

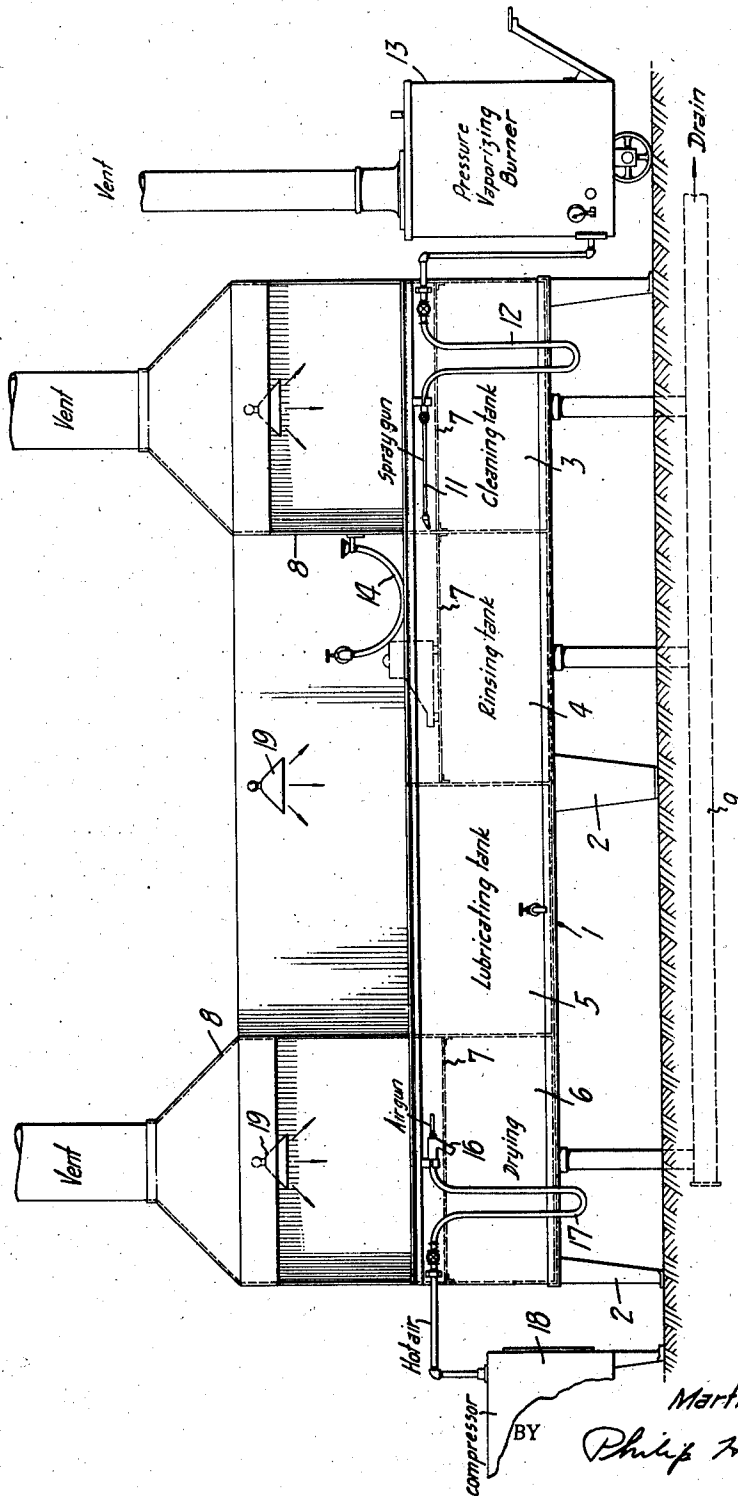
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OFFICE EQUIPMENT CLEANING PROCESS

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OFFICE EQUIPMENT CLEANING PROCESS

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mesne assignments, to California Typewriter
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The present invention relates to the cleaning and reconditioning of office equipment and machines such as typewriters, adding machines and the like, and more particularly to a cleaning process which provides for effective reconditioning of such machines without requiring disassembly thereof.

It is common practice with users of such equipment to have a periodic servicing thereof to clean out the accumulation of dust, paper fibres, and other deleterious matter in order to restore a piece of equipment to its optimum operating efficiency and to prolong its useful life. This is particularly true with reference to typewriters whose operating parts are more exposed than with other types of equipment. The following description, therefore, will refer to typewriters but it is to be understood that the described process is also useful with adding machines, calculators, cash registers and other similar equipment, where a large number of operating parts are assembled in compact relation with many parts and bearing surfaces inaccessible for ordinary cleaning with a brush, rag or the like.

The conventional procedure for cleaning typewriters is to disassemble the machine and clean it part by part as by brushing each part with a cleaning solution and then rinsing with water or kerosene and oil. Subsequently, the parts are oiled and then dried by use of a compressed air blast to blow out excess moisture and oil and by heating in a drying oven, after which treatment the machines are reassembled part by part, oiled and adjusted. With the above procedure it has been found that with one man doing the actual cleaning and an expert mechanic doing the dismantling and reassembling of the typewriters, only two machines a day can be reconditioned. Also, it will be noted that all factory adjustments are lost and it has been found practically impossible for a mechanic to restore such factory adjustments exactly. As a result, a typewriter usually operates differently after such servicing and presents an unfamiliar "touch" to the typist with resulting dissatisfaction, loss of time, and less efficient work.

The process disclosed herein eliminates the above noted disadvantages of the conventional procedure by providing for rapid, effective cleaning of typewriters without requiring complete dismantling and without disturbing any adjustment of the machine.

It is a general object of the invention, therefore, to provide a cleaning process which provides

effective reconditioning of a machine in a minimum time.

Another object of the invention is to provide a cleaning process which does not require disassembly of a machine.

Apothor object of the invention is to provide a cleaning process which does not disturb the operating characteristics of a machine.

Other objects will appear from the following description of my improved cleaning process and a preferred apparatus with which such process can be carried out.

The drawing illustrates a preferred apparatus for use in cleaning typewriters and the like in accordance with the process disclosed herein:

In carrying out my cleaning process, any easily removed parts of the typewriter such as the paper carriage, cover plates, and the like may be removed if desired, however, such removal is not necessary and may be omitted if desired. Thereafter, the typewriter is subjected successively to a pressure spray cleaning operation with a wet saturated vapor, a rinsing operation with hot neutral water, an oil bath, a drying operation with a hot, moisture free air blast, a lubricating spray with a solvent carried lubricant, and finally to a heating operation to dry out the machine and thoroughly distribute the lubricating oil on the bearing surfaces of the typewriter. The various steps will now be described in greater detail.

The cleaning operation is preferably effected with a hot pressure spray in the form of mist or a wet saturated vapor in which the heat, pressure and spray liquid are properly balanced. The spray is ejected under pressure from a nozzle in the form of a pressure jet which is applied to all parts of the typewriter and effectively removes all dirt, grease, and deleterious matter both from exposed parts and from confined bearing surfaces.

To obtain the desired spray characteristics, the cleaning liquid or water is heated while subjected to a selected pressure above atmospheric pressure to a temperature below the boiling point of the water at the selected pressure. When the pressure is released by opening the spray nozzle, a portion of the water flashes into steam and serves to atomize the remainder of the water and cause the resulting emulsion to attain a high velocity over and in addition to the velocity resulting from the pressure. It will be noted that only so much of the water being ejected will vaporize as will cause the temperature of the remaining water adjacent the nozzle to drop below its boiling point at atmospheric pressure. In addition to the atomizing effect of the steam,

the water expands when the pressure is released and tends to break up into fine particles or drops. The result is that the nozzle supplies a high velocity jet of atomized liquid and vapor at a temperature slightly below the boiling point at atmospheric pressure. The temperature of the cleaning spray jet is usually about 208° F. and the pressure and temperature in the burner are controlled to obtain this jet temperature together with a preferred pressure of 65 pounds per square inch at the nozzle.

A preferred form of pressure vaporizing burner for automatically obtaining this type of spray is disclosed in the patents to Frank W. Ofeldt, No. 1,855,866, dated April 26, 1932, and No. 1,925,643, dated September 5, 1933.

Best results in cleaning are obtained in such a burner with a pressure of from 50 to 80 pounds per square inch, the preferred pressure being approximately 65 pounds per square inch, however, more or less satisfactory cleaning can be effected within a pressure range of from 25 to 150 pounds per square inch. It will be understood that the temperature of the liquid in the burner is controlled in accordance with the pressure to obtain the desired temperature at the nozzle.

The cleaning liquid to be used is preferably a pure neutral compound which will have no abrasive, corrosive, or electrolytic action on the parts of the machine. To this end, I prefer that the liquid should not be over $\frac{1}{2}\%$ caustic, and have found that a satisfactory compound can be obtained by using from $\frac{3}{4}$ to $1\frac{1}{2}$ pounds of soap of the type made with a linseed, coconut, or olive oil base, to 40 gallons of soft water. The above type of liquid is preferable as it has no deleterious effect on the typewriter and will not leave any harmful deposits.

After the cleaning operation, the typewriter is subjected immediately to a rinsing operation in which it is flooded with heated neutral water to remove loosened dirt, grease and the like as well as any dirty cleaning liquid adhering thereto. The temperature of the rinsing water is not important except that it should maintain the typewriter in heated condition.

As soon as the rinsing operation is completed, the typewriter is immersed for a short time in a bath of oil, which is preferably of very light grade so that it will penetrate readily within closely spaced surfaces such as the bearings and the like. The oil displaces all water from the parts and bearings of the typewriter, the water sinking to the bottom of the tank. The oil may be at room temperature because the typewriter is still heated from the cleaning and rinsing operations so that the oil will flow freely throughout the machine.

After the removal of surplus moisture in the oil bath, a hot, moisture free air blast is then applied to the typewriter from an air gun or nozzle to remove all excess oil. Air at a pressure of from 25 to 125 pounds per square inch has been found satisfactory for this purpose.

Subsequently, the typewriter is lubricated with a pressure spray from any conventional type of spray gun, the lubricating medium being preferably a light grade of oil carried by a quick evaporating solvent such as gasoline. This type of lubricating medium affords rapid penetration of oil to all bearing surfaces of the typewriter, while the carrier solvent can be easily removed as by heating to cause evaporation thereof. If such heating is desired, it may be effected by placing

the typewriter in an oven or the like, such as a conventional type of electrically heated oven.

The above described process provides for effective and rapid cleaning of typewriters and the like machines without complete disassembly thereof so that factory adjustments are not lost, and the machine retains its operating characteristics. It has been found that one man using the above process can clean as many as twenty machines in an eight hour day.

In carrying out the above process, I prefer to employ the type of apparatus illustrated in the drawing. Such apparatus includes base or platform 1 supported by standards 2 and on which the various units of the apparatus may be mounted.

The apparatus includes cleaning, rinsing, lubricating and drying stations 3, 4, 5 and 6, respectively, which may be formed of integral side and bottom walls to provide tanks. At the cleaning, rinsing and drying stations, apertured drain trays 7 are provided for supporting the typewriter, as indicated, for example, in dotted lines at the rinsing station. Both the cleaning and drying stations are provided with vented enclosures 8 which are open at one side only, and from the cleaning, rinsing and drying stations suitable drain pipes may be provided leading from the tanks to drain pipe 9.

At the cleaning station, spray gun 11 of conventional construction is provided to which the cleaning liquid is conducted through hose 12 from pressure vaporizing burner 13. This burner is preferably of the type disclosed in the above noted patents, but other burners can be used if adjusted to provide the proper type of vapor spray.

At the rinsing station, hose and nozzle unit 14 is provided to conduct the rinse water from a conventional type faucet connected to a suitable tank or the like (not shown). At the drying station air gun 16 is provided connected through hose 17 with a suitable air compressor 18 having a drying unit incorporated therein. In addition, a lubricant spray gun and a heating oven (both not shown) may be provided in a location convenient to the drying station 6.

If desired electric light fixtures 19 may be provided at convenient locations on the apparatus.

While I have disclosed a preferred cleaning process and a preferred form of apparatus for carrying out such process, it is to be understood that both the process and apparatus are capable of variation and modification. The scope of my invention, therefore, should be limited only by the scope of the appended claims.

I, therefore, claim as my invention.

1. A process of cleaning assembled typewriters and the like machines, which comprises cleaning the machine with a pressure jet of an atomized cleaning liquid composed of neutral water and a cleaning compound, then rinsing the machine with neutral water, then immersing the machine in light oil to remove rinse moisture therefrom by gravitational displacement of adhering water by said light oil, then applying a moisture free jet of air to remove excess oil, and then applying a lubricating medium composed of a light oil and a quick evaporating solvent therefor.

2. In a process of cleaning and lubricating assembled typewriters and like machines, the steps of first cleaning the machine with a saturated wet vapor spray of cleaning liquid, then rinsing the machine with a heated neutral aqueous agent to remove loosened matter and residue adhering

to the machine after the application of the vapor spray, and then immersing the machine in a bath of lubricating oil to effect gravitational displacement of aqueous rinsing agent remaining on the machine following the rinsing thereof.

5 3. In a process of cleaning and lubricating assembled typewriters and like machines, the steps of first cleaning the machine with a saturated wet vapor spray of cleaning liquid, then rinsing the machine with a heated neutral aqueous agent to remove loosened matter and residue adhering to the machine after the application of the vapor spray, then immersing the machine in a bath of lubricating oil to effect gravitational displacement of aqueous rinsing agent remaining on the machine following the rinsing thereof, and then applying a moisture-free air blast to the machine to remove excess oil remaining thereon following removal of the machine from the bath of oil.

4. In a process for cleaning and lubricating assembled typewriters and like machines, heating a cleaning fluid under pressure greater than atmospheric pressure and to a temperature above the boiling point of the fluid at atmospheric pressure; spray-releasing such fluid at atmospheric pressure in a manner to cause it partially to flash into a mist or vapor carrying particles of unvaporized fluid at high velocity, and subjecting the machine to the cleaning action of the spray; then rinsing the machine with a heated neutral aqueous agent to remove loosened matter and residue adhering to the machine after the application of the vapor spray; and then immersing the machine in a bath of lubricating oil to effect gravitational displacement of aqueous rinsing agent remaining on the machine following the rinsing thereof.

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