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# DANGERS IN GASOLINE

✓ BY

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## DANGERS IN GASOLINE.

BY JOHN H. KELLOGG, M. D., MEMBER OF THE STATE BOARD OF HEALTH,  
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*Mr. Chairman, Members of the State Board of Health :—*

As your committee on the preparation of a circular calling attention to the dangers connected with the domestic use of gasoline, I would respectfully submit the following:

The extensive introduction of gasoline stoves within the last few years has brought into very general domestic use an article, the presence of which in a dwelling house is a constant menace to life and property. Gasoline, since its discovery, has always been known to chemists to be a dangerous substance. It evaporates rapidly at ordinary temperatures, and its vapor, when mixed with ordinary air, in proper proportion, forms an explosive compound the same as does ordinary illuminating gas. It is stated that one pint of gasoline, when evaporated, will render explosive two hundred cubic feet of air. The vapor of gasoline is in some respects more dangerous than common illuminating gas, especially the variety of gasoline which is ordinarily used in connection with gasoline stoves.

1. Because it is somewhat heavier than the air instead of lighter, as is the case with illuminating gas. On this account, it accumulates in greatest quantity near the floor, and thus its presence is not so quickly detected, and it more readily comes in contact with fire in grates or stoves, and it does not so readily find an outlet through open windows, the ordinary means of ventilation.

2. The gasoline recommended by the manufacturers of gasoline stoves, and ordinarily employed in their use, having been deprived to a great degree of its characteristic odor, is much less readily detected in the air of a room than the same quantity of illuminating gas.

3. Illuminating gas is suffocative in its effects, as well as extremely unpleasant in odor, so that its presence becomes unbearable long before the proportion present in the air of a room becomes so great as to render it explosive.

Several years ago this Board called attention to the dangers of using explosive kerosene oil; and protective legislation has been maintained which has doubtless been the means of saving many lives. Before the enactment of the laws referred to, loss of life and serious injuries from kerosene explosions were exceedingly frequent, but at the present time, casualties from this cause in

Michigan are almost unknown. This safety in the use of kerosene oil has been secured by the more perfect separation from it of the explosive products of coal oil. Gasoline is one of the most explosive substances obtainable from coal oil, and it is not to be wondered at that the extensive use of this dangerous article of late years has led to frequent distressing accidents, usually involving grave personal injury and often loss of life. The increasing frequency of these accidents has led this Board to undertake an inquiry into the matter, the results of which are, in part, embodied in this circular.

A letter was addressed to each of the leading manufacturers of gasoline stoves, asking for descriptive circulars and directions for the use and care of a gasoline stove. A careful examination of these circulars failed to discover any proper warning respecting its safe keeping or handling. Indeed, the evident effort of manufacturers and dealers is to convince the public that the use of gasoline is *perfectly safe*, although it is well enough known to every one familiar with its properties that a mixture of the vapor of gasoline with common air in proper proportions is as violently explosive as gunpowder and many other explosive substances. It is true that gasoline may be handled in such a manner that the risk of explosion and consequent injury may be made very small. The same is true, however, of gunpowder, nitro-glycerine, and dynamite. But these substances not infrequently explode with most destructive violence, even in the hands of those who are educated respecting their character, and trained in their use. This fact restricts the handling of the explosives mentioned to very few persons, and their employment to those uses for which no other substances can be well substituted. Certainly no one would think of placing gunpowder or nitro-glycerine in the hands of ignorant or unskilled persons, even though precise instructions respecting their use might accompany the destructive articles; yet this is precisely what is being done in the most extensive manner with gasoline, an explosive in all respects more dangerous than gunpowder. Gunpowder will not explode unless fire is brought in immediate contact with it. It certainly will not leave the can containing it, should the cover happen to be left off, and insidiously find its way to a fire, a lighted lamp, or other means by which an explosion may be produced. But this may occur with gasoline. Notwithstanding these well known facts, thousands of gasoline stoves and the gasoline employed in them are to-day in the hands of ignorant persons, many of whom are perhaps ignorant of the explosive nature of the vapor of gasoline, and who at least seldom appreciate the extent of the danger to which they and other persons are exposed in its use.

A circular letter addressed to the officers and general agents of the leading insurance companies doing business in this country elicited a large number of replies, the writers of which, with barely two exceptions, pronounce the domestic use of gasoline as a fuel extremely dangerous, and greatly deplore the general introduction of gasoline stoves, not only on account of the increased risk to property, but of the great risk of serious personal injury or loss of life. Although not requested to withhold the names of the writers of these letters, we quote without credit, for brevity's sake, the following opinions and statements from the great number of letters received.

A general insurance agent writes:

"I have known of at least twenty-five cases in which the use of gasoline stoves caused a loss of life and injury, and from my experience of them I would not have one in my house under any circumstances, as in my judgment *they cannot be made safe.*"

A general agent doing business in Detroit states, under date of Nov. 15: "On the first of July I commenced keeping a private record of gasoline stove accidents, and so far have a list of eight." (Eight accidents in one city of the size of Detroit in four and one-half months is certainly not a good record.)

An insurance agent doing business in one of the leading towns of the State, a city of about 20,000, inhabitants, and who has given special attention to this subject, states on the authority of the chief engineer of the city fire department that eight fires from gasoline stoves have occurred in that city within four years, aggregating a loss of several thousand dollars; and adds that in his opinion "the first duty of every municipality in the State of Michigan should be the adoption of a rigid law relative to, and governing the storage and use of gasoline, and the issuing by circular or other efficient means of information to the people, educating and admonishing them as to its nature and its use; better still, an ordinance excluding it altogether." He pronounces gasoline "more dangerous to have around than gunpowder."

The secretary of a large insurance company writes: "Our impression from the accounts in the daily papers is that the losses of life and property (from the use of gasoline as fuel) have been very considerable." "As every one must be aware who reads the newspapers, the losses to life and property are much too frequent and disastrous. As insurers, we should be glad to see its use for fires entirely abandoned."

Another general agent writes: "There have been a great number of accidents from the use of gasoline stoves," and states, "I would not permit one in my house under any circumstances." "The stoves of to-day are doubtless of better make than the first, but guarded with even the perfection of care the insidious vapor arising from gasoline is extremely dangerous, and seizes every opportunity to join itself to fire or light however distant."

An insurance agent residing at Jackson, Mich., mentions two deaths as having occurred in that city from the result of gasoline, of which he says: "In the cases mentioned, the death of one, Mrs. G. Stevenson, was caused by setting the can too close to the flame of the stove, thereby causing it to explode, throwing the gasoline all over her. The death of Mrs. A. Porter was occasioned by grease igniting on the stove, the heat from which caused the tank to explode, scattering the gasoline over her." He adds, "The chief of our fire department informs me that the department has been called out nineteen times by reason of leak and explosion of gasoline stoves within two years."

Another general agent states: "We have paid several losses for fire caused by the explosion of gasoline stoves. Where great care is exercised, they may be used safely; but familiarity renders people careless."

A State agent of one of the largest Insurance Companies in the country writes: "If I should express my own opinion on the subject, it would be as follows: Gasoline is by its very nature a dangerous substance to have anywhere; further, the gasoline stoves in general use, while very well constructed, and fairly good when new, will get defective while in use, and when defective are very dangerous, and a possible source of great damage to life and property. I consider their use in any family composed in part of young children to be almost criminal."

Descriptions of a number of cases of loss of life occurring through the use of gasoline in connection with gasoline stoves were included in the replies received. In most of these cases, the explosion occurred as the result of turn-

ing on a little too much gasoline before lighting it, placing the can or other vessel holding gasoline too near the flame of the stove, or lighting a match in the vicinity of an open can. Nearly all of these accidents may be charged to carelessness; but is it not questionable whether an article which by so slight neglect or carelessness may be productive of so great mischief is not too dangerous an article for domestic use? The majority of domestics are habitually careless, especially respecting matters in which they have not been trained to careful habits. When we add to this fact the ignorance respecting the dangerous character of the substance which they are handling and the soothing assurance of the manufacturer and dealer that the particular style of stove in use is "perfectly safe," is it not remarkable that the number of distressing and fatal accidents is not vastly greater than it is?

Attention should be called to the fact that the statistics of losses from various causes are misleading as regards the danger from the use of gasoline. While it is true that fewer fires result from gasoline than from defective chimneys, stoves, or kerosene lamps, it must be recollected that the number of each of these causes in active operation is vastly greater than the number of gasoline stoves. The loss from eleven explosions in 1886 was \$154,000.

We found in the circular of one of the leading manufacturers an inadvertent confession of the dangerous character of these stoves in the statement that a particular device recently added to this special stove "makes this the safest and simplest stove on the market."

In a letter received from the manufacturer of another popular stove, the acknowledgment is made that "the gas from gasoline when allowed to evaporate, mixed with air, is stuff that is explosive." To allay fears, however, the same writer added, "you are all right if you do not go near it with a lamp or fire of any kind." If this were true, the thing which is forbidden is precisely what some child or thoughtless person is certain to do, and, as previously mentioned, even if no person takes a lamp or fire to the gasoline, the gasoline may vaporize and go some distance to a lamp or fire, when the most disastrous results are likely to follow.

Is it not a very grave question whether the acknowledged convenience of gasoline as a fuel is not vastly more than counterbalanced by the positive dangers involved in its use?

#### RULES FOR THE USE AND CARE OF GASOLINE.

Every person employing or keeping gasoline should keep constantly in mind the following facts and cautions respecting its use:

1. Gasoline is an extremely dangerous, explosive substance.
2. It should be kept in a cool, well ventilated place, if possible out of doors, or in an out-building; never in a kitchen, closet, or cellar.
3. A vessel containing gasoline, unless tightly closed, should never be brought within ten feet of a lamp, stove, grate, flame, or fire of any sort. The small flame of a match or even a spark is sufficient to explode the gas when present in sufficient quantity.
4. The vapor of gasoline may be carried by a draught or current of air, and thus be brought in contact with fire at considerable distance, even greater than that mentioned in the preceding paragraph; consequently gasoline should never be opened or poured from one vessel to another in a current of air, unless the current is from the room out of doors.

5. The danger in connection with the use of gasoline stoves is not so much in the stoves themselves as in having the gasoline about; yet by continued use, the valves of a stove may become worn so that leaks may occur, and thus a stove may become a source of great danger.

6. If an overflow of gas occurs from being turned on too freely, from leakage of valves, or from the blowing out of the generating burner, as sometimes accidentally occurs, the surplus gasoline should be carefully wiped up, and the room should be well aired by the opening up of windows and doors before the burner is lighted.

7. If an open vessel containing gasoline has been standing in a room over night, or an overflow has occurred during the night, or if there is found in a room a strong smell of gasoline at any time, the room should be opened and well aired, and before a match is lighted or a lighted lamp or candle carried into the room.

8. Gasoline should never be used for lighting a fire. An explosion, which may possibly be fatal in its effects, is almost certain to follow. Persons have been maimed for life in this way.

9. The use of gasoline lamps is, if possible, attended with even greater dangers than the use of gasoline stoves.

10. A wise regard for safety will lead to the disuse of gasoline in any form for domestic purposes.

11. Gas or kerosene stoves may be safely substituted for gasoline stoves, but neither gas, gasoline, nor kerosene stoves are so safe or healthful as the ordinary wood or coal stove. The ordinary stove aids in the ventilation of the room, and carries away the poisonous gases formed by the combustion of the fuel, whereas the other forms of stoves discharge the products of combustion into the air of the room, compelling the occupants to breathe the poisonous gases. Neither gas, gasoline, nor kerosene stoves should ever be employed in other than very open or well ventilated rooms, unless provided with a special flue or ventilating duct for the purpose of carrying off the products of combustion.

Respectfully submitted,

J. H. KELLOGG.



