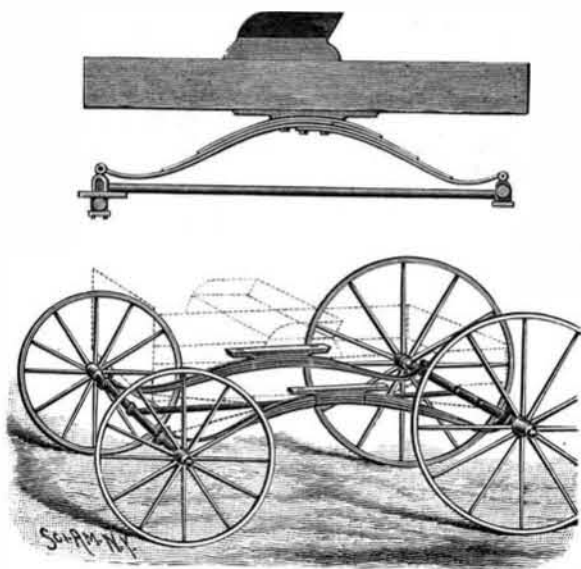


AN IMPROVED VEHICLE SPRING.

The accompanying illustration represents a novel construction of side springs for wagons, which has been patented by Mr. James F. Thomas, of Alexandria,



THOMAS' VEHICLE SPRING.

Neb. These springs are bent laterally inward at the middle parts, and there secured to the vehicle body or a cross-piece on its bottom, the springs thence diverging in straight lines outward, and being clipped to the front and rear axles. Each of the springs is strengthened in its rear by adding a half leaf beneath the other leaves, this leaf being secured at its forward end by the usual center bolts, and extending backward to form part of or connect with the clip coupling on the rear axle. The clips or couplings with which the spring is connected at its outer ends with the front and rear axles are bent where the connection is made to present skew-joints or knuckles, adapted to conform to the laterally diverging portions of the spring. This spring is designed to combine all the advantages of both end and side springs, holding the body of the vehicle substantially level when the load may be very unequally placed.

African Goats.

A pair recently brought from Africa has been added to the Central Park collection of animals.

"There is no particular value attached to the animals, except from their rarity," remarked Director Conklin. "They are the first pair of Morocco goats probably that ever found their way to this country. They are young, in their second year, quite gentle, as you see, and will eat out of your hand. But if startled, all their inherited wildness comes out. I never saw such animals. They seem to have muscles of rubber, from the way they jump. I have never had so much trouble with the most dangerous animals we have here."

"The jumping of the thoroughbred hunters in Madison Square Garden a few weeks ago doesn't begin to compare with that of these goats. I put them in a yard having a fence eight feet high, but they jumped it so easily that now I have a fence ten feet high."

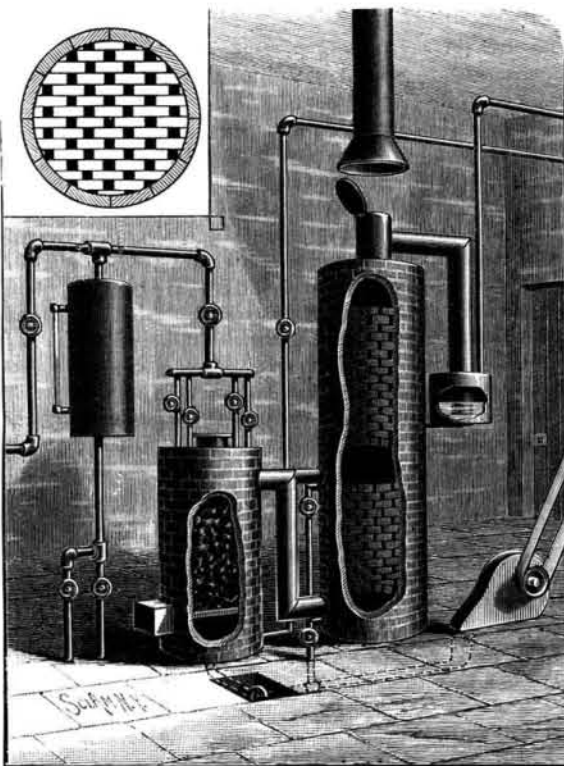
"The space within their inclosure is so limited that they cannot get a good start to go so high, or I would not trust them with anything less than a fifteen foot fence. Then, they are getting accustomed to these quarters and are not so easily alarmed as they were, but I think, if startled, they might still clear this fence. Their leap is peculiar. They crouch a little, give a short jump in the air, and as they strike the ground, bound upward again as if they were shot from a catapult. The muscles of their legs are extremely tough, but the legs are not adapted for great rapidity or endurance in running. They have been developed by generations of climbing on the Morocco hills. As these goats get older and their bodies in captivity become heavier, they will probably become less active. Possibly our native goat has lost his faculty of high jumping, if he ever had it, since he became partly civilized and accustomed to a diet of brown paper."

AN IMPROVED GAS MANUFACTURING APPARATUS.

The illustration herewith represents an apparatus for the rapid and economical manufacture of water gas from oil, steam, and coal, which has been patented by Mr. John A. McCollum, of Riverside, Cal. In this apparatus, the furnace is charged, through a door at the top, with coal or coke, there being at the bottom a door leading to the grate bars, under which discharges a blast pipe connected with a blower. A series of pipes are arranged to spray oil into the top of the furnace, these pipes being connected with a tank at the left, while the tank itself is connected at the top with a pipe from the storehouse, and at the bottom with a pipe admitting water under pressure, and also providing for the escape of water, when the valves are properly turned for either purpose, the water pressure being made to force the oil into the furnace and spray it upon the fire. From the upper end of the furnace extends a

horizontal pipe, having two branch pipes leading into a double "fixing" chamber, one pipe leading to a bottom fire-place and the other to a fire-place about midway of the chamber, fire-bricks being arranged in checker-fashion, as shown in the small view, above each fire-place. In the upper end of the chamber is an outlet pipe leading to a smokestack, and having a valve on its outer end to cut off the smoke-pipe connection, while from the same pipe extends horizontally, and then downward, a discharge pipe leading into a "washer," which has the usual outlet pipe. A pipe conveying live steam from a boiler is connected with the apparatus, being passed vertically through the branch pipe between the furnace and "fixing" chamber, to discharge steam on the under side of the furnace grate bars.

In operation, the coal or coke in the furnace having been ignited, the combustion is forced by an air blast from the blower, a portion of this blast being also at first discharged into the two fire-places of the fixing chamber, while the valve leading to the smoke-pipe is open. The checker bricks having become about a straw color, the air blast is shut off, and the valve leading to the smokestack closed, while the steam is admitted, being superheated on passing through the branch pipe from the furnace before its discharge under the grate bars. At the same time the oil from the supply tank is caused to spray on the top of the fire, whereby light and heavy hydrocarbon gases are formed, which mix with the hydrogen gas, carbon monoxide and carbon dioxide produced by the steam passing through the fire, this mixture passing through

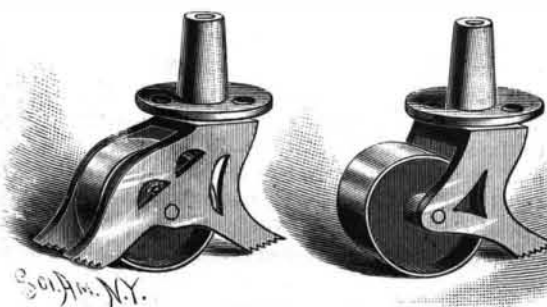


McCOLLUM'S GAS MANUFACTURING APPARATUS.

the bricks of the "fixing" chamber, and making an enriched or carburated water gas, which passes into the washer to be further treated in the usual manner.

AN IMPROVED SAFETY CASTER.

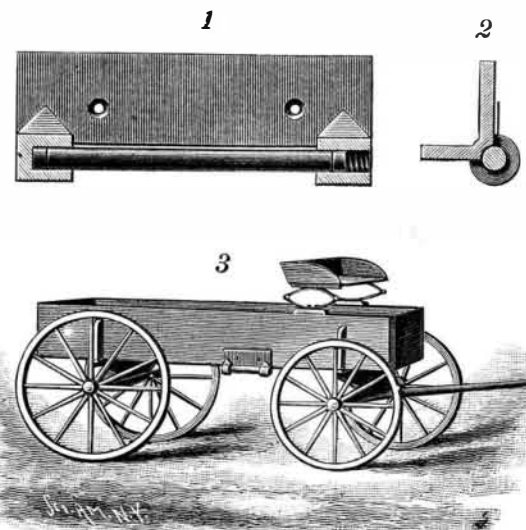
A simple frame or horn, making a socket for casters in chairs or other articles of furniture which will tend to prevent their tipping over, is illustrated herewith and has been patented by Mr. James J. Sullivan, of No. 59 Second Place, Brooklyn, N. Y. It often happens, as a caster is ordinarily attached to a chair, that a person sitting in the chair and slightly tipping forward will cause the chair to roll back from under him, and similar results will follow when the chair is tipped too far back, both being accidents which this invention is designed to prevent. The frame in which the wheel is journaled has at its base horizontally aligning integral arms or lugs, at each side of the wheel bearings, and projecting beyond the periphery of the wheel. These may be made to project from one or both sides of the bearings, as shown in the different views, and are adapted to immediately stop the further progress of the wheel after a chair has been slightly tipped, the feet of the projecting lugs then coming in contact with the floor or carpet.



SULLIVAN'S SAFETY CASTER.

IMPROVED WEAR IRON FOR VEHICLES.

The accompanying illustrations represent a wear iron for taking up the wear of the wheels against the body of a vehicle, as in turning. It has been patented by Mr. Jacob M. R. Gedney, of Little Falls, N. J. The



GEDNEY'S WEAR IRON FOR VEHICLES.

device consists of a plain friction roller, preferably made of chilled steel, mounted to turn in bearings formed on an angle plate adapted to be attached to the body of the wagon, Figs. 1 and 2 showing a sectional side view and a cross section of the device. The roller is held detachably in place by a set screw working in one of the bearings against the corresponding end of the roller, a cylindrical rubber or other yielding block or spring being interposed at each end bearing of the roller to prevent all rattling. The angle plate attached to the body of the wagon has a concave bearing or seat on its apex or ridge, throughout its length, in line with the bearings of the roller, whereby the roller will be supported, and there will be no danger of its being bent or broken by a blow of the wheel in turning the vehicle.

Contrast of Colors in Nature.

Nature is very sparing of showy contrasts of warm and cold colors. Red and blue are very rare, and of yellow and blue the cases are but few, and black and blue are found in lepidoptera more often than white and blue are seen in our flora or fauna. It is not uncommon for one of two strong colors to be overcast with a tinge of its fellow, or for both of them to be reconciled by a common touch of black or of some third color, or for one of them to be lightened by a dash of white, while the other is lowered by as much black, and so red, off-hued with black—russet and green up-brightened with white—often meet in the autumn in dead and dying patches of fading leaves. It may be shown, I believe, by the refractions of light in crystallized gypsum that brown is the complementary color to lavender-gray; and how true to herself is nature we may go forth and see, in the fall of year, in the dead and curled leaves of the mugwort, or meadow sweet, which are beautiful even in their death, with one side brown and the other the brown-matching gray; and, if brambles be cut in the leaf-green season, their two surfaces soon wither into the harmony of gray and brown.

And what use are we to make of these hues of nature? They are warrants for a gray mantle under locks of brown hair, or a brown bonnet or trimmings, or a gray room wall with brown furniture; and if, in a hot summer's day, I see the dark leaf-shades playing on the gray bark of a young beech, I can boldly lay darkish leaf shades on a wall of the beech bark's hue; or if, after the winter rains, I find a barkless pole in railings, tinted with the palest blue-gray, and on breaking off a splinter of it I find its inner wood of its true color of pale brown-yellow, why should I not take the inner tint for my wall and the outer one for the skirting? Or, if I pick up a piece of lichen of dull green on one side and dull gray on the other, why should I not bind my book in one color and lay on it a lettering piece of the other? Nature is the best school of art, and of schools of art among men those are the best that are nature's best interpreters.—W. Barnes, in *The Architect*, London.

Oiling the Waves.

Almost every vessel that encounters heavy seas reports, on reaching harbor, that oil was used in calming the waves with great success, and had it not been for the oleaginous liquid, the ship and all on board would certainly have gone to the bottom. Notwithstanding these multifarious statements, the percentage of vessels lost appears to remain about the same. Even if the oil has no great effect on the angry waters, it certainly produces a powerful influence upon the imaginations of the mariners. They believe it adds to their safety, fears are allayed, good judgment is preserved, and all hands work intelligently.

The Amber Fishers of the Baltic.

The Samland, the region lying between the Frisches Haff and the Kurisches Haff, equidistant nearly from Dantzic and Memel, is the home of the amber fishers of the Baltic. Germans call it the California of East Prussia, and, standing under the shadow of the lighthouse at Brusterort, where the peninsula juts out into the sea, one can see with the naked eye, on a moderately fine day, the entire stretch of coast from which, for more than three thousand years, the bulk of the amber supply of the world has been obtained. Twenty, thirty feet deep, and more, beneath the sand dunes that extend for miles around, and form the ocean floor here, are the veins of "blue earth," as it is termed locally, in which the petrified yellow and yellow-brown masses are found embedded; and a little way out beyond the lighthouse, on the Fox Point, where a fleet of black boats generally rides at anchor on the gray-green water, is one of the great amber reefs of the "Bernstein-Küste," a veritable layer of amber cropping up in the sea bed, and heaped up by the ceaseless action of wind and water. The "blue earth" formation runs far back inland, so that amber can be mined as well as fished, as it, in fact, is in some places in the district. But as the deposit is so much nearer the surface under water, where it is being continually exposed by the gradual sinking of the sea level, while the ebb and flow of the tide and the frequent storms that occur along the coast help to free the amber from the sand and weeds in which it is hidden, it is found more profitable, as well as easier, to "fish" than to "dig" it.

A few years ago, digging was largely carried on in the Samland, and assumed almost the proportions of a regular industry. Five or six peasants, not possessing the right to "fish," would combine, and obtain permission to excavate in likely spots on the estates of private persons. The result was profitable, but, in the end, the "digging" proved a source of unmixed evil to the locality. The "diggers" began to cheat the proprietors of their proportion of the yield, and invariably concealed a good find. Dealers, who crowded into the district, in the hope of picking up bargains, cheated the diggers. Then people commenced digging in parts forbidden to them, making what was termed "moonlight" expeditions to promising grounds. Fights with inspectors were of constant occurrence. When disturbed, the "diggers" had no hesitation in having resort to firearms, and murders became quite common, so that the government was obliged to prohibit this form of amber getting. The right to "fish" belongs to the coast villages and communities, and, in parts, to the state. The latter farms out the grounds belonging to it to certain Königsberg and Memel firms. One of these, Messrs. Stantien & Becker, agreed, in 1862, to keep open the waterway of the Frisches Haff—which needs constant dredging—and pay 25 thalers a day besides, if they were allowed to dredge there for amber. That the contract proved not unprofitable to them may be inferred from the fact that, when the six years for which they had tendered expired, they offered 200 thalers per working day instead of the original 25. The take of amber at Schwarzort, where the dredging is carried on, was estimated at 75,000 pounds for the working year of about thirty weeks.

Amber fishing is no child's play, and the fishers of the Samland are an exceptionally vigorous and hardy lot of men, as they need to be, seeing that they work either shoulder deep in the water, when the salt spray dashing over them falls in chilling icicles upon their faces, or are obliged to spend hours in a constrained position on the sea bottom, in heavy diving armor, when the air temperature is often a good deal below freezing point! They are not Germans, but Samaites, of the Kurish race, who have given a good account of themselves in many a frontier fight with Cossacks and Russ.

Stormy weather is the time to see the village fishers at work, for then wind and wave do what man's hands cannot accomplish. The sea, lashed into fury, loosens the boulders that press upon the amber masses underneath, disentangles them from the weeds and "sea tang," by which they are attached to the bottom, and sets them rolling inshore. Scouts are always on the look-out for approaching bad weather, and when a fierce northeaster comes roaring down the Baltic, sending the surf surging over the sand dunes, and strewing the sand with wrack, the fisher villages are warned that their harvest is a-ripening. Soon all are gathered near the water's edge ready for work. The fishermen, armed with long hooked forks and hand nets, wade shoulder deep into the sea, careless of the waves that buffet them to and fro, and seem almost to take them off their feet at times. With their forks some poke at the masses of seaweed and "tang" driven toward them by the crested surf, and catch as much as they can, and drag it landward, while others try to gather in their nets any stray pieces of amber tossed about by the surging waves.

As fast as the masses of weed or single pieces can be got ashore, they are passed on to women who stand as near as they can to the water, and who quickly loosen from them the fragments of amber, large or small, that may be attached. These are then put into bags, sorted,

and sold to the dealers, who not unfrequently accompany the fishermen on such occasions, in the hope of picking up a fine specimen before any rivals have the chance of seeing it. As it happens, though, it is the smaller pieces of amber that are cast ashore by the sea. The larger and finer blocks are rolled about on the sea floor and remain behind, the ceaseless play of wind and wave helping to cover as well as to uncover them. To get at these, the amber seekers wait a day or two until the wind goes down and the storm abates. Then, when the sea is smooth enough to see the bottom, they row out into the shallows, where there is not more than five to fifteen feet of water, and look for any amber blocks the waves may have uncovered or rolled in during the gale. When such are found they are raised by means of long pronged forks, and nets held out as before. On a fine morning, after a stiff hurricane has been blowing in the Baltic, scores of little boats may be seen off the shores of the Samland peninsula, the occupants bending over the sides, and eagerly peering into the sea in search of any amber treasures left by the departed storm. But the village fisherfolk only get the gleanings. The harvest proper is gathered by those at work on the amber reefs in deeper water.

For reef fishing, which is carried on off the coast of Brusterort, divers, specially trained to the work, are employed. The reef, a little to the northeast of the Samland promontory, is the most valuable in existence. It is over six hundred feet long, and more than four hundred feet broad, and consists of solid pieces of amber, deposited by the currents that meet just there, and embedded in the sand and seaweed that accumulate about it, and covered, in some parts, by huge boulders and blocks of stone. The barrier has been formed in the course of many centuries, and is now worked ten months out of the year, by the little flotilla of black boats that lie about three-quarters of a mile out, off the Brusterort lighthouse. Seen at a distance, the occupants of the boats seem idle enough as they sit in the stern, silent and preoccupied; but, rowing out to the fleet, one finds the men to be busy enough. Each of the half score boats at anchor here has six hands on board, besides the divers, who are at work below. Two pairs take charge alternately at the air pumps, which must be kept going without an instant's stoppage. One holds the life lines in his fingers, watching for the least pull, which is the signal to haul up, and the last is the overseer, who keeps an eye on everything.

The pumpers fix their gaze steadily upon a little dial plate placed amidships, and do not even turn as we row close up to them. They are watching the air pressure gauge, for too much air would prove as fatal to their mates below as too little, so their eyes never wander from the register in front of them. Every now and then strange and uncouth-looking figures are drawn out of the depths and rise to the surface, dripping wet, and are hauled into the boats—divers, evidently, and yet unlike ordinary divers—monsters, whose heads appear to hang down in front and wobble as they rise, and with curious humps on their backs. The amber reef fisher has to work in a lying and recumbent posture, so that the ordinary diver's equipment has had to be modified to suit him. Instead of the helmet, with its barred goggle eyes, being screwed on to his shoulders in an upright position, it projects forward, to relieve the neck and collar of the strain, and hangs down in front, so that his appearance as he rises from the deep, with the water dripping from his pendent top covering, is ludicrously like some sea animal with a snoutless head that waggles solemnly from side to side. To the back of each is strapped what looks, at a first glance, like a soldier's knapsack, but is really a metal box, with an upper cylinder, constituting an air reserve, so arranged as to supply the diver at each inspiration with exactly the quantum of air he needs, and no more; while the expired carbonic acid gas rises through another passage to the upper atmosphere.

As the divers are hauled into the boats, the overseer takes from a receptacle round the waist any amber blocks that have been attached to it. After a few minutes' rest, the fisher descends, and resumes his work below. With stout crowbar and pronged iron he pokes about among the masses of weed, and sand, and stone that form the sea bottom, until he detects the presence of an amber mass. Or, crawling about on hands and knees, he loosens from the sea floor any blocks recent storms may have partially dislodged. Often these pieces require two, or even three, divers to move them, and gigantic slabs have, now and again, been found that resisted even the united strength of three pairs of hands to disentangle from the masses of stone and weed encumbering them. The fishers remain down five hours a day, and though in autumn the sea is icy cold, so severe is the strain of working under water that they rise to the surface bathed in perspiration.

When gathered, the amber is sorted according to color and size. Pale, straw-tinted pieces go to the pipe makers of Constantinople, North Africa, and the Levant, and are made into mouthpieces; the light, bone-colored, and veined slabs are sent to grace the classic busts of the peasant women of central Italy; while the full yellow, sherry-tinted specimens find their way to

the South Sea Islands and inner Africa, where, worked up into necklets and beads, they are destined to adorn the ebony necks of the dusky beauties of Otaheite or Timbuctoo. Water amber is nearly all transparent and glasslike. Earth amber—that is to say, amber obtained by digging—is of the smoky kind, more white than yellow, and quite opaque. Only the finer sorts are obtained from the "reef" off Brusterort, and these fetch on an average about five thalers, that is fifteen shillings, per pound. Large blocks fetch proportionally higher prices than smaller slabs, while exceptional specimens, of unusual size, run to fancy prices altogether—fifteen, and even thirty, pounds sterling, it is said, having been paid for such samples. Most of the ordinary qualities of amber go to Leghorn and Venice. In return, northeast Prussia takes coral gathered from the reefs of the Adriatic.

This is due to the fact that in the Baltic provinces of Germany and the neighborhood custom ordains that brides and young married women shall appear in a curious ornament of red coral. It is made by stringing coral beads on a stout silken cord, the smallest beads procurable coming first, larger next, then still larger ones, until the largest of all are reached. This ornament is worn in such a way that the smaller beads are round the neck, the next in size round the shoulders, while the largest cover the bust, and depend down the back. The cost of a perfect string of coral like this is over fifty pounds sterling, and all well-to-do Polish families consider it an indispensable item of a bride's outfit. Hence the demand for coral is pretty regular and constant in the North; and in this way it comes that, practically speaking, the produce of the Italian coral reefs is exchanged for the yield of the Baltic amber fishery.—*London Standard*.

[MANUFACTURERS' GAZETTE.]

The Draftsman.

The most approachable men among the mechanical fraternity are the draftsmen. Why it is that they always maintain that serene suavity that characterizes them as a body, it is impossible to divine.

Perhaps this comes from the fact that their calling isolates them, to a certain extent, and when you do meet them, their good nature is all the more impressive.

Many people suppose that a draftsman only draws.

This is only partly true. Strange as it may seem to these good people, a draftsman has brains.

If such was not the case, many crude sketches of "what I want" would lie buried in the rubbish, and many meritorious inventions never see the light.

Do manufacturers appreciate the services of their draftsman at his full worth?

Some do, many do not; the work he performs is of such a transitory nature that they never stop to think.

But the draftsman does; he thinks out many improvements in the design of the manufacturer, he points out errors in mechanical movements, and often saves it from becoming a total failure.

Then if you knew more about the knight of the drawing board, you would say that he was the brains of the inventor.

Precisely, and that is what he may be termed, for in many instances without him the inventor would be nonplussed. Therefore it must be concluded that the draftsman is one of the most useful members of the great mechanical and manufacturing industries, and an acquaintance worth cultivating, for it is due to his skill mainly that we are indebted for nearly all of the necessary, useful, and luxurious comforts that surround us, for the constant increase of labor-saving machinery, the construction of stupendous progressive enterprises in engineering, increased speed in locomotives and engines, simplicity of construction in many lines of mechanical utility, and in a thousand and one ways the draftsman helps the inventor to realize on human ingenuity.

The draftsman is also a teacher, in that his works are on file for the generation that follows him, and upon the basis of thought, or construction, more properly speaking, which he has outlined, are builded the improvements or more advanced methods of each succeeding venture in that particular line of manufacture. Give, therefore, the draftsman his due, and speak well of him.

RICHARD B. WRIGHT.

Ink Rains.

Writing from Grahamstown, Cape Colony, Mr. L. A. Eddie gives an account of some extraordinary showers that fell there on August 14 last. A storm commenced near midday and lasted till late the next morning. At intervals during this period heavy showers of rain fell, after which large areas were found to be covered with water as black as ink. Two theories are put forward to account for the observed facts, one attributing it to dust in the air from a recent volcanic eruption, while the other considers the phenomena to be due to the passage of the earth through a dense meteoric stream, the dust of which suspended in the atmosphere was carried down by the rain, and being essentially iron, formed, on being mixed with the organic acids of the soil, a true ink.