

ON THE USE OF ELECTRICAL EQUIPMENT ON SHABBATH AND YOM TOV

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1. Introduction

The problem of using electrical equipment on Shabbath is one of great practical importance today. But, even beyond this, we must expect its importance to grow with the ever-increasing role technology plays in our daily lives.

The use of electrical equipment being of relatively recent origin, we cannot hope to find any direct references to it in the Talmud or even in the classical codes. It would, however, be hasty to conclude that there are no interdicts involved. The following is written as a survey of Talmudic sources which would seem to preclude such a permissive attitude in the vast majority of cases.

In section 2 we list such Talmudic sources and their major interpretations and in section 3 we present an extensive sampling of references to specific equipment found in the recent responsa literature. Although no effort at completeness has been made, a number of good review articles are quoted, enabling the interested reader to delve further into this fascinating subject.

Both the format of this article and the qualifications of the writer preclude the possibility of presenting here a summary of practical *halakhah* on these matters. The reader's attention is drawn to a recently published work⁰ which presents practical Shabbath laws in a highly systematic and convenient form. Together with other modern questions, it treats extensively the use of electrical equipment. In view of its excellent Rabbinical endorsements, the reader may find it highly useful. It is, incidentally, more lenient in many cases than the authorities quoted here.

2. Talmudic Sources and Their Interpretations

In this section we present relevant Talmudic passages. We divide these into four categories, devoting a section to each. To facilitate referencing, each passage is numbered.

2.1 "Adjusting a Device" (tikkun keli)

Among the 39 "cardinal categories" (*avoth*) of "work" (*m'lakhah*) which are forbidden on Shabbath, two apply to making a "device" (*keli*), completing it or making it operative: "building" and "striking with a hammer" (*makkeh b'patish*).

The following nine Talmudic passages are relevant to outlining both the extent and the limitations of this group of laws.

- (1.1) Anything that involves completing "work" is classified under the category "striking with a hammer."¹
- (1.2) Inserting the pin into the handle of a spade is classified as "building" (Rav) or as "striking with a hammer" (Sh'muel).²
- (1.3) Returning the shaft into a lamp is forbidden by original Torah law, whereas assembling a white-washing rod is forbidden by Rabbinic law. This is based on the Baraitha which states that replacing the boards and legs of a bed is forbidden by Rabbinic law; replacing them firmly, by original Torah law.³
- (1.4) On Shabbath it is permitted to remove the door of a box, but not to replace it; for, although neither "building" nor "tearing down" applies to "devices," we fear lest he replace it firmly.⁴
- (1.5) On Yom Tov it is forbidden to re-attach (removable) covers of boxes [although "building" does not apply to devices—Rashi; lest he attach them firmly—Tosaphoth].⁵
- (1.6) Beth Hillel permit erecting a sectional lamp on Yom Tov, saying that the category of "building" does not apply to devices.⁶
- (1.7) The Law requires the Levites to play musical instruments as part of the daily service in the Temple and this overrides Shabbath. That it overrides even an original Torah prohibition is illustrated by the law permitting a Levite to repair a torn string by unwinding a length from the upper pin and wrapping it around the lower pin.⁷
- (1.8) 'Ulla heard someone knocking on the door on Shabbath and severely reprimanded him. Rabbah replied that only musical sounds were forbidden.⁸ [In this connection, compare the opinion of Rabbah in (4.5c), below.]
- (1.9) One may not clap or dance on Yom Tov, because he might come to repair a musical instrument.⁹

The apparent contradiction between (1.2,3), on the one hand, and (1.6) on the other, has given rise to much discussion. The distinctions made include

firm attachment and expert techniques as prerequisites to classifying any work on a "device" in the category of "building."¹⁰

On the other hand, even firm attachment may be permissible, when the part is attached and detached in routine use, such as in a screw-on bottle top.¹¹

On this basis, one great authority^{11a} states that making an electrical contact does not constitute "adjusting a device," because the contact was initially made for continual making and breaking. However, many authorities forbid closing a circuit on (or switching on) electrical equipment on Shabbath, on the ground that this constitutes "adjusting a device."^{12a, 13a, 14, 15a, 16a, 17a}

Especially, one of the most outstanding of the recent authorities^{16a} goes to great lengths to explain how closing a circuit constitutes "adjusting a device" and probably falls into the category of "building" in the sense of original Torah law. The fact that parts of the circuit are attached to the ground aggravates the "work" involved, but is not essential to this classification. The argument seems to be based on the thesis that a combination necessary to make a device operative—even if temporary—is legally equivalent to a firm attachment. (This has been disputed.¹⁸)

The Rabbinic prohibitions against playing an instrument—or operating any device intended to generate sound—were established to guard against forgetful adjustment of the device. They have direct application to many electrical devices. (See sect. 3.3, below.)

The major decisors²⁰ seem to include in this prohibition even non-musical devices whose function it is to generate sound, although the matter cannot be considered fully decided. (Compare, e.g., the popular "Shabbath knocker.")

2.2 Sparks and "Producing" (molid)

Frequently the use of electrical equipment involves sparking, especially in devices such as commutator motors or when opening an inductive circuit. In such cases the question arises whether making sparks is considered kindling a fire.

We cite the relevant Talmudic passage:*

- (2.1) (Although it is permitted to light a new fire by means of an existing fire on Yom Tov,) it is forbidden to do so by means of (sparks obtained from) wood, stones, dust, bricks, or water,

Another passage²², which states "sparks have no substance", has been quoted in a collection of responsa (ascribed to the Rosh, 13th century)²³ to permit extinguishing sparks on Shabbath. However, on the basis of strong circumstantial evidence,²⁴ this collection (published in 1793) has been claimed to be a forgery. The passage quoted clearly refers to *muktzah* and is irrelevant here.

because this involves "producing". [If one fills a clear (spherical) glass bottle with water and places it in the sun, it can be used to start a fire—R. 'Ovadia of Bartinoro.]²¹

Study of the commentaries shows that this passage is open to at least three essentially different interpretations:

- (1) There may not be forbidden "work" involved, kindling being permitted on Yom Tov. There is, however, a Rabbinic law forbidding the use on Yom Tov of anything produced on that day.²⁵ Because of this law, the spark may not be used to kindle a fire.
- (2) Even though there is no "work" involved, there is something akin to "work"—"producing", and this is Rabbinically forbidden.²⁶
- (3) Kindling is not generally permitted on Yom Tov. The Torah permitted only kindling a fire from an existing one.²⁷

According to the first two interpretations, the prohibition is based on Rabbinic law; according to the last, on original Torah law. According to the first and last interpretations, there is no indication of whether causing the sparks is considered "kindling" (*hav'arah*). [According to (1), the question of "kindling" may be irrelevant on Yom Tov, and (3) may refer to the fire being lit by means of the sparks.]

Opinion (2), however, if taken literally, could mean that there is no "work" at all (not only no forbidden "work"). In that event, (2.1) would imply that causing a spark is not to be classified as "kindling". Some authorities^{14, 16a, 28} do indeed interpret it that way. One of these gives the short lifetime of the sparks as the reason for this.¹⁴

Conversely, we find the opinion that making sparks is considered "kindling", but not "producing" (only the fire eventually lit by the sparks is "produced").^{15a, b, c, d}

Whether a glowing filament is considered fire is a question treated in the next section. We shall see there that many authorities do consider it a form of fire, and as a result forbid lighting an incandescent lamp on Shabbath as falling into the category of "kindling". On Yom Tov, when it is permitted to light a fire from an existing one, lighting an incandescent lamp is then forbidden as "producing".^{15e, f, 29a, 30, 31a}

Others hold that fire is not produced in the lamp, but rather at the generating station, and therefore tend to permit lighting an incandescent lamp on Yom Tov.^{12b, 32} This opinion seems to be based, however, on the highly questionable premise that electricity is a form of fire.

Finally, one opinion would classify the production of electric current as "producing".^{33a}

2.3 Fire: "Kindling" (hav'arah) and "Extinguishing" (kibbuy)

"Kindling", "extinguishing" and cooking are three of the cardinal categories of "work" on Shabbath.

Since electricity is often used to generate heat and light, the definitions of these terms become important. Is a flame an essential element in a fire? Is combustion? heat? light? The answers to these questions may have important bearing on the use of incandescent and fluorescent light sources, vacuum tubes and heating elements.

We again list relevant Talmudic passages below. Note that (2.1), too, may have some bearing on the definition of fire.

- (3.1) All agree that it is permitted to roast an egg in the sun (i.e. by means of solar radiation) [because this is not the usual way of cooking—Rashi]; and all agree that it is forbidden by means of heat originating in a fire. In contradiction to the opinion of the Sages, R. Yosi holds that the heat of "hot spring water" (*hamei T'vayah*) originates in fire (that of *gehinnom*).³⁴
- (3.2) Cooking in the "water of hot springs" is not forbidden by original Torah law.³⁵
- (3.3) In connection with *tzara'ath*, a burn caused by "hot spring water" is not classified as a burn.³⁶

The following passages treat the "metal coal" (*gaheleth shel matekheth*) and the burning charcoal (*gaheleth shel 'etz*).

- (3.4) In contradiction to the Mishnah, R. Y'hudah said that in order to facilitate the many ablutions of the Kohen Gadol, it was customary to heat chunks of metal before Yom Kippur and to put them into the water on Yom Kippur. He permits such "extinguishing" because he holds that (heat) derived from fire is not like fire; the Sages hold that it is like fire.³⁷
- (3.5) In order to protect the public from damage, it is permitted to extinguish on Shabbath a metal coal lying in a public place, but not a charcoal.³⁸
- (3.6) (On Yom Tov) it is forbidden to sweeten mustard by means of a (hot) charcoal; by means of a "metal coal", however, it is permitted.³⁹
- (3.7a) It is not permitted to roast the Pessah lamb on a metal spit, because the spit would be heated by the fire; this heat would then be conducted to the point of contact with the flesh; consequently, part of the lamb would be roasted by means of the hot metal instead of the fire.⁴⁰

- (3.7b) R. Yohanan says: If an oven is heated by burning wood inside it, and this wood is then removed and the lamb roasted in the oven, it is forbidden. This method is excluded because the Torah repeats the commandment that the lamb be roasted in fire.⁴¹
- (3.7c) Rebbi says that roasting the Pessah lamb on coals is classified as roasting it on fire, as required by the verse.⁴¹
- (3.7d) According to Rav Hisda, a burn resulting from a "metal coal" is considered a burn in connection with *tzara'ath*, because the word "singe" (*mikhvah*) is repeated in the verse. A burn resulting from a charcoal, on the other hand, requires no special verse.⁴¹
- (3.7e) The burning of an adulterous daughter of a priest was done by means of molten lead. This is consistent with the verse, which is phrased so as to include all (heat) originating in fire. It excludes only lead mined (in a molten state).⁴¹
- (3.7f) Ravina contradicts the interpretation of (3.7d), saying that a burn resulting from a coal requires no special verse—possibly implying that a "metal coal", too, requires no special verse.⁴¹
- (3.7g) According to Rebbi we must say that the scriptural term "coal" includes both glowing and dark coals, and the term "fire" both glowing coals and a flame.⁴¹
- (3.8) The verse forbidding "kindling" on Shabbath is interpreted to refer specifically to the kindling in connection with the execution of an adulterous daughter of a priest.⁴²

We conclude our listing with two citations from the code of Rambam (Maimonides):

- (M3.1) Melting any amount of one of the metals—or heating a metal until it becomes coal—are derivatives (*toladoth*) of "cooking" (i.e., forbidden by original Torah law).⁴³
- (M3.2) Heating a metal in order to "harden" it (*tziruf*) in water is a derivative of "kindling". [It is "cooking"—Ravad.] Extinguishing a "metal coal" is not forbidden by original Torah law; but if the intent was to harden it, it is forbidden, since iron workers do thus: they heat iron until it becomes coal and extinguish it in water to make it firm—and that is "hardening" it, which is forbidden by original Torah law as a derivative of "extinguishing".⁴⁴

With this wealth of material concerning what is and what is not fire, it should be easy to arrive at a clear-cut definition. Unfortunately, the matter is considerably complicated by the fact that the definition of "fire" might be different in different applications;⁴⁵ when special verses are cited to broaden

or narrow the definition of "fire", it is not clear whether or not the broadened definition is applicable in other areas.⁴⁶

From (3.1) it would appear that solar heat (which is heat originating in incandescent gases, generated by nuclear reactions) is not considered fire as far as cooking on Shabbath is concerned. This seems to be confirmed by (2.1), which implies that a new "fire" is being lit when solar radiation is used. If we assume that "hot spring water" derives its heat from very hot—possibly incandescent—material in the earth's crust, and that the Sages were familiar with this fact, (3.2) and (3.3) imply that such material, too, is not "fire". [According to Tosafoth, the evidence from (3.3) is questionable.⁴⁵]

If our extrapolations are valid, this would seem to have immediate implications concerning cooking on electrical heating elements. We must, however, be very cautious, since we have not yet clearly covered incandescent material. Especially, when considering the "kindling" aspect, we must remember that the definition of fire may be different in this connection.

One recent authority interprets Rashi's commentary [cited above in connection with (3.1)] in so narrow a sense that cooking on an electrically heated element on Shabbath would be forbidden by original Torah law since it is now usual to cook in this manner.^{13b} On the other hand, one 17th century authority goes so far as to say that original Torah law does not forbid cooking on Shabbath on a fire lit by solar heat by means of a lens.⁴⁷ Both opinions—especially^{48, 49} the latter—seem very difficult to maintain.

The discussion of the "metal coal" seems more directly relevant to the question of causing incandescence. It is identified by Rashi³⁸ as "iron waste material", but in (3.7e) molten lead is implicitly classified as "metal coal". This broader definition is also implied by Rambam's code, as cited above (M3.1, 2).

It is also not clear whether metal must be incandescent to qualify as "coal". From (3.7g) it would seem that coal must incandesce to qualify as fire* and this seems to be also the intent of Rebbe in (3.7c).⁵¹ On the other hand, molten lead is implicitly classified as "metal coal" in (3.7e); since the melting point of lead is 327°C, but it becomes noticeably incandescent only above 700°C, the lead of (3.7e) is not likely to have been incandescent. Incandescence seems to be non-essential also according to very early authorities,^{52, 53, 54} who explain, in connection with (3.5), that the metal coal is more dangerous than the charcoal because *it does not glow*. Cooling it is

* Note that the heat of a "metal coal", even if non-incandescent, may be derived from a real (flaming) fire, whereas that of a glowing charcoal is derived from non-fery combustion, so that it may be possible to classify a dark metal coal legally as "fire", even though a glowing charcoal is not "fire".⁵⁰ This comment is, however, irrelevant to our problem, where the heat of the "metal coal" does not originate in a real fire.

then "hardening" the metal, which they classify under "adjusting a device" (*tikkun keli*).

With respect to extinguishing a "metal coal", most authorities seem to agree that it is forbidden by Rabbinic law only^{44, 55-59} (except when it is done for hardening purposes). This is based on (3.5-3.6). In interpreting (3.5), these authorities hold that the distinction between the metal coal and the charcoal is that the former is forbidden only by Rabbinic law and the latter by original Torah law.*

The opinion of the above early authorities on this question is not so clear. According to one early commentary,⁵⁷ they too agree that only a Rabbinic prohibition applies; others,⁶⁰⁻⁶² however, interpret them as classifying extinguishing a "metal coal" as forbidden by original Torah law.

Rambam, in his commentary on (3.5),⁶³ says: "(Extinguishing a 'metal coal') is not 'extinguishing', because the fire itself is not attached to the iron; it is only that the iron was hot and now, after extinction, it is cold."

Causing a metal to incandesce presents another problem. When the heating is done to soften the metal or to harden it, Rambam clearly classifies the act as "cooking" or "kindling", respectively (see (M3.1-3.2) above). Incidentally, one contemporary authority^{16a} has pointed out that the increase in the resistance of the filament when it is heated is essential to proper operation, and should perhaps be classified as "hardening". Although Rambam is not specific about heating a metal for purposes other than hardening, he implies that such heating should not be classified as "kindling"; he is, indeed, interpreted in this manner.^{12c, 64} Perhaps the validity of this interpretation is reinforced by the wording of Rambam's commentary⁶³ quoted at the end of the preceding paragraph, which may mean that no fire is transferred to the metal.

On the other hand, the *Maggid Mishneh*⁴⁴ states as a matter of course that a "metal coal" is classified (by the Talmud) as real fire.† This opinion seems to be endorsed by a great number of recent authorities.^{12a, 14, 15g, 30, 31, 33b}

Is *combustion* an essential element of "kindling"? One 18th century authority⁶⁸ holds that combustion is not essential, bringing proof from Rambam's statement cited above (M3.2). This is disputed by a later authority,^{66b}

* A reason given for this distinction is based on the assumption that "extinguishing" is "work" because it causes charring. It follows that extinguishing a "metal coal", which does not involve charring, is not work. [Rashi on (3.6)]

† He does not give a source, but it would seem that he is referring to (3.7f). This passage seems to imply that Ravina classifies heating metal as "kindling", and several recent authorities interpret it in that way.^{65, 66a} On the other hand, one very highly regarded authority⁶⁷ seems to take this interpretation as only a possibility.

who holds that the eventual consumption of the fuel is essential to the "cardinal category" (*av*) of kindling, causing fire without combustion being a "derivative category" of "work" (*toladah*)**. Another states that kindling the fire—not maintaining it—is the "work".³⁰ This matter is analyzed also by several other authorities.^{18, 19a}

If the "kindling" in (3.8) refers to the melting of the lead, as at least one authority holds,^{66c, 69} this too would be strong evidence for classifying metal heating as "kindling"; however, this interpretation is open to question, especially in view of a far earlier authority⁷⁰ who seems to say that it refers to kindling the fire on which the lead is to be heated.

An interesting sidelight is the question of using incandescent lamps for religious functions requiring lamps. This is treated below (sect. 3.4).

We conclude that, despite the wealth of source material on the subject, a far more intensive analysis is necessary before we can arrive at a clear decision on the question of the original Torah law about causing incandescence in a metal on Shabbath, when the source of heat is not fire and the purpose is not hardening.

2.4 Indirect and Unintentional Action (g'rama, eno mithkaven)

Many electrical devices perform "work" which the operator of the device would be forbidden to do on Shabbath. Under what conditions, if any, is one permitted to set such a device into operation on, or for, Shabbath?

The extent to which indirect work may be forbidden on Shabbath is evidenced by the following two Talmudic passages. [See also (4.5b).]

- (4.1) It is forbidden to place a vessel containing water under a lamp to catch and extinguish the sparks on Shabbath; it is forbidden to place it there even before Shabbath.²²
- (4.2) Adding oil to a burning lamp on Shabbath is in the category of "kindling" according to original Torah law; similarly, removing oil from it is in the category of "extinguishing".⁶

On the other hand, there are passages stating explicitly that it is permitted to cause extinction of fire:

- (4.3) According to one reading, it is permitted to remove an (unlit) piece of wood from a burning wood pile on Shabbath.^{6a}
- (4.4a) To prevent the spread of a conflagration*, it is permitted to put up

** As noted above, *Toladoth*, too, are forbidden by original Torah law.

* This refers to a conflagration threatening financial loss only; when human life is endangered, it may be permitted to put out the fire directly.

a wall of new earthenware vessels filled with water, so that they will burst and extinguish the fire when it reaches them.⁷¹

- (4.4b) It is permitted to pour water on the unignited portion of a burning garment.⁷¹
- (4.4c) It is permitted to turn over a table, so that a lamp burning on it will drop to the ground, even though this may extinguish the lamp.⁷¹
- (4.4d) Under ordinary wind conditions it is permitted—but severely frowned upon—to open or close a door which has a burning lamp behind it.⁷¹
- (4.5a) It is permitted to start the following processes shortly before Shabbath, even though they are then completed on Shabbath: soaking ink, spices and vetches; placing flax into the oven and wool into the dyeing vat; and setting animal traps.⁷²
- (4.5b) If someone sets a trap (on Shabbath) and an animal is caught in it, he is liable under original Torah law.⁷³
- (4.5c) One may put into a water mill before Shabbath only an amount of wheat whose milling will be completed before Shabbath. This is because of the noise, according to Rabbah; and because of the “Shabbath of devices” (*sh’vithath kelim*), according to Rav Yosef.⁷⁴

More material on the subject of indirect and unintentional action is available in connection with the laws concerning damages.

- (4.6) If one is unaware of a rock placed on his person and gets up, causing it to drop—in connection with damages, he is liable; in connection with Shabbath, not.⁷⁵ (His intention is essential in connection with Shabbath, but not in connection with damages.)

When other agencies are involved, the laws become more complicated.

- (4.7) If a person blows on a fire (to make it burn), but it burns only because of the additional blowing of the wind, he is not liable for damages, even though a similar act, winnowing on Shabbath, does make him liable as a Shabbath transgressor. The distinction is this: On Shabbath, “planned work” (*m’lekheth mahsheveth*) is forbidden, while, in connection with damages, indirect action does not make one liable.⁷⁶

This law must be evaluated in connection with the laws of “fire damages”, according to which a man is liable for damages caused by a fire lit by him, even though its progress was due to winds.

- (4.8) Fire is compared to an arrow⁷⁷ [and ascribed to the originator at the time it originates—Nimukei Yosef].
- (4.9) If a person places an object on a roof and it drops due to an ordinary wind, causing damage, he is liable under "fire damages".⁷⁸
- (4.10) If a person drops an object from a roof while there are protective pillows on the ground, and he then removes these pillows (while the object is dropping), he is not liable (since this is damage by indirect action).⁷⁵

A murderer is executed by the religious court (*beth din*) only if he murdered by direct action. What is considered direct action in this connection is illustrated by the examples in the following Talmudic passages:

- (4.11a) A special verse makes the murderer liable to capital punishment if he confines the victim in a situation where the lethal agent is already active. If he restrains the victim under water, in the sun's heat, in the cold, in the presence of insects, he is liable. If he confines the victim so that he dies of starvation, in a place which later becomes hot or cold, or in the presence of a lion, he is not liable.⁷⁹
- (4.11b) If he threw a rock upward, or against a wall, and it killed on its return, he is liable, unless the rock dropped along a vertical path.⁷⁹
- (4.11c) If he killed by diverting a water stream, he is liable only if the water acted directly.⁷⁹
- (4.11d) If he made a snake bite the victim, the liability is disputed. The dispute is based on the question of whether the venom is stored in the tooth or ejected by an independent act of the snake.⁸⁰

The wealth and complexity of the above material, which is, incidentally, far from complete, makes it obvious that the question of indirect action is very difficult to clarify. One book on the use of electricity on Shabbath¹⁹ is devoted primarily to this question. We shall here, however, be very brief, outlining only some of the basic principles used to organize the above material.

First, we must reconcile the severity of (4.1) and (4.2) with the relative laxity of (4.3) and (4.4).

Ad (4.1): Why should an act performed before Shabbath be forbidden, when the "work" is done automatically on Shabbath?*

* Almost all authorities agree that we are permitted to have our inanimate possessions perform "work" on Shabbath (*sh'vithath kelim lav d'Oraitha*). The one dissenting opinion refers to "work" done by a human (a non-Jew) by means of our possession.⁸¹

(1) The Tosaphoth explain the prohibition as a safeguard against doing this on Shabbath itself; then it may result in extinguishing by direct action, if a spark happens to be falling at the time the water-filled vessel is being lifted.⁸²

(2) Rabbenu Tam, on the other hand, explains the action as being more direct than those of (4.4).⁸²

Ad (4.2): Why should the removal of oil which, admittedly, speeds the extinction, be considered identical with the act of extinguishing, when other acts speeding extinction, such as (4.3) and (4.4), are not so considered?

(1) The Tosaphoth explain here that the removal of the oil causes an immediate dimming (presumably due to the lowered oil level), which is direct action.⁸³

(2) Rosh, on the other hand, explains that the removal of part of the burning body itself is identical with extinguishing, while any action involving other bodies only is not considered direct action.⁸⁴

Perhaps we can summarize the difference between these two explanations by saying that (1) holds temporal immediacy and (2) spatial immediacy to be decisive in determining whether an action is "direct".

Ad (4.4, 6). The lack of intent (*mithkaven*) and certainty of consequence (*p'sik resha*) seem to be factors in (4.4c, d) and (4.6). These concepts play fundamental roles throughout Shabbath law and the conditions under which they apply require fundamental clarification in general before their application to electrical equipment can be treated.

Ad (4.5c, 8): The fact that it may be forbidden to initiate before Shabbath an action which continues on Shabbath* obviously has profound implications for the use of many electrical devices. The codification of (4.5c) is still subject to dispute among the decisors.⁸⁵ It is of interest in this connection that the Shulhan Arukh permits winding a clock *before* Shabbath so that it strikes the hours on Shabbath.⁸⁶ (Winding a clock *on* Shabbath may be forbidden by original Torah law.^{86a})

On the basis of (4.1) and (4.8), some authorities have expressed great hesitancy concerning the permissibility of the popular "Shabbath clock", which is set before Shabbath and switches on lights at a certain time on Shabbath. [See sect. 3.1 below.]

* We refer here to prohibitions based on the fact that Shabbath "work" is being initiated, and exclude precautionary decrees designed to prevent accidental "work" on Shabbath, such as (4.1)(1) and the use of a lit oven.

Ad (4.9-11): Criteria of direct action on Shabbath can to some extent be deduced from the multitude of related laws in connection with damages and murder. However, the criteria are obviously not identical [cf. (4.6, 7)], and great care must be exercised in applying to Shabbath law any of the conclusions reached in connection with damages and murder.

One widely accepted authority classifies switching on a light as direct action under (4.11c).³¹

3. *Responsa Concerning Some Specific Devices*

To illustrate the breadth of the responsa literature in connection with electrical equipment, we provide here a cursory annotated bibliography, classified according to the equipment.*

The material may be conveniently divided into the following four categories:

- (1) *Automation Equipment.* This classification includes equipment set into motion before Shabbath to perform "work" on Shabbath.
- (2) *Non-m'lakhah Equipment.* Equipment not primarily performing "work", but whose operation may involve "work" as a by-product, is included here.
- (3) *Sound Equipment.* This section includes equipment whose function it is to generate sound.
- (4) *Equipment Doing Forbidden "Work."* This section covers equipment which involves incandescent elements in an essential manner.

3.1 *Automation Equipment.*

The so-called "Shabbath clock" is the classical prototype of modern automation equipment. It is a clock set up before Shabbath so as to perform "work" at a specified time on Shabbath.

This device is quite universally accepted, and it might surprise the reader to hear that no less a personage than a former Chief Rabbi of Palestine would not see his way to permitting its use to switch on a light on Shabbath. In deference to the great authorities who did permit it,^{87, 88} he did not explicitly forbid its use.^{12d} Reviews of this question have been written.^{15b, 17b}

The question of placing food on a cold electric oven, which is subsequently turned on (on Shabbath) by a Shabbath clock, has given rise to much debate. An extensive review of this has been published.^{89a} The conclu-

* In addition to the sources quoted here, the reader is advised to refer to Ref. (0) for many further relevant sources.

sion seems to be that the food must be placed on the oven before Shabbath, and the heating element and controls covered.^{16b}

The question of resetting the clock on Shabbath has been analyzed. It might be possible to permit delaying extinction,^{89b} if it were not for the danger of accidentally throwing the switch. However, if delaying involves resetting the clock, this is equivalent to setting it initially and forbidden on Shabbath.^{13c}

According to another authority, throwing a switch while the light is off, so that the operation of the Shabbath clock will later cause a light to go on, is forbidden as "kindling". Both it and its converse (throwing a switch so as to prevent the "Shabbath clock" function from turning on a light) are forbidden because of *muktzah*.^{15c, g}

3.2 Non-m'lakhah Equipment

In the category of electrical equipment designed to do permitted "work", the fan, elevator, train and refrigerator have been discussed.

In connection with the electric *fan*, the only problems would seem to be those of "adjusting" (making electrical contact) and sparking; with certain induction motors, even sparking could be eliminated. Thus, one authority permits having a fan turned on by a non-Jew on Yom Tov;^{15a} another permits it even on Shabbath, since he does not classify sparking as "kindling".¹⁴

The question of using an *elevator* on Shabbath is complicated by the fact that its operation is usually accompanied by the switching on and off of indicator lamps.^{14, 12c} On the other hand, a fully automatic elevator, stopping automatically at every floor, has been permitted if certain precautions are taken.⁹⁰

The use of an electric *train* on Shabbath is generally considered forbidden even though it is running for non-Jews. One authority basis this prohibition on its work-day nature (*'uvda d'hol*) and on the possibility that the Jew's presence might make it necessary for the operator to increase the "fire".^{33a}

The opening of a *refrigerator* on Shabbath has become a matter of major practical importance in many Jewish communities. The question raised is the following. The typical electric refrigerator has a thermostat controlling the starting and stopping of the compressor motor. When the temperature at the thermostat (inside the refrigerator) rises above a certain level, the motor starts, causing the refrigeration unit to operate to lower the temperature. When the temperature has dropped to a certain second level, the thermostat switch stops the motor. Opening the door admits warmer air and therefore raises the temperature inside the refrigerator more rapidly; consequently, it causes the motor to be switched on earlier than it would have started had the door remained closed.

Questions of "unintentional" and "indirect action" are involved here (sect. 2.4). The fundamental question hinges, of course, on the problems of sparking (sect. 2.2) and "adjustment" (sect. 2.1).

It has been suggested that all these problems could be avoided if the thermostat were replaced by an automatic timing device. Some authorities permit opening the refrigerator while the motor is running (so that there is no additional or earlier starting of the motor), while others permit opening the refrigerator at any time. An extensive review of the literature up to the year 5718 (1958) has been published,⁹¹ and more has been written since.^{151, 92-97}

3.3 Sound Equipment

Today's civilization abounds with equipment designed to produce sound. There are electric bells, phonographs, radio and television, public address systems, telephones, and hearing aids. All of these have given rise to halakhic investigations.

These devices differ essentially from those of the preceding section in that they involve, in addition to "adjustment" and sparking, also the prohibition against using sound producing instruments, discussed in connection with (1.8), sect. 2.1.

When the sound is musical there is little doubt, in view of the clear-cut prohibition against using musical instruments on Shabbath. Whether the same interdict applies to instruments producing non-musical sounds is an old dispute which does not yet seem to have found an accepted settlement. [See end of sect. 2.1 above.]

Even if the instrument is turned on before Shabbath, it should perhaps be classified with the water mill of (4.5) (sect. 2.4); if so, its usability would be subject to the same dispute.

The *bell* has been treated both as applied to burglar alarms ("it is permitted to ask a non-Jew to set it")⁹⁸ and in connection with opening doors which automatically operate a bell. Combining the facts that the operation of this bell—and certainly the production of the sparks—is unintentional, indirect and short-lived, one authority permits entering such a door on Yom Tov, if it is "unavoidable";¹⁵¹ another forbids such an automatic bell on Shabbath, if it is electrical, but permits it if it is mechanical.^{89c}

The *phonograph* and *radio* are frequently used for music, so that there is little basis for permitting their operation on Shabbath.^{12f} The question of turning on a *television* set before Shabbath for viewing on Shabbath is decided in the negative.^{89d}

One authority classifies making a phonograph record as "writing".³³

Another permits turning on a radio before Shabbath for the sake of a sick person for whom the music may be of therapeutic value, since then only the law of (4.5c) is concerned, and this may be set aside on occasions involving great financial loss and, *a fortiori*, for a sick person.^{15k}

The use of the *public address system*, too, has increased very much in recent times and the question of its permissibility has often been raised.⁹⁹

A treatment of this device has to consider each of its three major components.

- (1) The *microphone* which converts sound waves into electric fluctuations;
- (2) The *amplifier* which increases the amplitude of these fluctuations; and
- (3) The *loudspeaker* which converts the amplified electric fluctuations back into sound waves.

If the public address system is turned on before Shabbath and is used for non-musical sounds, the case may be somewhat less severe than that of the radio and phonograph. However, as noted before, many authorities forbid the use of sound devices even when they are non-musical. In addition, as long as the systems are such that there is danger of an adjustment becoming necessary during use, it is very difficult to find a basis for permitting their use.

The advisability of using a public address system in the synagogue for services is made even more questionable by the fact that the sound produced by it is not the original sound at all, but merely a copy of it. The voice is not that of the speaker but that of the (mechanical) loudspeaker, so that the listener may not be hearing the reading and prayers themselves at all.

The *telephone* involves a system very similar to that of the public address system. Here an electrical connection is made by lifting a receiver. An additional connection is made by the operator or by dialing. In addition, the use of the telephone is often accompanied by the switching on and off of indicator lamps^{12f, 14, 33a} and ringing of a bell.^{11a}

The *hearing aid* also operates on the same principle, using the same three major components as the public address system. It is, however, considered more leniently by some, because there is danger to the deaf person not equipped with a hearing aid. (This carries some weight even though there is no danger to his life.) In addition, avoiding the embarrassment experienced by the deaf person has been classified as a matter of "human dignity" (*k'vod ha-b'rioth*).^{17a} The fact that these devices are generally made with transistors and do not contain incandescent elements further alleviates the situation.^{15d}

On these bases, some Rabbinical prohibitions may be overruled. Consequently, some authorities permit the use of hearing aids both on Yom Tov and on Shabbath,^{14, 17a} another only on Yom Tov^{15d}—but in any case, of course, only if the device has been switched on before Yom Tom or Shabbath, respectively, and the controls have been made inaccessible to avoid accidental adjustment. In addition, the question of carrying the device is an entirely separate one which must be resolved before the wearer may leave his house (unless his town is *m'urav*). It has been suggested that the battery be sewn to the clothing of the wearer.¹⁴

3.4 Equipment Doing Forbidden "Work"

The situation is much more severe when the intended function of the device is "work" forbidden by original Torah law. Since the evidence of sect. 2.4 indicates very strongly that switching on an electrical device must in general be considered direct action, operating such a device must be considered equivalent to doing the "work" performed by the device.

The incandescent lamp, treated in many responsa, is representative of this class of devices. (Cf. sect. 2.3 as to its "work" character.) The problem of the *heating pad* is also raised. It is found, however, not to fall into this category, since its heating elements do not become very hot.^{15b}

Assuming that an incandescent lamp is fire according to original Torah law, a number of secondary questions arise. May it be used as a Shabbath lamp (*ner Shabbath*)? Hanukah lamp? *havdalah* lamp?

There appears to be general agreement that an incandescent lamp cannot serve as a Hanukah lamp.^{12g, 19b, 29b, 33a} As to its usability as a Shabbath lamp, there is some disagreement, which has been reviewed recently.^{89e} Some authorities permit its use, while others disqualify it on the basis that

- (1) Only a device using a wick and fuel is a lamp in the sense of *halakhah*.¹⁰⁰ and
- (2) there is no kindling when an electric light is switched on.^{12g} [Opinion (1) was stated in connection with gas light, but seems to be at least equally applicable to an incandescent electric lamp. Opinion (2) seems to be based on the assumption that electric current is itself fire.]

Some authorities permit using an electric lamp for *havdalah*.^{12b, 31b} Another is doubtful about this, especially when the lamp envelope is diffusing.^{19c}

Rabbinic law forbids an individual to read by the light of a lamp on Shabbath, since he might come to adjust it.¹⁰¹ Some authorities would apply this to an electric lamp also. This is, however, disputed.^{29c}

4. Conclusion

The above survey should suffice to show that very general and profound questions of *halakhah* are involved in the use of electrical equipment on Shabbath. These must be resolved before any clear-cut and indisputable decisions will be possible.

I personally look on these problems as a welcome by-product of our modern civilization. We may hope that the new problems will lead to a fuller clarification of *halakhoth* which have been neglected in the past. If any of the readers of this paper are encouraged to delve further into this study—with the necessary seriousness and intensity—I should feel amply rewarded in my efforts here.

To conclude on a wistful note: The highest fulfillment of Torah study is that it lead to action.¹⁰² When there are no new questions, the opportunities for this are limited and the Torah scholar may become isolated from the daily life of the community. Perhaps these modern problems may force even more of our scholars into closer contact with the world around them, which was created to be a stage for the Torah.¹⁰³

Acknowledgement

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מראי מקומות

- | | |
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| 0. ר' י"י נויבירט. שמירת שבת כהלכתה. ירושלם, תשכ"ה | 11. ט"ז. ש"ע או"ח סי' שי"ג ס"ק ז' |
| 1. שבת ע"ה: | 11(a). ר' י"ל צירלסאהן, עצי הלבנון. קלוזש, תרפ"ב. סי' י' |
| 2. שבת ק"ב: | |
| 3. שבת מ"ז: | 12. ר' במ"ח עזיאל. משפטי עזיאל. ח"א. תל אביב, תרצ"ה |
| 4. שבת קכ"ב: | (a) השמטות רכ"ו |
| 5. ביצה י"א: | (b) סי' ח' |
| 6. ביצה כ"ב. | (c) סי' י"ט פ"ב |
| (a) גירסת הרי"ף שם | (d) השמטות רכ"א אות ב' |
| 7. עירובין ק"ג. | (e) עג"כ השמטות רכ"ו |
| 8. עירובין ק"ד. | (f) סי' י"ג |
| 9. ביצה ל"ו: | (g) סי' ז' |
| 10. ר"י. שבת ק"ב: תד"ה האי | |

13. ר' א"צ פראמער. שו"ת ארץ צבי. לובלין, תרצ"ט
(a) סי' ס"ד
(b) סי' ס"ב
(c) סי' ע"ב
14. ר' י"א הענקין. עדות לישראל. נוא יארק, תש"ז (?). ע' 120-121
15. ר' מ"י ברייש. שו"ת חלקת יעקב. ח"א. ירושלים, תשי"א. ח"ב. לונדון, תשי"ט
(a) ח"א ס' נ"ג
(b) ח"א ס' מ'
(c) ח"א ס' נ"ח
(d) ח"ב ס' מ"א
(e) ח"א ס' נ'
(f) ח"א ס' נ"ב
(g) ח"ב ס' מ"ה
(h) ח"א ס' מ"ט
(i) ח"ב ס' מ"ז
(j) ח"א ס' נ"ה
(k) ח"א ס' ס"א
16. ר' א"י קרליץ. חזון איש. ח' או"ח. בני ברק, תשי"ז
(a) סי' נ' ס"ק ט'
(b) עג"כ סי' ל"ח
17. ר' א"י וולדינברג. ציץ אליעזר. ירושלים. ח"א, תש"ה. ח"ו, תשכ"א
(a) ח"ו סי' ו'
(b) ח"א סי' כ' פ"ט
18. ר' א"א פרייס. משנת אברהם. פ"ע ס' חסידים. טאראנטא, תשט"ו. ע' קי"ב-קי"ז
19. ר' ש"ז אורבאך. מאורי אש. ירושלים, תרצ"ה
(a) עג"כ דף ס"ז
(b) פ"ה ענף ב'
(c) שם ענף א'
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22. שבת מ"ז:
23. ר' שאול ברלין. שו"ת בשמים ראש. ברלין, תקנ"ג. סי' קצ"ד
24. ר' מנחם קרענגיל. הגהות מנחם ציון ע"ס שם הגדולים השלם. ח"ב הגה ס"ב
25. השגת הראב"ד על הרמב"ם היו"ט פ"ד ה"א
26. ר"ע מברטנורה. ביצה פ"ד מ"ז
27. ט"ז ש"ע או"ח סי' תק"ב ס"ק א'
28. פמ"ג שם מ"ז סק"א
29. ר' מ"ל ווינקלער. שו"ת לבושי מרדכי. בודאפעשט, תרפ"ב
(a) סי' צ"א
ח"ב. מאד, תרצ"ז
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30. ר' ד"צ האפפמאן. מלמד להועיל. ח"א. פרנקפורט ענ"מ, תרפ"ו. סי' מ"ט
31. ר' ח"ע גראדזענסקי. שו"ת אחיעזר. ח"ג. ווילנא, תרצ"ט
(a) סי' ס'
(b) רבים בשמו
32. ר' ב"א הכהן ווייס. שו"ת אבן יקרה. מ"ג. לעמבערג, תרנ"ד. סי' קס"ח
33. ר' י"י שמעלקיש. בית יצחק. חיו"ד.
(a) ח"ב סי' ל"א מפתח
(b) ח"א סי' ק"כ סק"ד
34. שבת ל"ט.
35. שבת מ':
36. חולין ח'.
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 46. ע' צל"ח פסחים ע"ה.
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 53. ר' האי גאון. שם.
 54. ר"ח. שבת מ"ב.
 55. רש"י. שם
 56. ס' יראים סי' ק"ב ד"ה המכבה
 57. רשב"א. שבת מ"ב.
 58. מאירי. שם
 59. ר"ן על הרי"ף. שם
 60. רמב"ן. שם
 61. ריטב"א. שם
 62. חדושי הר"ן. שם
 63. הובא בהגהות הר' מ"י הכהן
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 66. ר' אברהם מסאכאטשאב. אבני
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 (a) סי' רכ"ט סק"ג
 (b) סי' רל"ח
 (c) סי' רכ"ט סק"א
 67. ר' י"מ הכהן (מחבר ס' חפץ
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68. ר' שניאור זלמן מלדי. ש"ע
 או"ח סי' תצ"ה קונטרס אחרון
 69. כן משמע גם מתוס' פסחים
 ע"ה. סד"ה למעוטי
 70. רמב"ן. שבת ק"ו. (סוף ע"א)
 71. שבת ק"כ:
 72. שבת פ"א מ"ה ומ"ו
 73. תוספתא הובא שבת י"ז: תד"ה
 אין פורסין
 74. שבת י"ח.
 75. ב"ק כ"ו:
 76. ב"ק ס'.
 77. ב"ק כ"ב:
 78. ב"ק ג':
 79. סנהדרין ע"ו: ע"ז:
 80. סנהדרין פ"ט מ"א ודף ע"ח.
 81. ר' אלעזר מגרמיזא. רקח. סי'
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 82. שבת מ"ז: תד"ה מפני
 83. ביצה כ"ב. תד"ה והמסתפק
 84. רא"ש ביצה פ"ב סי' י"ז
 85. ש"ע או"ח סי' רנ"ב ס' ה'
 86. שם סי' של"ח ס"ג
 (a) משנה ברורה שם ס"ק ט"ו
 87. ר' י"ש נאטאנזאהן. שו"ת שואל
 ומשיב. ח"ב. (ברוקלין, תשי"ד)
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 88. ר' משה שיק. שו"ת מהר"ם
 שיק. חאו"ח. סי' קנ"ז
 89. ר' גדליה פעלדער. יסודי ישורון.
 ח"ג. ניו יורק, תשי"ח. ח"ד.
 ניו יורק, תשכ"ב. עמדים
 (a) ח"ג מ"ב-מ"ט
 (b) ח"ד ש"ה
 (c) ח"ד רפ"ה
 (d) ח"ג נ"ה
 (e) ח"ג קמ"ח-ק"נ
 90. ר' י"א הענקין. מכתב. י"ג תשרי
 תשכ"ד

98. ר' שמואל ענגיל. שו"ת מהר"ש.
ווראנאו, תרצ"ו. ח"ה סי' צ"ה
99. ע' בדרום, ח' ח"ט, ניסן
תשי"ט, ע' 87-106, דברי ר'
שמואל היבנר, ר' מנחם
פאליאקאו ור' ח"ד שעוועל
100. ר' י"ד הלוי במברגר. שו"ת יד
הלוי. ירושלם, תשכ"ה. סי'
קט"ז
101. ש"ע או"ח סי' ער"ה ס' א'
102. אבות פ"ד מ"ה
103. ... בשביל התורה שנבראת
ראשית דרכו. אותיות דר'
עקיבא (הובא ברש"י ריש
בראשית)
91. ר' חיים דרוק. נועם א'.
ירושלם, תשי"ח. ע' רס"ג-רפ"ב
92. ר' י"א הענקין. נועם ב'.
ירושלם, תשי"ט. ע' ע"ב-ע"ד
93. ר' עובדיה הדאיה. שם. ע'
ע"ה-צ"ד
94. ר' יצחק גליקמן. שם. ע'
צ"ה-קי"ז
95. ר' מרדכי שטיין. נועם ג'.
ירושלם, תש"כ. ע' ר"ד-ר"ו
96. ר' ישראל הלוי בארי. שם. ע'
ר"ז-רט"ו
97. ר' ש"ז אוירבך. מזכרת לזכר
הריא"ה הרצוג. ירושלם, תשכ"ב