Patent Law
Fall 2016
Prof. Ford

Take-Home Final Exam

This take-home final exam is worth 60% of your course grade. It will be administered on Wednesday, December 21, 2016. You have eight hours to complete the exam (or twelve hours if you have been granted an accommodation by the Registrar's Office). At the conclusion of the exam, responses must be emailed to the Registrar's Office at **registrar@law.unh.edu**.

Please do not put your name or any identifying information on your exam. Place only your assigned exam number on the top right corner of your answers.

Please format your responses similarly to this document: **single-spaced with 1.5-inch margins and empty space between paragraphs**. Use 12-point Cambria, Century, Constantia, or Book Antiqua; do *not* use Times New Roman. Number your pages. I recommend you submit your answers as a PDF file.

You may consult **any existing material you wish** while completing this exam. This specifically includes online research tools like Google and Lexis, though I do not recommend relying heavily on such tools. Answers discussing cases, doctrine, or principles that were not assigned or discussed in this course will receive no credit. **You must write your entire response, yourself, during the exam period; you may not paste any previously written material into your answers**, whether written by you or anyone else. **You may not discuss the exam with anyone while it is being administered,** including other students, attorneys, or participants on online discussion boards. Please type the following at the top of your exam:

> I affirm that I have not discussed this exam with other students or anyone else during its administration.

This exam consists of **ten short-answer questions**, which are weighted equally. **There is a total word limit of 3,500 words for your entire exam.** This is an exceptionally generous limit; you do not need to use this many words, and concise and well-organized responses will be rewarded. **Do not include the questions in your responses. List your word count at the end of your exam.**

If any of the questions are unclear, or don't provide necessary information, state explicitly any assumptions you make and explain how your answer depends on those assumptions.

Good luck and have a wonderful winter break!

The following scenario applies to all questions:

Gauri Nanda filed a patent application on August 11, 2005, for a "mobile wakeup device." (This is a real patent application, and the products discussed in the questions are real products, but I have changed the facts for this exam. Please rely on the scenario given here, not any facts from the real world.) The abstract described the invention as follows:
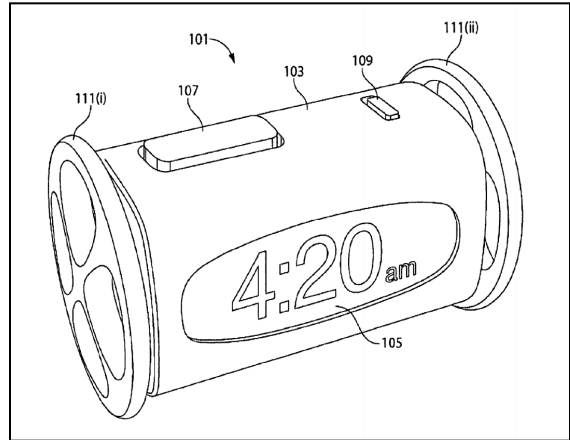
> A mobile wake-up device responds to a snooze-button in an alarm clock. The mobile wakeup device includes a mechanism for making the device mobile, a controller for directing the movement of the device and responding to input, and an alarm off input. When the alarm clock's alarm goes off and an individual activates the snooze button, the mobile wake-up device moves forward, drops from a table to the floor, and moves to a remote location. While moving, the device may use sensors to avoid objects in its path. After the mobile wake-up device has reached the remote location, the alarm signals again. To turn off the alarm, the individual must get out of bed and locate the mobile wake-up device.

The preferred embodiment looks like a standard alarm clock with large wheels on the sides, as shown in Figure 1 of the application, shown above.

The application contained the following written description, all of which was unchanged during prosecution and became part of the patent's specification:

BACKGROUND OF THE INVENTION

The invention relates to alarm clocks and more particularly to techniques used in alarm clocks to ensure that the user of the alarm clock is really awake when the user shuts off the alarm.

Most everyone has experienced problems waking up in the morning. In response to this need the alarm clock was developed to produce an audible signal to rouse an individual from their slumber. The original alarm clocks were mechanical in nature and caused a bell in the alarm clock to ring when a specified time was reached. Improvements in clock technology over time resulted in digital alarm clocks in which time was determined by electronic circuitry and displayed by a Light-Emitting Diode (LED) or other electronic display. The use of such electronic circuitry permitted further developments, among them the "snooze

alarm." The object of the snooze alarm is to allow the alarm to be temporarily suspended while the individual catches a last few minutes of sleep.

The drawback to the snooze alarm is its abuse by its user. An individual who has been waked up by an initial alarm activates the snooze alarm and falls back to sleep. When the alarm is triggered a second time, the individual repeats the process by activating the snooze button again. This process can continue to repeat itself until the individual has slept past the time needed to get up to attend some important event. In attempting to prevent this, the individual can move the alarm clock to a new position across the room. The drawbacks in so doing are that the snooze button becomes useless, the alarm clock may be too far away to be readable, and the individual has to go to the clock to reset the time or the alarm.

It is an object of the invention to provide a wakeup device which may be located near the sleeper but requires the sleeper to get out of bed to turn the wakeup device off.

BRIEF SUMMARY OF THE INVENTION

The object of the invention is achieved by means of a mobile wake-up device. The mobile wake-up device responds to an alarm event in a clock having an alarm. The mobile wake-up device includes an input device that receives input that causes an alarm-disable event, a controller, and a mobility device. The mobility device operates under control of the controller. The controller responds to the alarm event by causing the mobility device to move the mobile wake-up device to a location that is remote from the mobile wake-up device's location upon occurrence of the alarm event. At the remote location, the controller causes the alarm to go off and responds to the alarm-disable event by causing the alarm to cease going off. The alarm event may include the alarm itself going off or the user activating a snooze button. The remote location reached can be based on a pattern or chosen randomly.

In another aspect of the invention, the mobile wake-up device has a docking station. The docking station providing a means for charging the battery internal to the mobile-wake up device. It is a further aspect of this invention, that the docking station portion of a mobile wake-up device contain the time display of the alarm clock, allowing the time to be viewed easily by the individual.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows a presently-preferred embodiment **101** of a mobile alarm device. Mobile alarm device **101** is a mobile alarm clock. Like most alarm clocks, device **101** is placed on a nightstand next to the user's bed. Mobile alarm device **101** has an exterior body **103** that contains and protects the internal workings of the clock. On the front of the clock is a Liquid Crystal Diode or Light-Emitting Diode (LCD/LED) **105** for displaying the time. An on/off switch **109** activates or de-activates the alarm clock's alarm. A snooze button **107** turns off the alarm for a predetermined period of time. Not shown, but included in most alarm clocks are buttons for choosing whether a time value or alarm time value is to be set and buttons for advancing the values of the alarm time value or time value. Mobile alarm device **101** further contains a pair of wheels **111** (i and ii). These wheels allow mobile alarm device **101** to be propelled forward in response to an alarm event such as the snooze button being activated. Wheels **111** (i and ii) are slightly larger than the body of the alarm clock **103** to allow mobile alarm device **101** to move. Wheels **111** (i and ii) are also larger to allow for the absorption of shock when mobile alarm device **101** rolls off the nightstand onto the floor. Springs may be added to the axle holding wheels **111** (i and ii) to further absorb shock from the fall. The case **103** has the parts of the clock within situated as to create a low center of gravity. This arrangement keeps the orientation of the mobile alarm device such that the LCD/LED **105** remains visible. After moving forward and dropping off the nightstand onto the floor, mobile alarm device **101** moves to another point in the room. When mobile alarm device **101**'s alarm goes off again, the user can only turn off the alarm by getting out of bed and finding mobile alarm device **101**.

When the alarm sounds, the user may either turn the alarm off or activate snooze button **107**. In the latter case, controller **203** responds by turning off the alarm and setting the alarm so that it will go off again after a snooze period has elapsed. Additionally, controller **203** activates motor controller **215** that directs motors **217** connected to wheels **111** (i and ii) to propel mobile alarm device **101** forward, so that it falls from the nightstand where it has been placed. Internal circuit board **201** is designed to help absorb the shock of falling from the nightstand. After landing on the floor, mobile alarm device **101** continues to move. Controller **203** may vary the times and directions of motion such that each time the user activates the snooze button, the mobile alarm device stops at a different location. Controller **203** may change the direction of mobile alarm device **101** by independently varying the speed of each of the motors **217** that drive

wheels **111** (i and ii). If one wheel **111** (i) is turning faster than another wheel **111** (i), mobile alarm device **101** will turn around the slower wheel. Wheels **111** (i and ii) can also be moved in opposite directions to make mobile alarm device **101** pivot.

After a predetermined time has elapsed, mobile alarm device **101** comes to rest. When the snooze period expires, the alarm goes off again. The individual who activated the snooze button must now get up and locate mobile alarm device **101** in order to deactivate the alarm by activating switch **109**. Now that the individual is out of bed, the alarm clock has completed its function.

FIG. 4 [shown above right] shows a several views of a mobile alarm device with docking station. Mobile alarm device **401** is in a docking station **405** that contains a mechanism for charging battery **205** held in the body of mobile alarm device **103**. Mobile alarm device **401** contains a set of wheels **407** for propelling mobile alarm device **401** from its docking station **405**. Mobile alarm device **403** separates itself from the docking station **405** after snooze button **107** has been depressed.

FIG. 6 [shown to the right] shows several different ways of making the mobile alarm mobile. Tracks instead of wheels allow mobile alarm device **601** to cross more varied terrain such as a deep shag carpet where a wheeled mobile alarm device **101** may become bogged down. A tracked mobility unit with arms allows alarm device **603** to climb over objects in its path or ascend or descend stairs. A mobility unit with legs like an insect allows alarm device **605** to walk across its terrain. Alarm device **605** is weighted so that it always falls on its back. Like an

Fig. 4
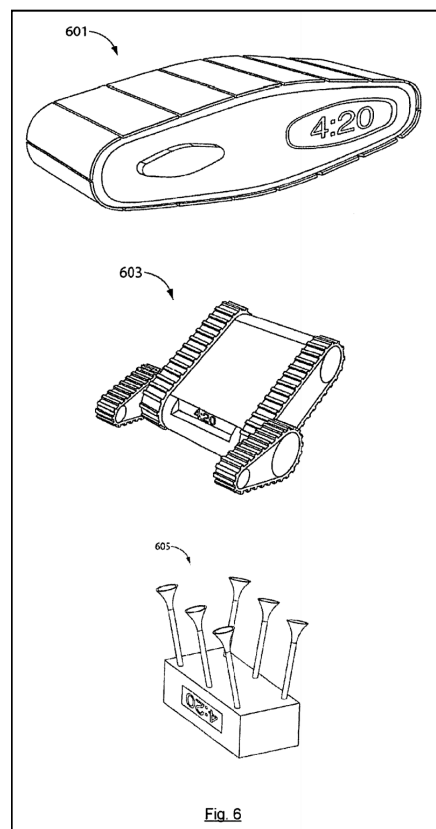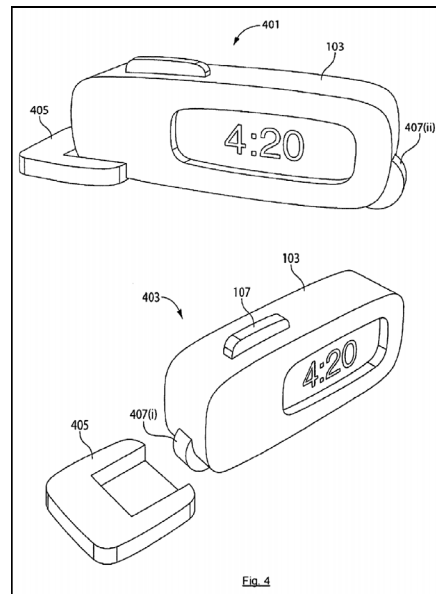
Fig. 6

insect, it can right itself. The mobility units shown in FIG. 6 are illustrative and exemplary only; any device which makes it possible for mobile alarm device **101** to move out of reach of the sleeper may be employed in place of the wheels used in mobile alarm device **101** or of any of the mobility units shown in FIG. 6.

The original application contained ten claims:

1. A mobile wake-up device comprising:

    an input device configured to receive input and, in response to that input, cause an alarm-disable event,

    a controller configured to receive and respond to an alarm event and to the alarm-disable event, and

    a mobility device that includes the input device and the controller,

    in which the mobility device is configured

    > to operate under the control of the controller, and

    > to respond to the alarm event by causing the mobility device to move the mobile wake-up device from a first location to a second location that is remote from the first location upon occurrence of the alarm event, and

    > thereafter to cause the alarm to go off, and

    > to respond to the alarm-disable event by causing the alarm to stop.

2. The mobile wake-up device of claim 1, wherein the alarm event is a snooze button being set.

3. The mobile wake-up device of claim 1, wherein the controller is configured to cause the mobility device to move with variations in speed, distance and/or direction.

4. The mobile wake-up device of claim 1, wherein in response to the alarm event, the controller is configured to cause the mobility device to move such that the mobile wake-up device falls from a nightstand.

5. The mobile wake-up device of claim 4, wherein the controller is configured such that upon the mobile wake-up device having fallen from the nightstand, the mobility device proceeds in a random direction, for a random time, and/or at a random speed.

6. An alarm clock comprising:

    a case containing

        a clock,

        an alarm that may be turned off,

        a snooze button that silences the alarm for a snooze period,

        a controller responsive to the snooze button,

        a motor that is controlled by the controller, and

        wheels that are coupled to the motor,

    such that the controller is configured to respond when the snooze button is pressed by causing the motor to turn the wheels so that the alarm clock moves from a first location to a second location that is remote from the first location,

    whereby the alarm clock must be located at the end of the snooze period in order to turn off the alarm.

7. The alarm clock set forth in claim 6 wherein the wheels are external to the case.

8. The alarm clock set forth in claim 6 wherein the wheels are of a size such that no part of the case touches the ground.

9. The alarm clock set forth in claim 6 wherein the wheels are located relative to the case such that when the wheels turn at differential rates, the case turns around the slower wheel.

10. The alarm clock set forth in claim 6 wherein the controller is configured to vary the speed of the motor and the further motor according to a randomly determined parameter.

The patent issued on April 8, 2008, as patent no. 7,355,928 (the '928 patent) with unchanged claims.

Nanda formed a company, Nanda Home, to commercialize her invention. The company's first product was an alarm clock called Clocky, shown to the right. The product was a success, selling more than 20,000 units in its first year and more than 500,000 to date.

* * * * *

Question 1

Walmart, a popular retailer, sells a product called the Runaway Clock, which looks essentially identical to Clocky. The Runaway Clock does not have a snooze alarm. Instead, at the programmed time for the alarm to sound, the Runaway Clock starts playing a siren sound and, a few seconds later, rolls away in a random pattern.

Nanda sues Walmart for infringement of the '928 patent under 35 U.S.C. § 271(a). Assess the strength of the infringement argument for claim 4 and claim 6.

Question 2

Walmart asserts that some claims of the '928 patent are invalid under 35 U.S.C. § 103. Walmart points to several prior-art references, including:

‣   The Roomba, an autonomous vacuum cleaner that rolls around on wheels in randomized patterns;

‣   A remote-controlled flying drone, shown below on the left; and

‣   An alarm clock that slaps the user in the face with an artificial hand until the user wakes up, shown below on the right.

Are these references relevant prior art for purposes of § 103? Explain.

Question 3

Walmart also asserts that some claims of the '928 patent are invalid under 35 U.S.C. § 112 for failure to satisfy the definiteness requirement. Assess this defense for claim 10.

Question 4

Walmart also asserts that some claims of the '928 patent are invalid under 35 U.S.C. § 102. Walmart points to several references, including the following:

- A Ph.D. thesis, *Autonomen Robotern mit Anwendungen [Autonomous Robots With Applications],* by Friedrich Brinkerhoff, submitted to the Eidgenössische Technische Hochschule Zürich, a Swiss university, on June 1, 2005, and thereafter made available in the university's library and indexed in various online databases.

- A battery-powered alarm clock with a vibrating motor that sometimes causes it to fall off a nightstand, sold in Shenzhen, China on April 12, 2005.

- A recorded audio interview with the podcast "This Week in Tech," released on the Internet on March 24, 2004.

Are these references relevant prior art for purposes of § 102? In other words, for each reference, does it fit within a category of prior art covered by § 102, and if so, does the timing render it relevant prior art? Explain. Do not assess whether each reference discloses each claim limitation.

Question 5

One reference that Walmart cites is the Flying Alarm Clock, shown at the right. The Flying Alarm Clock was sold by Brookstone stores throughout the United States beginning in 2003.

The Flying Alarm Clock consists of a base with a clock face and a flying propeller component. When the alarm goes off, the base emits a buzzing sound and uses a motor located in the base to launch the propeller into the air. It flies a short distance due to the lift created by its blades and then falls to the ground. The base continues to emit the buzzing sound until the user retrieves the propeller and reinserts it into the base. The propeller component is a simple piece of molded plastic with no embedded electronics.

Walmart asserts that the Flying Alarm Clock is invalidating prior art under 35 U.S.C. § 102. Assess this defense for claim 1 and claim 3 of the '928 patent.
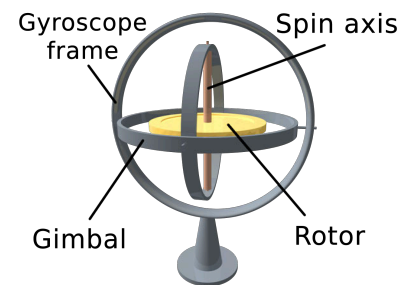
Question 6

A competitor, Javier Ruiz, invents Tocky, a spherical alarm clock shown at the right.

Tocky works similarly to Clocky. The user sets a time for the alarm to sound. When that time arrives, the alarm sounds and Tocky rolls off the nightstand onto the floor. Tocky has no snooze function. The major difference between Clocky and Tocky is that rather than being propelled by wheels, Tocky uses an internal weight driven by a motor and a gyroscope. (A gyroscope is a spinning internal wheel or rotor, the angular momentum of which can be used to control the orientation of a device. A diagram of a gyroscope is shown to the right.)

Ruiz files a patent application on July 1, 2015, describing the embodiment discussed above and containing the following claims:

1. An alarm clock comprising:

   a substantially spherical housing;

   a clock face embedded in the substantially spherical housing;

   a control mechanism configured to allow the user to program an alarm time and enable and disable an alarm function;

   a speaker; and

   a mobility mechanism controlled by the control mechanism and configured to allow the alarm clock to move.

2. The alarm clock of claim 1 in which the mobility mechanism further comprises an electric motor.

3. The alarm clock of claim 1 in which the mobility mechanism further comprises a spinning wheel.

4. The alarm clock of claim 3 in which the spinning wheel comprises a gyroscope.

The examiner is concerned that Ruiz's proposed claims are invalid under 35 U.S.C. § 102 in view of the '928 patent and/or the Clocky device. Assess the validity of proposed claims 2 and 3 in view of this prior art.

Question 7

While the Ruiz application is pending, Nanda sues Ruiz for infringing claim 1 of the '928 patent by selling Tocky.

Ruiz asserts that claim 1 of the '928 patent is invalid under 35 U.S.C. § 112 for failure to satisfy the written-description and enablement requirements because the scope of the "mobility device" claim limitation is broader than described in the specification. Assess this defense for claim 1.

Question 8

Assume, regardless of your response to question 7, that Nanda is successful in her infringement suit against Ruiz. Nanda seeks lost-profit damages and a permanent injunction barring Ruiz from selling the Tocky.

What are Ruiz's best arguments *against* an award of lost profits and a permanent injunction? How likely are those arguments to succeed? If there is information you do not have that would be useful for your analysis, explain what that information is and how it would affect your analysis.

Question 9

One problem Nanda has run into with her alarm clock is that when it falls off a nightstand, the internal wires connecting the components sometimes break due to the force of the impact. Nanda wants to strengthen the wires without causing them to become thicker, and thus more likely to corrode. Nanda begins experimenting with various ways to produce strong, yet thin, wires that can be used to produce Clocky.

Nanda remembers from one of her materials-science classes in college that silk is one of the strongest fibers available, though it is unsuitable as a wire since it does not conduct electricity. (Silk is a natural fiber produced by silkworms, the larva of the silk moth.) She remembers from a different class that graphene, a form of carbon in which the atoms are arranged into a one-atom-thick hexagonal lattice, is an exceptionally good conductor of electricity. (Graphene occasionally occurs in nature but is usually produced by humans. The molecular structure of graphene is shown above.) Nanda wonders if she can find some way to combine silk and graphene to produce silk threads that are strong and conductive.
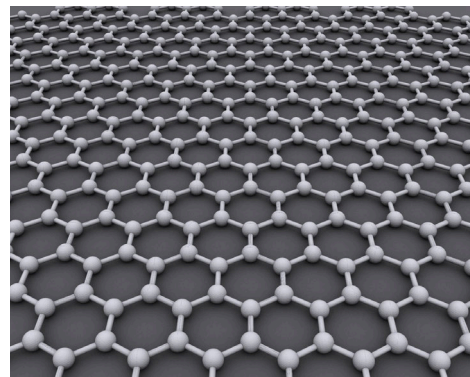
Nanda experiments with various ways to combine silk and graphene. Eventually she tests feeding silkworms a diet of ordinary food laced with graphene. To her surprise, the silk produced by these silkworms is exceptionally strong and also electrically conductive. (This is a real thing. It's really cool.) Nanda files a patent application with two proposed claims:

1. A method of producing an electrically conductive fiber comprising feeding silkworms a diet laced with graphene powder.

2. An electrically conductive fiber comprising silk that is impregnated with graphene.

Does Nanda's application claim patentable subject matter under 35 U.S.C. § 101? Explain.

Question 10

Assume, regardless of your response to question 9, that the examiner rejects proposed claim 2 of the application but allows claim 1 as shown in question 9. The patent issues as the '568 patent, with one claim, on October 8, 2016.

Fisher Scientific is a company that sells supplies for scientific research. One of its product lines is aimed at academic and industrial scientists researching methods of making conducting fibers. As part of this product line, Fisher Scientific sells a kit containing a variety of silkworm that is effective at producing graphene-impregnated silk fibers along with instructions on how to produce graphene to feed the silkworms.

After the '568 patent issues, Fisher Scientific seeks an opinion of its outside patent counsel about its ability to sell the kit. The lawyer opines, in a written opinion letter, that several things are true:

‣ That a user using the kit as instructed would infringe the '568 patent;

‣ That the '568 patent is invalid under 35 U.S.C. §§ 101 and 103; and

‣ That the silkworms included in the kit are staple articles of commerce capable of substantial noninfringing uses.

Fisher Scientific decides to continue selling the kit.

Nanda asserts that by selling its kit, Fisher Scientific is liable for indirect infringement of the '568 patent under 35 U.S.C. § 271(b) or § 271(c). Assess Fisher Scientific's liability under those provisions.