it is connected by means of the horizontal belt shown in the engraving. The operator of the machine changes the motion by pressing the treadle either up or down. This treadle is connected to a rod passing under the frame of the counter-shaft. The attachment of a double crank at its end connects it, by means of rods, to a pair of eccentric arms, which hold on their peripheries pinned rollers fastened on the swinging frame of the upper horizontal wheel. This arrangement of changing the motion from right to left, or to rest, is positive quick-acting and unyielding. The whole arrangement is a decided improvement on the common friction counter-shaft now used. It also has all necessary arrangements for taking up wear.

The illustration shows the frame of the machine. It is cast in one solid piece of great strength, and stands broadly on the floor, taking up all vibration, and the spider-webs of the housings are of improved pattern. The spindle is adjustable, and can be raised and lowered, and set at different angles to the face of the table, so that the pitch of the molding can be changed and the cutting made easy for deep or flat moldings. The spindle carries cast-steel stocks, independent of the spindle, which enables the operator to use stocks of larger or smaller diameter, to suit the work. Solid immovable, solid reversible, or flat cutters can be used, or cutters of other machines can be interchanged.

The manufacturers furnish the machine, when so ordered, at moderate cost, with different attachments for doing special work.

For further particulars and prices, address the manufacturers as above.

TRAPS IN HOUSE DRAINS.

On Thursday last the Board of Health, of New York, met for conference a number of gentlemen interested in public hygiene, who had been invited to discuss the question of what the board, in the exercise of its legal discretion, should require of the builders of tenement and apartment houses to anticipate and avert the evils which follow defective drainage. There being no differences of opinion as to the property of requiring good work and good materials, or as to most details of plumbing work, the discussion chiefly centered on one point—Shall traps in house drains, cutting of the house from the public sewer, be required? On this subject Mr. J. C. Bayles spoke as follows:

MR. PRESIDENT: I scarcely dare venture the discussion of the matter before your board at this time. It is one in which I am very deeply interested, and while there is nothing which imposes upon the citizen the duty of holding opinions in accordance with those of public officers, especially if he has a good and sufficient reason for the faith that is in him, it is always a pleasure to agree with gentlemen so able, so conscientious and so devoted to the work of public hygiene. As a citizen I desire nothing so much as to strengthen the hands of the Board of Health and to give it in all good undertakings such moral support as I can. It is for this reason I dread to encourage discussion with it, fearing that it may be magnified by the enemies of this board and its work into opposition. I desire, therefore, to preface my remarks with the assurance that nothing which I may say is properly susceptible of an interpretation which would seem to place me in any other attitude than that of entire sympathy with this board in its efforts to reform all evils prejudicial to the public health.

I understand that the question we are invited to discuss is not the broad one of what system of drainage is best adapted for tenement and apartment houses, but what the Board of Health can properly require of the builders of such houses to anticipate and avert the evils which, if permitted in construction, must subsequently be discovered by inspection and corrected by order, or left to do their mischievous work unnoticed, in the absence of complaint. I should conceive it to be a matter of considerable difficulty for this board to lay down any general rules for the piping of tenement and apartment houses, for the reason that there is great variety in the arrangement of such houses, and wide differences in the views of builders as to what conveniences should be provided. Among the requirements which may probably be insisted upon are the use of good materials, the proper jointing of iron pipes, the carrying of all vertical lines of waste pipe to and through the roof, and a clear connection with the sewer by a continuation of the iron soil pipe, with no traps or other impediments to the flow of water freighted with matter intended for the sewer. This last suggestion touches the really vital point of this discussion.

I am informed that when complaint is made of defective drainage in a house under the jurisdiction of this board, the work of reforming the evils found to exist begins by requiring the owner to put in a trap somewhere between the cellar wall and the sewer, and to vent this trap above the seal in such a way as to obviate what, in the absence of such ventilation, would make a trap in this portion so obviously dangerous that no man could be found to favor it after giving the matter even superficial attention. Without an adequate vent above the seal, there would really be no room for discussion as to whether a trap in such a position was desirable, since it could never be anything else than a dangerous nuisance, giving rise to greater evils than would be likely to exist in its absence. With an adequate vent the objections to such a trap are in part met, but the question remains, "Is it even then necessary or desirable?"

I conceive the objection of this board to an untrapped house drain to be that which my esteemed friend, its president, has many times expressed to me and in my hearing—"I do not want the sewer ventilated through my house." Presuming that the associate commissioners share this feeling as regards their own dwellings, they doubtless consider it their duty to protect others from what they regard as a source of danger in their own cases. I honor their consideration for others, even though I discover no reason for the feeling which prompts it.

I do not need to remind you, Mr President, of the experiments so carefully made at your direction, and so frequently cited by you, to prove that there is no such thing as a *pressure* of air in sewers. I might, perhaps, take exception to the broad conclusion you seem to have drawn from these experiments, but, for purposes of argument, I prefer to concede that you are right. I might object to making the soil pipe of my house a safety valve through which a sewer should blow off great volumes of foul air compressed within, but if there is no such thing as a pressure of air in sewers—if, in other words, there are too many possible means of escape to permit within them a compression great enough to disturb the level of water held in a bent glass tube one end inserted in a sewer connection and the other open—I see no reason why I should fear to permit what air may enter my house drain at the sewer end to pass out through my soil pipe at the top. We are not dealing with pressures, by your own admission; we are not under the necessity of closing our pipes against rushing currents of air charged with organic poisons. If we were, no form of trap would stop them which did not, at the same time, oppose serious obstacles to the outflow of matter intended to reach the sewer.

The only possible object, and the ultimate function, of a trap depending on a water seal, be its dip more or less, is to close a pipe against what may be called natural currents of air. In the case of a trap in a house drain, it can have no other object than to close the house drain against currents tending to move in one direction or the other in obedience to natural laws. If we ask why it is put there, the answer would probably be: "To keep sewer gas out of our pipe systems." To this I reply without hesitation: To avoid an imaginary danger you not only sacrifice a tangible benefit, but you create conditions incomparably worse than those you seek to correct.

The term *sewer gas* is as convenient to the pseudo-hygienist as is the term "malaria" to people of another class. It means at once a great deal and nothing. As used, it commonly means nothing. The air of sewers, after all, is in no sense the worst enemy with which the plumber has to deal. Men work in sewers, and unless asphyxiated by carbonic acid, which is not, I believe, accredited with toxical properties, rarely suffer any inconvenience therefrom. The real enemy to life and health which does fatal work under the pseudonym of sewer gas, does not come from the sewer at all in most cases, but is born within the pipes which drain our houses. I am sure that every plumber of experience will say that he would rather work for hours over a clean connection with an average New York sewer and fill his lungs with the air coming from it, than lay open an old and foul waste pipe and be for even a few moments in close contact with the deposit lining it. We do not want to breathe the air of sewers if we can help it, but better that than encounter the greater dangers of air fouled by confinement in our house drains and waste pipes. I say this with the more confidence as I have often used the term sewer gas with unscientific looseness myself, meaning what a large experience has taught me to trace in most cases to sources within houses, in themselves so foul that a free access of sewer air, bad as it may be, would have practically purified them.

Now, Mr. President, let us deal briefly with the question of house drain traps in their practical aspects. Having no pressures to resist, it is no objection to such traps that they are incapable of resisting pressures. But every trap impedes the flow of water through water pipes and causes a foul accumulation in them. Their influence in this respect is most conspicuous in the case of