinders fifteen inches in diameter; stroke, twenty inches; driving wheels, five feet diameter; speed, forty miles per hour, with a working pressure of steam in the cylinder of one hundred pounds per inch, full stroke?"

I have worked out the question for myself, and have made the power of each cylinder 393 horse, nearly, or 787 total. An apprentice in a machine shop in this place recently asked me the above question, and when I gave him the foregoing answer, all the engineers in the shop laughed at me. I then asked quite a number of mechanics what was the power of such a locomotive, and they said from forty to eighty horse. An engineer of a locomotive of about the capacity given, told me that his engine was eighty horse power. There is either a very mistaken notion among mechanics generally concerning the power of locomotives, or else the rules laid down in books for estimating their horse power are not correct. Your opinion will throw light on the subject. G. B. F.

Canton, N. Y., April, 1858.

[Our correspondent is nearly right in the conclusions deducible from the question according to the data he has furnished. The nominal horse power of a locomotive of the dimensions given and performing, as described, is eight hundred. This is estimated by multiplying the pressure of the steam per inch on the area of piston into the velocity of the latter in feet per minute, and dividing the product by 33,000. The unit of a horse power is 33,000 pounds, lifted one foot per minute. In the above case, therefore, we have—

$15^2 \times .7854 = 176.715$ inches area of piston.

$5 \times 3.1416 = 15.708$ feet circumference driver wheel.

$5280 \div 15.708 = 336$ revolutions of wheel per mile.

$336 \times 40 \div 60 = 224$ revolutions driven per minute.

$224 \times 3\frac{1}{3} = 747$ feet (nearly) velocity of piston per minute.

Therefore, $176.715 \times 100 \times 747 \div 33{,}000 = 400 \times 2$ (cylinders) $= 800$ horse power.

A like result is obtained as follows:—$(15^2 \times 20 \times 40 \times 100) \div (5 \times 4500) = 800$.

This latter rule embraces the multiplying of the speed in miles per hour by the square of the diameter of the piston in inches, by the stroke in inches, by the effective mean pressure on the piston in pounds per inch, and dividing the product by the diameter of the driving wheel in feet, and by 4,500.

The *nominal* and the *efficient* horse power of a locomotive are two very different questions, and the engineer to whom our correspondent refers may have given a correct answer so far as it related to the efficiency of his locomotive. In working out the above question no allowance is made for back pressure, which in locomotives sometimes amounts to one-seventh of the direct pressure. There is also a great difference between the pressure in the boiler and that in the cylinders, especially when running at high speeds and working expansively; this difference of pressure is from 20 to 40 per cent in speeds of from twenty to sixty miles per hour, and is even greater when the cylinders are not protected.

The question, "What is the horse power of a locomotive?" is one of a complex character, and in some respects very different in its nature from that of a stationary steam engine. The efficient horse power of a locomotive may be very small, while its nominal horse power may be very large, and the very best locomotives expend a vast amount of power in proportion to their amount of efficiency. Redtenbacher, a German author of scientific attainments and a practical engineer, has published the results of quite a number of experiments on this head, and his conclusions are that the efficient horse power of a locomotive performing under the best possible conditions, according to his experiments, is only as 230 to 505—not fifty per cent of the power expended. Six wheeled drivers connected together, he found far more efficient than engines having either two or four driver wheels. He also found that the important element, *adhesion*, varied greatly with the character of the engine. Thus a locomotive of eleven tuns weight with two wheel drivers, possessed only 5.5 adhesion, whereas one of twenty-five tuns weight with six wheel drivers possessed 22.5 of adhesion; the former only half the adhesion of its tunnage; the latter nearly the whole of it. There are quite a number of elements which necessarily enter into the computation of "the efficiency of locomotives."—[EDS.

Appreciation of the Scientific American.

The *Iowa Farmer*, published at Des Moines, Iowa, speaking of the SCIENTIFIC AMERICAN, says:—

"This is one of the most valuable publications in the country. To the mechanic and inventor it is invaluable. In it may be found a notice or description, and frequently an engraved illustration, of the most important and useful discoveries of the day in all the arts, both in Europe and the United States. It is highly and deservedly prized by every intelligent workman in the mechanic arts, and receives from them a generous support. It is as necessary and useful to them as any of the tools of their trade, for in its beautifully printed pages they find a record of the result of the toils of years of the greatest minds of the world. A friend who stopped a few days in Chicago on his way West informed us that at a lecture which he attended there one evening, a large portion of the audience were mechanics, and he thinks he saw not less than fifty of them with this paper in their hands reading it, which they no doubt had just received from the Post Office. It gave him an exalted opinion of the intelligence of the workmen of Chicago."

The Egyptian Steamship Voyageur de la Mer.

This fine steamship, built at Boston for the Pasha of Egypt, has been lying idle at her wharf, for several months, in consequence of difficulties connected with the working of her engines. We are informed that a contract has just been closed between the agent of the Pasha and the Corliss Steam Engine Company, of Providence, by which the latter are to remodel her engines by the introduction of Mr. Corliss' improvements. The work will probably be completed in two or three months, and by the 1st of July it may be presumed that this splendid ship (which our readers will probably recollect is constructed with a double hull of iron and wood) will be in a condition to reflect the full credit due to her designers and constructors. She is the largest iron vessel ever built in this country, and is the first, we think, in which an inner casing of wood has been provided in this manner to contribute to the strength and efficiency of the structure.

Fans for Ventilating Mines.

On page 235, this volume, SCIENTIFIC AMERICAN, we published a brief description of the success resulting from the employment of a steam fan in ventilating the coal mine at Abercarn colliery, England. In answer to this, we have received a communication from Stephen Cox, of Bridgeton, N. J., claiming priority of invention, and he has furnished us with some testimony to prove his title. He made a rotary fan, and put it to work in a mine at Reading, Pa., in September, 1854, and another for the same company in November following. Since then, it has been successfully at work, embracing a period of three years and seven months. The mine in which it is placed is three hundred feet deep, and the workings are a considerable distance from the shaft. The fan is three feet in diameter, has four blades, and runs at the rate of twelve hundred revolutions per minute. A branch pipe from each inlet of the fan case connects with a main pipe, which is carried down the shaft and into the rooms where the miners are working. Through this pipe the foul air is sucked up, thus causing a current of fresh air to rush down the shaft and through the mine to supply the place of that which is exhausted. This fan is driven by the usual mine engine, and is not set in a separate ventilating shaft like the one in England. As it appears to be competent to fulfill the offices for which it was constructed and arranged, it is an important fact for miners, inasmuch as it presents a very simple method of mine ventilation. In regard to its utility, Thomas Robarts, mine agent for Reeves, Buck & Co., of Phœnixville, Pa., states that the mine to which it has been applied, was previously almost impossible to work on account of foul air, but this was removed within an hour after the fan was set in motion, and the mine thoroughly ventilated. This is pretty high testimony to its efficiency. "Honor to whom honor is due."

Recent Patented Improvements.

The following inventions have been patented this week, as will be found by referring to our List of Claims:—

COMPRESSING AIR.—Samuel Chichester, of Poughkeepsie, N. Y., has invented a machine, the object of which is to obtain from a spring or other prime mover exerting an unmoving or but little varying force, a supply of air for any purpose at a pressure above that of the atmosphere that shall be perfectly uniform, notwithstanding any degree of variation in the quantity used. The machine is especially intended for supplying the necessary quantity of air for passing through and taking up the vapors from the hydro-carbon liquids for illuminating purposes, particularly the liquid invented by Levi L. Hill, and it consists in a combination of a spring with a reservoir and pistons.

MACHINE FOR CUTTING CORK.—The great difficulty in cork-cutting machines has been in keeping the cutters sharp, and at the same time not interfering with the operation of the machine. In this machine this difficulty is overcome, for the cutters and saw teeth are kept sharp by an automatic or self-acting sharpener. The cork is fed to the machine, and cut, and the shaving is conveyed away by the saw teeth, and the necessary parts sharpened by the rotation of a wheel or handle. Edward Conroy, of Boston, Mass., is the inventor.

MODE OF COOLING MEAL.—This invention consists in the peculiar arrangement of a suction fan, conveyors, and elevators, so that the meal during its passage from the grinding stones to the bolts, is thereby cooled and dried within a limited space, the whole being a simple and economical device. It is the invention of John Deuchfield, of Oswego, N. Y.

DRIVING WHEELS FOR LOCOMOTIVES, PLOWS, &c.—John F. Elliott, of New Haven. Conn., has invented a novel arrangement of legs and feet applied to the driving wheels of locomotives for running upon common roads or for agricultural purposes, such as plowing and otherwise tilling land, or reaping and mowing by steam power, and operated by a cam, or its equivalents, to cause the propulsion of the machine or engine by the rotary motion of the wheels.

PORTABLE CHAIR LOUNGE AND BEDSTEAD.—This invention contains in one simple article the above useful comforts. It consists in a sort of chair frame, so arranged that by shifting a couple of straps it may be converted into an easy chair, or if desirable into a sort of sofa lounge; or, by another change of the straps, it may be horizontally extended into a comfortable bed. The legs are hinged, and the whole folds up into a small pack. To take up one's bed and walk, with this contrivance, would be a very easy matter. We have had one of these chairs in practical use for some time past, and therefore speak from experience when we say that it is an excellent improvement. For camp use it is just the thing, and our government ought to give it a trial among the soldiers. The inventor is Z. C. Favor. The assignees of the patent, who may be addressed for further information, are Messrs. Brown & Hilliard, Chicago, Ill.

The following inventions were patented last week:—

CARRIAGE WHEEL.—With this arrangement, after the spokes are inserted and the wheel put together, the wheel can be tightened by simply inserting the taper axle-box, expanding an annular packing ring which is placed within the eye of the hub, and causing the same to bear against the ends of the spokes, and force them outward until the wheel is tightened up; and again, in case of shrinkage, after the wheel has been in use, by simply withdrawing the taper box and inserting a duplicate packing ring and again driving in the taper axle box, all the spokes can be moved radially outward, and the wheel thereby tightened up. We regard this as a good attachment to wheels. It is the invention of B. A. Rogers, of Shubuta, Clark county, Miss.

COAL HOISTER.—With this machine, the coal car loaded can be hoisted from the railway of the mine or pit, to a convenient or proper position relatively to a dumping shute, and then automatically dumped and allowed to re-adjust itself and descend to its original position ready for receiving another load, without any other attention other than the turning of a windlass shaft to the right and left. It is the invention of George Martz, of Pottsville, Penn.

FILTER.—This invention is designed for purifying the water used in steam boilers, and thus prevent incrustations of lime and sediment over the inner surface of the same. The arrangement adopted is very simple and perfectly automatic in its operation, the weight of the discharging filtered water being made available at intervals for opening certain valves, so as to effect the discharge of all sediment which may have accumulated in the bottom of the filtering vessel. It is the invention of Dr. A. Jaminet, of St. Louis, Mo.